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Helmut Johannes Vollmer, Martin Rothgangel

General
Subject Didactics

Comparative Insights into
Subject Didactics as Academic Disciplines

Allgemeine Fachdidaktik, Vol. 4

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18

FACHDIDAKTISCHE FORSCHUNGEN

Fachdidaktische Forschungen
(Subject-Didactic Research)

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Christoph Brauer, Erin Gerlach, Kerstin Kremer,
Andreas Körber, Friederike Korneck, Martin Rothgangel

Volume 18

"Subject-matter didactics is the science of subject-specific teaching and learning within and outside of school. In its research, it deals with the selection, legitimisation and didactic reconstruction of learning objects, with the definition and justification of teaching objectives, with the methodical structuring of learning processes and with an appropriate consideration of the psychological and social background conditions of teachers as well as learners. It is also dedicated to the development and evaluation of teaching and learning materials" (Conference of the Chairmen of Subject-Didactic Societies / *Konferenz der Vorsitzenden der Fachdidaktischen Fachgesellschaften*, KVFF 1998).

With the founding of the Association for *Fachdidaktik* (Gesellschaft für Fachdidaktik, GFD) in 2001, subject didactics in Germany gained an organized representation and an effective mouthpiece. At the same time, a separate publication series (*Forschungen zur Fachdidaktik*) was established, which was renamed later and is now being continued under the title of *Fachdidaktische Forschungen*. This series publishes monographs and edited volumes that are of general interest to all subject didactics due to their methodological approach or their thematic focus. The aim is to encourage and promote interdisciplinary cooperation between the different subject didactics in the field of research.

Helmut Johannes Vollmer, Martin Rothgangel

General Subject Didactics

Comparative Insights into Subject Didactics as Academic Disciplines
Allgemeine Fachdidaktik, Volume 4

With contributions of Ulf Abraham, Hanan A. Alexander,
Zongyi Deng, Brian Hudson, Ellen Krogh, Ulrich Riegel,
Bernard Schneuwly, and Karin Vogt

Table of Contents

Foreword

Zongyi Deng

I am honoured to be invited to contribute a foreword to this immensely important book by Helmut Johannes Vollmer and Martin Rothgangel. Since 2019 I have had a personal acquaintance with Vollmer, professor emeritus of applied linguistics and didactics of English at the University of Osnabrück, who, according to Wiki, "is primarily known for his contributions to empirical research into foreign language teaching and learning, to the evaluation of subject teaching and student performance, and to the development of bilingual teaching in Germany". However, I came to know him not because of his linguistics and English didactics expertise, but because of his interest in *Bildung*, General Subject Didactics (GSD), and pedagogical content knowledge (PCK). In 2019 he invited me to participate in a symposium titled "Pedagogical Content Knowledge: International Perspectives" at the European Conference on Educational Research (ECER) in Hamburg. Subsequently, I invited him to deliver a talk about General Subject Didactics at the National Institute of Education in Singapore where I was a faculty member then. After I moved to London in December 2019, I invited him to contribute a paper to the *Journal of Curriculum Studies* (*JCS*) as part of the special issue titled "Towards Powerful Educational Knowledge: Perspectives from Educational Foundations, Curriculum Theory and *Didaktik*" (Vol. 53, No 2).

The book is more in line with this interest in general didactics, *Bildung* and PCK. Over the last decade there have been several edited books (e.g., Hudson & Meyer, 2011; Lee & Kennedy, 2017; Krogh, Qvortrup & Graf, 2021) which attempt to continue and extend the *Didaktik* and/or curriculum dialogue initiated by Bjørg Gundem, Stefan Hopmann, and Ian Westbury in the 1990s. Hudson and Meyer (2011) provide a survey of various traditions or schools of didactics across Europe and seek to find common ground among various traditions. Krogh, Qvortrup and Graf's volume (2021) aims to continue and update the dialogue in view of the challenges posed by international policy and practice borrowing, the changing educational and scholarly landscape, and international and comparative research. Lee and Kennedy's (2017) anthology explores ways in which curriculum, teaching, and learning are theorised across countries in Northern Asia and Northern Europe, with a focus on the Chinese curriculum and European didactics traditions.

Four distinctive features – focus, methodology, intention, and knowledge transfer – set this book apart from the set of books mentioned above. First, the focus is on the construction of General Subject Didactics as a summation or a meta-theory of subject didactics. Second, the construction entails empirical analyses of 17 subject

didactics – rather than mere deductive thinking and theoretical speculation as commonly seen in the field of general didactics. General Subject Didactics is general in its approach because it seeks to synthesize various subject-specific didactics through an overarching theoretical framework. It aims to generalise findings from individual subject didactics by employing both top-down (theoretical reflection) and bottom-up (empirical investigation) approaches, leading to a deeper comprehension of subject-specific teaching and learning methods.

Third, this book intends to respond to the crisis in general didactics in Germany. As a science of teaching and learning in general, general didactics has been attacked for its lack of an empirical basis, its lack of a response to the "learnification" of educational discourse[1] and its failure to take account of the significant and enormous progress achieved in subject didactics research over the last decade or more. General Subject Didactics, by way of a synthesis of the empirical findings of 17 subject didactics, "addresses global trends of learnification and contributes conceptual and practical tools for the advancement of disciplinary teaching and teacher education, as well as comprehensive scholarly development within the field" (Krogh, Qvortrup & Graf, 2021, p. 8).

Fourth, the book attempts to foster knowledge transfer and dialogue in the international arena. It seeks to "explain and transfer the idea of GSD into the Anglophone world and the broader international communities" by inviting several non-German educational theorists (from Denmark, England, France, and Switzerland) to comment on "some of the major results of the study and relate them to their own setting or socio-cultural context" (Ch. 17, p. 281). They were provided with a set of questions that offer guidance for comparative analysis between the German educational context and their own settings, encouraging them to explore similarities and differences across various aspects of subject-specific education. As such respondents are prompted to reflect on historical conditions, formative periods, sources defining subject content, research methodologies, interdisciplinary links, and dialogue partners in subject didactics (see Chapters 18, 19, 20, & 21 for details).

Given the impressive and complex findings of the book and the relative unfamiliarity of both General Subject Didactics and subject didactics to English readers, in what follows I first lay out the six key areas of findings – based on the individual Chapters 9–14 in Part C of the book and summarised through the so-called "Résumés of Findings" in Part D (Chapter 17) – and next discuss the international significance of three of the areas.

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1 Cf. Krogh, Qvortrup & Graf, 2021. The term "learnification" is meant to refer to a global shift towards talking about learning, rather than education and teaching, with little concerns for purposes, content and relationships in education (Biesta, 2010; see also Deng, 2020).

The main results

At the risk of omission and oversimplification, I present a brief sketch of the six key domains of findings: (1) the origins and development of school subjects; (2) the origins and development of subject didactics; (3) the goals, content, and competences of a school subject; (4) the development of subject didactics research; (5) linking content across school subjects; and (6) linking subject-didactic research across school subjects.

1) As units of institutionalised teaching and learning, school subjects have a long history which can be traced back to the 5th century BC. The development of school subjects is influenced by influential personalities and shaped by subject groups, associations, and educational organisations or institutions. School subjects have evolved and changed during different periods, in response to various social, cultural, and educational needs.

2) By comparison, subject didactics have a far shorter history, with formative periods ranging from the Enlightenment to the 1990s. The development and institutionalisation of subject didactics are shaped by social and historical milieus, influenced by important personalities, and marked by key events such as establishment of the first professorships, the founding of subject didactics associations, etc. Characterized by diverse didactic approaches, subject didactics draws input from both educational sciences and scientific disciplines.

3) Subject didactics provides a distinctive way of thinking and theorising about the goals and contents of school subjects in relation to competences. Construed as having both a personal and a functional dimension, *Bildung* is held as providing the "superordinate goal structure under which all different sub-goals can be subsumed" (Ch. 17, p. 286). Subject-based *Bildung* is found to be "more fundamental and comprehensive than the concept of competence" (ibid. p. 287). All subject subjects "contribute to *Bildung as one of their ultimate goals*" by way of contents which can be derived from four different sources: academic disciplines, social praxis, "subject-related life-world and cultural contexts", and "subject-related anthropological aspects" (Ch. 18, p. 289).

4) While subject-didactics research has become increasingly empirical and scientific, it is complemented by theoretical research and embraces diverse methodologies – historical, empirical, theoretical, comparative, practice-oriented. Subject didactics draws on theoretical and methodological input from subject academic disciplines, educational sciences, and empirical educational research, among others. Research is shaped by various political and institutional factors such as "third-party funding, subject-didactic associations, and finally the internationalization" (Ch. 17, p. 291).

5) General Subject Didactics is concerned with "the necessity and possibilities of establishing interdisciplinary links between subjects" across three contexts,

"life-world", "educational-political", and "subject-to-subject" (Ch. 17, p. 295). It "could stimulate and guide" (ibid.) empirical studies that explore the potentials of cross-curricular approaches which link topics across school subjects, with a call for more dialogues among the different subject didactics and with educational sciences.

6) General Subject Didactics fosters networking in subject teaching and subject-didactic research, emphasising cross-curricular cooperation. It identifies "constitutive" and "contingent" interdisciplinary dialogue partners, showcasing varying engagement levels (ibid., p. 296). This analysis underscores the need for an extended meta-theory accommodating diverse research practices and the evolving influence of external factors on subject-didactic research.

International significance

With a focus on the first three domains of findings, I now discuss three contributions of the book: (1) a better understanding of the nature of a school subject, (2) a distinctive way of thinking and theorising about the aims and content of a school subject, and (3) a new way of thinking and theorising about teachers' professional understanding of content.

In the Anglo-American world, the development of school subjects has long been an import topic of research and inquiry in history and sociology of education and curriculum studies. From a sociological and critical standpoint, scholars have shown that how knowledge is selected, sequenced, and organised into school subjects is inextricably *intertwined with questions* of social class, race, gender, power, and politics (Apple, 1979; Bernstein, 1971; Young, 1971). From a socio-historical perspective, scholars have demonstrated that school subjects have roots in power and interest struggles between and among those associated with various academic disciplines and those outside the university (Goodson, 1985, 1996; Goodson, Anstead, & Mangan, 1998). Likewise, Popkewitz (1987) has shown that a school subject is the result of a struggle between the interests of different social groups in a world full of conflicting interests and contradictions. These perspectives together represent the dominant approach to research on the development of school subjects in Anglo-American literature, in which school subjects are taken as social and political constructions which are to be studied, with perspectives which are 'external' to education itself. Such an approach does not show a pedagogical or didactical interest or an *educational* orientation toward understanding school subjects.

By contrast, this book examines the development of school subjects through an 'internalist' perspective – a perspective of those who are involved in teaching and doing research in subject didactics, with a pedagogical interest and an educational commitment. It yields important insights on the formation of school subjects that have been ignored by much of the Anglo-American educational research commu-

nity. Rather than merely a social and political construction, a school subject is a purposeful (educational) construction, with its own purposes or functions and its own principles of content selection and organisation. School subjects, as Vollmer argues elsewhere, "are cultural products that organize school knowledge in a specific way in function of aims and values" (Vollmer & Klette, 2023, p. 21). On this account, school subjects are not just something out there to be investigated, analysed and critiqued from 'externalist' perspectives – sociological, historical, critical, postmodern or post-structural. There are distinctive educational and didactical issues inherently vital to the construction of a school subject – issues that are worthy of investigation in their own right.

Another significance, closely related to the one above, has to do with a distinctive way of thinking and theorising about the goals and contents of a school subjects as indicated in the third area of findings. This perspective is particularly pertinent for the endeavour of "bringing knowledge back in" to the global discourse on curriculum policy and practice initiated by Michael Young and his colleagues under the banner of social realism (e.g., Young, 2008; Young et al., 2014). The central purpose of school subjects, from the perspective of social realists, is to help students gain access to disciplinary knowledge that they cannot acquire at home (Young, 2009). Through their passing on of disciplinary knowledge to the next generations, school subjects fulfil an important role in "reproducing human societies" and "providing the conditions which enable them to innovate and change" (p. 10). The formation of a school subject entails "re-contextualising" an academic discipline – selecting, sequencing, and pacing academic knowledge in view of the "coherence" of the discipline and constraints created by the developmental stages of students (Young, 2013). Over the last decades, the social realist discourse on purposes and the formation of school subjects has been very influential across the world.

This book invites educationalists to go beyond the social realist discourse. The question of the goals of school subjects "cannot be discussed without reference to" *Bildung* (Ch. 18., p. 8) – the ultimate goal of education. The knowledge purpose of a school subject stressed by social realists, as Vollmer argues elsewhere, needs to be guided and motivated by a concern for "the comprehensive education of the young ones as persons and citizens", that is, for *Bildung* (Schneuwly & Vollmer, 2018, p. 38). *Bildung* can be achieved through the interactions with various branches of human knowledge which are selected and organised into school subjects. Rather than merely a re-contextualisation of an academic discipline, the formation of a school subject must deal with what constitutes the content and how content is selected and organized into a school subject – two questions that constitute the core issue of didactics research and inquiry. "[T]he *definition of subject content based on different sources and the process of selecting and structuring subject content within subject-specific models of competence",* Vollmer and Rothgangel argue, "*is a core issue for subject didactics*" (p. 290, emphasis original). Content can be derived from four different

sources – academic disciplines, social praxis, "subject-related life-world and cultural contexts", and "subject-related anthropological aspects" (p. 289).

The third significance, directly related to the first and the second, concerns a unique way of thinking and theorising about teachers' professional knowledge of content which finds support in this book. The book testifies that school subjects, not academic disciplines, lie at the heart of teachers' specialised content knowledge for teaching. As Vollmer argues in a recent article, teachers "are primarily focused on the knowledge accumulated within their school subjects to which they relate and upon which they act accordingly". And "it is the school subjects that normally provide the frame of reference for professional thinking and acting" (Vollmer & Klette, 2023, p. 24).

This is rather different from the conceptualisation of teachers' specialised subject-matter knowledge developed by Lee Shulman and his colleagues – in terms of *content knowledge*, *pedagogical content knowledge* (*PCK*), and *curricular knowledge* (Shulman, 1986, 1987) – a model that is predicated on the necessity of classroom teachers' understanding and transformation of the content of an academic discipline (see Deng, 2007). The way of thinking and theorising supported in this book is also in contrast with the conception of *subject specialism* as advocated by David Lambert and informed by social realism – a model that promotes an image of a teacher as a curriculum maker who creates 'educational encounters' in classrooms, using powerful disciplinary knowledge as an important tool (Lambert, Solem & Tani, 2015; see also Lambert, 2014a, 2014b). Such a conception calls for curriculum thinking centering on the "what" and "why" questions around teaching, informed by powerful disciplinary knowledge. In mainstream English literature, little or no attention has been paid to the necessity of teachers' understanding of the content of a school subject in the school curriculum.

In this regard, the book is significant because it lends support to the claim that "subject didactics is the actual motor of a specialized teacher's professional development and also its guarantee" (Vollmer, 2021, p. 235). By articulating what General Subject Didactics entails, the book contributes to a re-envisioning of "content learning in school as an institution" and of teacher training, on the way towards a truly powerful, educational professionalization. It as well provides support to the replacement of PCK with subject didactic knowledge (SDK) – as advocated by Vollmer – that "is powerful and reflective towards students' basic educational needs (*Bildung*) and follows these via subject-specific awareness, teaching and reflection" (Vollmer & Klette, 2023, p. 24).

I would like to add that the articulation of teachers' professional content knowledge informed by subject didactics is particularly relevant and urgent in England – where the expertise of teachers is characterised more in terms of pedagogy and technical delivery, where general didactics and subject didactics do not exist at all (Hudson, this volume, Ch. 21). Over the last decade, there has been a repositioning of initial teacher preparation by the government as "a craft best learnt through observation and

imitation of teachers in school settings" (McIntyre et al., 2019, p. 153). Most recently, there has been a market review of Initial Teacher Education (ITE) which led to the mandate that all ITE/ITT providers "must ensure their curricula encompass the full entitlement described in the ITT Core Content Framework" to achieve accreditation (DfE, 2022, p. 5; DfE, 2021) – a framework that centres on "what works" in classrooms, to the neglect of broad educational purposes (Hordern & Brooks, 2023). Changes like these have progressively led to dissolving the role of university-based teacher preparation.

The historic neglect of general didactics and subject didactics, I argue, has rendered the preparation of teachers vulnerable to the assault and takeover by the government and susceptible to the intrusion of "best practice" and "what works". It is time to reclaim the place of teachers' content expertise informed by both general didactics and subject didactics. The book is important in the sense that it argues that both subject didactics and General Subject Didactics are vital for articulating and developing "powerful educational knowledge" for teachers (Vollmer, 2021).

Broadening the horizon?

So much for the significance. I now turn to one important issue which requires attention. It seems that in the book subject teaching and learning is construed largely within a classroom or a school. Teaching, according to the authors (Part B), is the creation of an educative space that provides the student with opportunities to meet the world through carefully chosen content in a way that enables the individual's *Bildung*. Accordingly, subject didactics is regarded as a science of subject teaching and learning that entails a theorisation of the interplay between the teacher, the learner and the knowledge content which contribute to *Bildung*. Surprisingly, there seems to be a lack of attempt to theorise about subject teaching and learning as embedded within a broad socio-cultural and institutional context, in which teachers take the state-mandated curriculum and translate it into teaching and learning activities, while the survey of the 17 subject didactics in Part C indicates that subject didacticians are involved in the development and research of state curriculum standards – in particular, regarding subject-specific competencies.

It is at this juncture that general didactics (*Allgemeine Didaktik*) and general pedagogics (*Allgemeine Pädagogik*) are relevant and helpful. As a theory that serves to regulate the interplay of various levels of state-based curriculum making, *Didaktik* stresses the needs to integrate state curriculum-making, centralized teacher education, and local schooling. And it provides the major tool for "bridging the gap" between centralized curriculum planning and local classroom teaching, and for "creating space for local teaching by providing interpretative tools for dealing with state guidelines" (Hopmann, 2007, p. 113). *Pädagogik* provides a science that "sought to refine understanding of the universal principles governing human growth and the

'art' of applying those principles" (Westbury, 2000). My point is that both subject didactics and General Subject Didactics need to be thought of against a much wider background of ideas and principles derived from *Didaktik* and *Pädagogik* so that research and scholarship has a broader educational and public significance.

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Part A
Developing General Subject Didactics

1. General Subject Didactics in the Making

Helmut Johannes Vollmer and Martin Rothgangel

This book deals with a highly stimulating topic, the development of which has taken place over the last decade or more, in Germany as well as in other parts of the European continent. It deals with the research on subject-matter teaching and learning in school and beyond. This is done under the label of *Subject-Matter Didactics* (SMD) or in short *Subject Didactics* (SD) – instead of using the ambivalent term "education", which can also relate to the *practice* of teaching and learning and not only to *research* about it. Subject-matter didactics are dealt with in theoretical terms (top-down approach) as well as under empirical perspectives (bottom-up approach). It will be demonstrated that we can arrive at a general understanding of subject-matter didactics by formulating theoretical hypotheses on the one hand and by comparing the individual subject-didactic disciplines in detail on the other hand, identifying their commonalities and their differences in a systematic way. The results of both the theoretical work and of this evidence-based comparative analysis will be labelled *General Subject Didactics* (GSD), understood as a theory of subject didactics.

1.1 The development of General Subject Didactics in Germany

One of the basic assumptions underlying our educational philosophy is the fact that almost all learning and teaching in school (as a matter of fact: in life) is topic- or subject-based. At least it normally involves processing and dealing with some subject-matter issues, independent of general or generic goals, elements or aspects in the curriculum or in school learning. To put it another way: general or generic forms and goals of education are often mixed with specific content dimensions; indeed, they can largely be developed and unfolded only through in-depth subject-specific work. This basic insight has been acknowledged world-wide, even in the Anglophone sphere and by general didacticians time and again (cf. recently Reusser & Pauli, 2021; cf. also Shulman, 1986, 1987).[1] However, this educational insight is not always taken into ac-

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[1] Cf. The widespread international use of Lee Shulman's notion of "Pedagogical Content Knowledge" (PCK) implies several meanings included in subject didactics (cf. Kansanen, 2009). Shulman tried to bring content, pedagogical considerations and teaching methods together as a central competence area of teachers. However, this does not seem to capture enough the interactive nature of the planning, teaching, learning and evaluation processes in subject-based educational contexts. Nor does it reflect the theoretical insights and the theory-building about content-based teaching and learning which subject didactics can provide and offer (cf. critically Vollmer & Klette, 2023).

count nor handled accordingly. Therefore, our approach insists on the importance of subject-matter in teaching and learning, on the respective subject-matter orientation in educational research and theory-building and on acknowledging the impressive work done by different subject didactics, allowing for generalizations on a higher level of theoretical description and reflection through systematic comparison.[2] In other words, there is a need for a new scientific theory comprising the different individual disciplines of subject-didactics which is *meta-theoretical* in nature and located on the level of philosophy of education. In the longer run, there will also be a need for the formulation of a new educational vision based on the empirical findings within the subject didactics themselves and thus also evidence-based.[3]

During the last decades, the fields of *subject-matter didactics* were strengthened enormously, in many parts of continental Europe, accompanied by an impressive volume of subject-didactic research. They gained importance through the results and the impact of the PISA studies and the shocks accompanying them. And they received even more international attention and acknowledgement in connection with studies on expert knowledge (expertise) and in cooperation with educational psychology. All of this is reflected in a number of influential publications.[4]

For Germany, this development has been strongly supported through the establishment of a professional umbrella organization, comprising almost all of the individual subject didactics existing in the country – more than 30 separate associations by now. These deal with the scientific study of different content areas in school and beyond, with how they are taught and how they are learned. The umbrella organization by the name of "*Gesellschaft für Fachdidaktik*" (GFD, Association for *Fachdidaktik*) has existed for more than 20 years: it organizes membership meetings twice a year, always with a topical focus and normally with decision-makings concerning educational policy issues which are related to subject didactics and their acknowledgment in academia, in funding agencies, as research providers and equal research partners and last, but not least, as substantial contributors to the education and training of future teachers including the wide networks of in-service training. The Association for *Fachdidaktik* also organizes bi-annual conferences on central subject-didactic issues which concern all of the members alike (e.g. on empirical foundations, on research paradigms or formats, on language in all subject-matter teaching and learning,

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2 This centrality of focus seems to be justified, because other educational perspectives such as self-cultivation and personality development or the acquisition of generalizable capacities (e.g. epistemic qualities) are usually connected with or even grounded in subject-based education. In this respect our content-based approach is in line with newest research results.

3 On the assumption that every teacher, on top of being an educator, is also a specialist in content knowledge and content pedagogy (at least to some extent), a theory of Subject Didactics offers a powerful educational platform for the professionalization of all teachers and helps them to be able to reflect systematically on their central subject-related dimensions in teaching.

4 See, for example, Schneuwly et al., 2013; Rothgangel & Vollmer, 2020; Hordern, Muller & Deng, 2021; Krogh, Qvartrup & Graf, 2021, Vollmer, 2021a, 2021b; Hudson et al., 2022a, 2022b; recently Ligozat, Klette & Almquist, 2023.

on task orientation).[5] At one of those conferences in 2009 a prominent representative of general didactics was invited to hold a key note lecture. Again, the impression arose during this conference that the many current research activities of subject didactics were not perceived or taken properly into account by general didactics. So based on informal discussions which took place alongside the official program, it was decided that a new task group on "General Subject Didactics" should be formed within the Association. Its six members came from five different subject-didactic backgrounds. The initial goal of this work group was to formulate a GFD position paper – perhaps a collective essay. Very soon, however, it became apparent that establishing a General Subject Didactics was not as easy an undertaking as first imagined. As a consequence, there was a long period of discussion and clarification and finally of publishing not an essay, but two substantial volumes within a new book series. These were entitled: *Auf dem Wege zu einer Allgemeinen Fachdidaktik* (Towards a General Subject Didactics; cf. Bayrhuber, Abraham, Frederking, Jank, Rothgangel & Vollmer, 2017) and *Lernen im Fach und über das Fach hinaus* (Learning Within and Beyond a School Subject; cf. Rothgangel, Abraham, Bayrhuber, Frederking, Jank & Vollmer, 2021). Besides theoretical clarifications, many empirical comparisons between different subject didactics were done, and both activities were related to one another again and again in a spiral manner: In Volume 1 of the above-mentioned series we compared the five subject didactics, which were represented in the work group (based on certain impulses for describing subject learning). In Volume 2, as many as 17 subject didactics and their respective self-reports were under scrutiny as to their self-description and self-definition, which were then analyzed in a comparative way. This happened with the help of six central questions or dimensions (see below in Chapter 8), leading to a theory of subject-matter didactics or General Subject Didactics as the major result.

But what exactly is meant by General Subject Didactics? As the networking activities among the different strands of subject didactics grew, the need to discover their commonalities, but also the differences between them more systematically became stronger. Accordingly, the task group tried to identify the common features of all subject didactics as well as to investigate the specific differences among them. As the concept of a "Generalized" or a "General Subject Didactics" developed further, the need to observe and relate the different subject-related disciplinary research activities to one another, to look closely at their research results as much as to find out *how* exactly these results were obtained, increased considerably. So looking for a common

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5   In this context a new publication series was founded, serving all subject didactics alike, entitled "*Fachdidaktische Forschungen*", already consisting of 15 comprehensive volumes till this day. More recently, an international peer-reviewed English-speaking journal was founded, edited by the GFD, which appears under the title "Research in Subject-Matter Teaching and Learning" (RISTAL.org) since 2018. All of these activities led to an intensified exchange and to the unfolding and strengthening of a common understanding among the different subject-didactic disciplines, documented and described in some detail e.g. in Vollmer, 2017; see also Vollmer, 2007, for an earlier stage.

meta-theoretical framework was one of the driving forces over the years. Also the problem of generalizability and specifically the questions "What does 'general' mean in the concept of General Subject Didactics?" and "How does it relate to or differ from the 'general' as defined by General Didactics?" became more prominent over time. These specific issues and the theory underlying them will be dealt with explicitly in Chapter 4.

1.2 Structure of the book

With this specific focus, the book is divided into four parts. In Part A the notions of didactics and subject didactics are introduced and discussed. We will follow especially the development of subject didactics in Germany, defining subject didactics as a theory of subject education, before concentrating fully on the concept of General Subject Didactics in Chapter 4 at the end of this part. General Subject Didactics operates on a meta-level of scientific perception and analyses the research of the individual subject-didactic disciplines. By way of pre-orientation, we can already say that it observes and reflects on *how* the individual subject didactics explore subject-specific teaching and learning, but also on *what* is being researched by them and what their results are. This is done both by top-down reflections and by bottom-up comparisons.

In Part B (Chapters 5–7) we will turn to the description of the progress made in recent years within many of the subject-didactic fields, in theoretical terms, but above all in terms of empirical research. By way of examples, two extensive self-reports will be presented in full length, namely the one by Didactics of English as a Foreign Language and the one by Didactics of Religious Education. These two reports about the state-of-the-art and the research perspectives in their respective fields will demonstrate how the issues and topics of self-description and of self-reflection were handled and how the data was prepared for comparison. This exemplary data base is already rich in information and implication, as will be seen and demonstrated in the texts of these two reports.

In Part C the larger empirical study comparing no less than 17 different subject didactics as academic disciplines in Germany will be described. Also the major results of this comparative analysis will be presented in some detail. These include looking at the history of the specific subject didactics as well as the history of the related school subject, teaching and learning in the subject themselves (e.g. content areas and goals defined) plus subject-didactic research on them, and finally reflecting on the cross-curricular orientation of the school subjects as well as on the interdisciplinary research orientation of the respective subject-didactic discipline. Based on these dimensions and on prior theoretical assumptions the comparative analysis among the 17 subject didactics was administered. The empirical results of this analysis were presented in German within Volume 2 of our above-mentioned publication series (cf.

Rothgangel, 2021). In the present book these comparative findings will now be summarized in English in some detail, leading to the formulation of a theory of subject-matter didactics.[6] In this context, the work of other research groups devoted to the study of "Comparative Didactics", mainly in continental Europe, will be reviewed and discussed in relation to our own approach (see Chapter 15 below).

In Part D finally, the focus is widened towards an international perspective on subject-matter didactics and General Subject Didactics. More concretely, we have presented our empirical findings and the theoretical reflections based thereupon alongside some central questions to a number of international experts in the field of school education, who are from different regions and countries, asking them to respond freely to our findings. These critical responses, namely by four colleagues, will be made available in Part D, each in a separate chapter, without immediate commentaries on our part. These contributions give ample opportunity to reflect on the different types of educational reality and philosophy as well as on the specific discourse within various educational settings. In the end we will have to discuss how to organize further exchange within an international community which is still very fragmented and how possible avenues towards conceptual clarification and progress in the field of subject-specific teaching and learning, of school education in general and of teacher training can be found or secured. This includes necessary reflections on the challenges of language, on the difficulties of translation (here: from German into English), and on the possibilities of transferring scientific knowledge across national and cultural borderlines.

Thus the book is meant to offer and stimulate further academic exchange among educational philosophers and subject didacticians around the globe, supporting a focussed discourse on the theory of content-based teaching and learning and on international knowledge transfer across countries and continents – finding out chances, respecting limits.

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6 We distinguish between subject-matter didactics as a collective term for all the different individual subject-didactic disciplines together and subject didactics (in the singular) when referring to an individual subject-didactic discipline. The term subject didactics in the plural relates to more than one of these diverse individual research and disciplinary fields. As to the formulation of a Theory of Subject-Matter Didactics we partly draw upon earlier versions of the same, as published by ourselves (cf., for example, Rothgangel & Vollmer, 2020).

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2.   Didactics and Subject Didactics

International Dimensions

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For some time now it could be observed that there is a growing awareness and need for subject didactics in school education, conceptually as much as in classroom practice. This perception is expressed in different ways and also under different names, as the following overview will show.

2.1   The spread of didactics and subject didactics

In the last two decades the notions of didactics and subject-matter didactics have spread throughout mainland Europe, partly under a slightly different label. For example, instead of subject-matter or subject didactics some speak of "disciplinary didactics" as opposed to "(general) didactics", especially in the Francophone areas or in Scandinavia (e.g. Dorier, Leutenegger & Schneuwly, 2013; Ligozat, 2023; Krogh, in this volume). And instead of "general didactics" (German: *Allgemeine Didaktik*) this concept is most frequently referred to simply as "didactics" in a comprehensive understanding. Even the German term and notion of *Didaktik* is still in use quite often, mainly in Scandinavian countries (e.g. Willbergh, 2016), but also more recently by international scholars who work in England (e.g. Deng, 2020, 2021). These terms and concepts exist in different parts of the European continent, though in varying degrees, types and quality (cf. Rothgangel & Vollmer 2020; Vollmer, 2021, 2022). This development reflects the growing interest of research in subject-matter teaching and learning, also under theoretical perspectives. As the different subject didactics have received more attention and became more in demand, especially in cooperation with Educational Psychology, they evolved as a network of specialized disciplines, each one of them focusing on their specific issues and research area and thus on their particular topics of specialized subject-based teaching, learning and theory-building.

All of this did not happen at the same rate, to the same extent or with the same intensity everywhere. The knowledge about subject didactics and the various schools of thought are probably unevenly distributed in the international communities. This is also true for the more recent international discourse about *Didaktik* and *Fachdidaktik* of German origin: how this discourse is perceived and processed outside of Germany depends very much on the accessibility of the relevant literature. This is one of the reasons why German scholars in the field increasingly publish in English so as

to grant non-German speaking audiences access to what is going on academically in this respect.[1] In some countries like France, Switzerland or Denmark, for example, it looks as though subject didactics or disciplinary didactics/*didactiques disciplinaires* are well anchored as a scientific concept and as disciplines within teacher education (cf. Schneuwly or Krogh, both in this volume), while in others such as England this is not the case (cf. Hudson, also this volume). And yet, the academic status of subject didactics might not be secure in all places, certainly not in comparison to that of general didactics, with its long history and its embeddedness in the educational sciences. Interestingly enough, one also gathers the impression that the term "didactics", is sometimes used as a cover term: in other words, it might comprise or imply subject-didactic aspects and considerations as well, without being explicitly stated as such. So, one has to be careful and investigate more closely in each case what exactly is meant by "didactics" (or one of the equivalents) and whether issues of subject didactics are subsumed under that notion or not.

This background information has to be kept in mind when looking at the use and the geographical spread of didactics or *Didaktik* – and subject didactics or disciplinary didactics/*didactiques disciplinaires* as it were – across Europe and beyond. Yet it is already remarkable in itself that this concept and the theories which go with it have made their way into so many different educational settings of the world: From there on it is only a small step further to understand the need and the existence of *subject* didactics and to acknowledge its specific and diverse functions.

All of this will be dealt with by way of overview within the next sections. We are fully aware that our knowledge of the didactic landscape concerning the use of these terms might be limited. Nevertheless, these preliminary observations about the variations and the diverse meanings of didactics and subject didactics may serve as a good starting point for further research. We will point to different traditions and cultural spaces when it comes to subject-matter didactics as one of the theoretical cornerstones for understanding subject-matter teaching and learning within the institutionalized forms of schooling and within specific school subjects.

2.2 *Didaktik – Didactique –* Didactics[2]

The different modes or uses of the term *Didaktik*, *Didactique* and "Didactics" in different languages reflect the existence of parallel or similar notions, yet implying

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1 Of particular relevance in this context is the newly established (since 2018) international English-speaking open access journal entitled "Research in Subject-Matter Teaching and Learning" (RISTAL, see ristal.org).

2 Within this section, certain ideas and insights are taken over from earlier publications (cf. Rothgangel & Vollmer, 2020; Vollmer, 2021a).

the possibility of diverging concepts.[3] The specific concepts of *Didaktik* have been established for long, even for centuries, as a matter of fact. This is documented by authors such as Hopmann (2007) in his short overview, for example. In Germany *Didaktik* became part of the educational history and philosophy ever since Comenius (1592–1670), who wrote among others the book "Didactica magna" (1657) and who is sometimes considered the father of *Didaktik* (Meyer, 2016, p. 57). The research approach of a General *Didaktik* and its specific vision of the curriculum and of school education became part of the educational sciences later on, with a fairly unchallenged academic role to play within the German university setting and in teacher education. This role changed gradually over time, and the change has accelerated within the last two or three decades, so that we can perceive a certain crisis today (cf. Terhart, 2009; H. Meyer, 2021; Meyer, Ren & Junghans, 2022). The reasons for this are manifold, e.g. lack of empirical research and thus of evidence-based modelling on the part of general didactics in comparison to educational psychology; resistance or unwillingness to integrate the content dimensions substantially into theory-building and as a result lack of cooperation with subject didactics as well as reluctance to acknowledge their massive research efforts and results.

The three terms above *Didaktik/Didactique/Didactics* will certainly be familiar to a larger international audience, more so than those of "subject didactics" or "disciplinary didactics", which developed as research fields and academic disciplines over time. Parallel to the German tradition and independent of it, the notion of "*Le Didactique*" (as an anthropologic category) and "*les didactiques des disciplines*" (as culturally specific research in subject didactics) were developed in France, though much later. They were originally based on the work of Brousseau (2002) and that of Yves Chevallard (2007, 2010) in mathematics didactics (cf. the thematic issue of the journal "Éducation et Didactique", Volume 8(1), 2014; more recently Ligozat, 2023). These concepts are spreading all over the Francophone world and even beyond (e.g. into Italy, Spain or Portugal or into South America), into what has been laballed the "Latin" cultures in the wider sense (cf. Schneuwly, this volume). The French-speaking discourses meanwhile form a didactic tradition of their own and are well documented (see Dorier et al., 2013; Special Issue of *Éducation & Didactique*, 2014; Ligozat, 2023 or Schneuwly, this volume). General didactics in the German sense is not developed within the French-speaking context.

Over time, the term *Didaktik* or equivalents thereof have also spread over Northern Europe, through large parts of Scandinavia. The particular spelling of "*Didaktik*"

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3 According to Hopmann (2007), however, this is not the case: there seems to be a common core among different modes or varieties of *Didaktik* (as opposed to the Anglo-American concept of 'curriculum and instruction' and also to the French notion of *transposition didactique*). This common core which has been characterized as "restrained teaching", (Hopmann, 2007, p. 109), is based on "a) a commitment to *Bildung*, b) the educative difference of matter and meaning, and c) the autonomy of teaching and learning" (ibid.). Such a far-reaching claim has to be carefully tested empirically in the future.

shows the great influence of the German educational philosophy and particularly the work of the educational scientist Wolfgang Klafki, to this very day (Kasanen, 2009; Willbergh, 2016; Uljens & Ylimaki, 2017). Similar to the French didactic culture, the Scandinavians prefer to talk about "disciplinary didactics" as well. As Krogh (this volume) argues, they are particularly influenced by the German notion of *Fachdidaktik* and by the fact that "fag" in Danish, for example, not only relates to the content of a school subject, but also to an academic field of study and even to any substantial content outside the educational field (be it primary, secondary or higher education). Others in Scandinavian countries are orienting themselves towards the German tradition of didactics, using the German expression *Didaktik* deliberately, while still others have switched over to the anglicized form of "didactics" and more recently to "subject didactics", without much of a problem, apparently. Pragmatically speaking, there seems to be a tendency or readiness to agree on using *one* specific linguistic variety all over Europe, namely the anglicized form of *didactics* and *subject didactics* respectively when referring to this broad field of research.

To finish this preliminary overview of terms and concepts in use, we will take a quick look at the United Kingdom or rather England. Here we can find no immediate traces of didactics or subject didactics as research disciplines; they are almost completely absent. Within this cultural context, the adjective "didactic" and the adverb "didactically" have a very limited and somewhat pejorative meaning, even with widespread negative connotations: it is reduced to *methods* of teaching only and implies a very one-sided, instructive, lecturing or even moralizing type of dealing with content, of being too eager to teach people things, of treating the audience like children at school or giving instructions from above (cf. The Oxford English Dictionary or the Cambridge English Dictionary; cf. also Hamilton, 1999). It remains to be seen to what extent this limited meaning with its negative connotations, originally associated with the word "didactics" in the Anglo-American mind, will fade away in the near future.[4]

After all, the concept of subject-specific education already appears at times within the respective academic community of England, mainly due to continental European influence and in defiance of a policy context, which ranges between ignorant to barely enlightened. In other words, we can observe budding developments in educational research, mainly in connection with the University College London, Institute of Education, where some of the colleagues are opening up towards continental European thinking and are reconsidering their position towards didactics and subject didactics (e.g. Lambert, 2014, 2016, 2018; London Review of Education, 2018; cf. also Hudson, 2018). In particular, we have seen a new research group emerge to study subject

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4 Hamilton (1999, p. 135) discusses the widespread negative connotations associated with the word "didactics" at that time "in the Anglo-American mind". He quotes from the definition in the Oxford English Dictionary which refers to formalist educational practices that combine "dogma" with "dullness" and "conjures up ghosts of an unattractive educational past" (ibid).

specialism in education and stretching out for new co-operations with projects outside the Institute and outside the country, e.g. with the ROSE group ("Research on Subject-Specific Education") and the KOSS network (Knowledge and Quality across School Subjects and Teacher Education), based at Karlstad University in Sweden; cf. Hudson et al., 2021a, 2021b). These are explicitly devoted to comparative research in subject didactics.[5]

As to the rest of the Anglophone world, they are following a different philosophy, namely that of curriculum theory and of curriculum studies as a mainstream, irrespective of some weakness and limitations formulated lately (Alexander, 2004; cf. Deng, 2018).[6] Within that educational setting, the term "education" plays a dominant role. It is widely used and relates as much to the practice of teaching and learning in the classroom as to the theory of teaching and learning in school and beyond. In other words, it is ambivalent to some extent, designating both the concrete practice as well as a research-oriented study of this practice. From a continental European point of view, we clearly prefer to distinguish between education (as practice) on the one hand and educational research on the other hand. Accordingly, the terms didactics and subject didactics are understood as relating to research and theory-building about teaching and learning, but not to classroom experience and practice itself (see the examples below).

Some experts claim that the term "pedagogy" in the English language and the Anglo-American usage of it has somehow come close to or even mirrored the mainland European usage of "didactics" at a certain time (Hamilton, 1999). In that case it would itself be or at least contain within itself a *science* of teaching and learning as a distinct academic discipline. Yet unlike in continental Europe, pedagogy has not a common ground developed along these lines.[7] It has been shown by others that meanwhile

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5   Comparative research in subject didactics seems to be different from *comparative studies in Didactics*, according to the judgement of Ligozat et al. (2023, p. 5). Ligozat (2023) elaborates specifically on the development of comparative didactics in French-speaking educational research and argues that this is "an epistemological act seeking to overcome the fragmentation of subject didactics and to provide a common ground of conceptual tools for investigating curriculum – both knowledge content selection and transformation processes and pedagogical practices – from a bottom-up perspective, i.e. starting from classroom studies" (ibid., p. 35). We will come back to different types and goals of comparison, depending on the focus and the level of scientific analysis, and relate them to our own comparative procedures involved in constructing General Subject Didactics.

6   One of the criticisms (cited by Hudson, this volume) was formulated by Hamilton (1999, p. 136): Curriculum was seen to have lost touch with the deeper questions that "for centuries have animated pedagogy and didactics" becoming reduced to questions about instructional content and classroom delivery. Furthermore, Hamilton argues that the sense of a curriculum as being related to human formation had become marginalised by the short-term question "What should they know" rather than "What should they become?"

7   The approach of Shulman (1986, 1987) under the name of "Pedagogical Content Knowledge" carries many aspects of what we understand by the concept of subject didactics, with distinct differences, however (cf. Vollmer & Klette, 2023). Some even equate PCK with subject didactics (e.g. Uljens & Kullenberg, 2021, p. 188) which is not tenable.

the term pedagogy has a reduced meaning again and is commonly equated, at least in England, with the practice of teaching only (in a restricted sense) and not with a comprehensive theory of teaching and learning (Alexander, 2004, p. 9). But nevertheless at least it has developed into a recognized research sub-area of Education, no less, no more, as classified by the UK Economic and Social Research Council. Interestingly enough, the concept of pedagogy is in common circulation, in the UK as much as in the United States. This is also true for Israel, even more so with its strong American ties and orientation – but there are remarkable conceptual differences between the notions of pedagogy and didactics.[8]

In sum, didactics does not exist as an academic discipline in England nor is it recognized as a research area within the field of Education. But the term has entered the discourse of the academic community, as indicated. Contrary to the situation in England or the United States, in mainland Europe there are many different subject didactics established as academic disciplines on the university level. In Germany, for example, we find more than 30 different subject didactics nowadays such as "Biology didactics", "History didactics" or "Mathematics didactics" (in German: *Mathematikdidaktik*). Due to the negative connotation of "didactics" in English and the absence of an established discipline by that name, terms like that of "Mathematikdidaktik" in German are often not translated into English as "mathematics didactics", but rather as "mathematics education". As already indicated above, this is potentially misleading since it can be confused with just the *practice* of mathematical teaching and learning in the classroom. Consequently, the intended theoretical dimension of the concept has to be expressed explicitly, and by many scholars this is done through adding the word "research", as in "mathematics education research" accordingly. But such conceptual precision does not happen often on the linguistic level. In the European context, therefore, we would rather refer to the scientific study of a content area such as mathematics (related to a corresponding school subject) as "didactics" – but not to didactics in general (as a general approach), but to "subject-specific didactics", in this case concretely to "mathematics didactics".

In other words, outside of the Anglophone world the notion of didactics is in the process of replacing that of education or has already largely done so, because this has obvious advantages in terms of precision and theory-building. But is that also true for subject didactics, replacing subject-matter education? First of all, within

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8 In contrast to didactics and its negative connotations Hamilton draws attention to the way in which the term "pedagogy" re-entered the Anglo-American educational lexicon after 1970, after having lain dormant since the First World War. He argues that fresh meanings arose in this revival that, "paradoxically, have hindered transatlantic dialogue" (ibid). The reason given for this is that the Anglo-American usage of the term "pedagogy" has mirrored the mainland European usage of "didactics" and that "only their language divides them" (ibid). His article coincides with a change in the name of the journal from "Curriculum Studies" to "Pedagogy, Culture and Society" arguing that Anglo-American conceptions had become limiting (cf. also Hudson, this volume, p. 10 to whom we owe this information).

the Anglo-Saxon world and particularly in England the focus for school education is increasingly returning to *generic* goals as opposed to subject-based ones (based on a problematic dichotomy: child-centred vs. knowledge-centred). The exception is the Curriculum Subject Specialism Research Group (CSSRG)[9] at the Institute of Education in London which was already introduced above. Secondly, the notion of didactics (often as a cover term) has definitely shifted towards that of subject-specific didactics and its explicit naming is indeed slowly spreading in the research landscape, as well as in the professional discourse in England (cf. Hordern, Muller & Deng, 2021). But this is above all true for mainland Europe. For the sake of a better understanding and "the construction of a consistent international discourse about the research traditions in Didactics" (Ligozat et al., 2023, p. 3, FN1), a common language use is developing pragmatically all over the continent. It is now being widely accepted and named accordingly when referring to the concepts of specialized content teaching and learning on all levels and in all types of school: the simple term 'subject didactics'. A proof of this is the recent publication by Ligozat et al. (2023, Introduction) where this is suggested as a terminological compromise among the European researchers in the field.

2.3 Perspectives

By way of summary, we can confirm that there are several conceptual frameworks operating in didactics on the European level (cf. Ligozat & Almquist, 2018 who analysed the "trends, evolutions and comparative challenges" inherent in this development). Certainly, didactics and subject didactics are widely in use as terms and concepts and identified as necessary research fields, though named and structured differently in different parts of the world. They are more widely spread than first expected, yet their meanings and research objects are not always the same nor clearly defined. In spite of this relative fragmentation, some (already) dare to speak of "Didactics in Europe" and even of "European didactics" (e.g. Ligozat, Klette & Almquist, 2023). One of the problems is that the (definite) shift towards studying specific issues and dimensions of *subject-based teaching and learning,* in all content areas of the curriculum, is not always acknowledged yet and appreciated. Subject-specific research issues are still sometimes dealt with under more general aspects and *not* explicitly under those of subject didactics. Nevertheless, in many cases we can assume that subject-specific issues and theories are included theoretically and covered by a more general approach – provided that this didactics operates with awareness and consciousness

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9   https://www.ucl.ac.uk/ioe/departments-and-centres/departments/curriculum-pedagogy-and-assessment/curriculum-subject-specialism-research-group

as to the many unique features and research issues as well as the specific results of the many subject didactic disciplines existing.[10]

Within the context of this overview, we cannot present the more detailed observations about the different didactic cultures, their underlying didactic thinking and their recent developments. This will be followed in a special publication, namely a separate article on "The Spread of Didactics and Subject Didactics in Europe and Beyond" (Vollmer, in progress). Suffice it to say that it seems to be important to perceive what is happening beyond one's own immediate field of scientific activity, to widen one's mental scope and to obtain a deeper understanding of the thoughts, findings and arguments of other scholars or groups of scholars within the same research field. It remains a task for the future to find out more precisely what kind of empirical basis exists for the different approaches and initiatives, in the different geographical areas or the national or regional contexts for defining subject-matter didactics. It is equally important to find out what kind of theoretical frameworks have been developed and are applied in researching subject-specific learning and teaching in school and to relate them to one's own.

In the following Chapter 3 we will turn our focus back to Germany once more in order to enlarge our understanding of Subject Didactics in theoretical terms and to check how it fits into the academic landscape. In doing so, we will characterize the existing subject didactics as independent academic disciplines of their own, situated between different reference systems. This will be the starting point for our discussions, leading to new insights about the nature and the status of the research field as a whole. In Chapter 4 we will then provide more information and insight into General Subject Didactics, its construction and its status as a theory of subject-matter didactics.

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10 The best-known approach internationally is probably the one developed by Wolfgang Klafki in Germany, which goes under the label of "*Bildung*-centred Didactics" among English-speaking experts (cf. Klafki, e.g. 1985, 2007, partly translated into English, Klafki 1995, 1998, 2000; cf. also Deng, 2018).

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3. Subject Didactics as a Theory of Subject-Matter Education [1]

Ulf Abraham and Martin Rothgangel

This chapter looks at the scientific status of subject-matter didactics in more detail and also at its position in relation to other academic disciplines. This will be done first in a traditional way, especially by situating subject didactics between the classical academic subject-matter sciences (such as mathematics, linguistics, geography, physics etc.) on the one hand and the educational science/s (including educational psychology or educational sociology etc.) on the other hand. This view will be reconstructed here as a theoretical starting point, before it is then critically re-assessed from the point of view of General Subject Didactics and what we know about it today.

3.1 Preliminary remarks

The following presents a model of how subject-matter didactics has traditionally been conceptualized and positioned within German speaking academia. This will be supplemented later by fundamental theoretical reflections and considerations and illustrated in Part B and C of this book. The visualized concept provided further down (see Figure 1) already illustrates important elements of what was further developed later in theoretical or empirical terms (cf. Bayrhuber et al., 2017; Rothgangel et al., 2021). Nevertheless, the model presented here is a good starting point for further elaboration and precision.

3.2 The two traditional tasks of subject didactics

In the period between the growth of subject-matter didactics as an academic discipline at universities in the 1970s to the enormous increase of empirical work that took place from the mid-1990s onwards, the perception of subject didactics as a discipline was often determined by the following ideas and premises: On the one hand, every academic discipline develops and applies its respective research methods so as to investigate their object of study, the facts, observable phenomena, theoretical assumptions, cultural practices etc. that pertain to its field – and in doing so, it generates

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1   This chapter is based on the one by Ulf Abraham and Martin Rothgangel (2017), with recent additions by Johannes Vollmer.

concepts, discovers relationships and produces a descriptive technical terminology, explanatory models and theories. According to this model, the *first task* attributed to subject didactics is often that of establishing a canon of relevant and accepted knowledge. This entails the selection of exemplary content as teaching objects from a much larger number of possible subject-matter sources and items, which are not all equally relevant to learners, depending on the criteria considered or chosen. Nor are the content items all equally accessible to learners (e.g. in the didactics of literature, this would involve the selection of authors, genres and epochs as well as studying topical influences or theoretical orientations of writers or critics).

The *second traditional task* of subject-matter didactics according to this model is to develop, test and evaluate teaching concepts, taken from various sources, teaching traditions and academic backgrounds. In doing so, these concepts have to be mediated and integrated in such a way so that variables such as age, interest, goals and learning level are taken into account. This could be accomplished by transposing the subject-matter in its complexity as it is generated and offered by the academic sciences in question – and restructuring it "didactically". Accordingly, subject didactics can be understood as a reconstruction or modelling science. However, this model does not yet encompass subject didactics as a research discipline of the actual subject-matter teaching and learning itself (see Bayrhuber, 2017).

3.3 The traditional model of subject didactics between two reference systems

The development of General Subject Didactics must begin with a reconstruction of the self-conceptualization of the different subject-related disciplines which have served as the basis for the (self-)attribution of the above mentioned two tasks for long. From the point of view of scientific theory, each discipline is characterized by a particular subject area that is studied, reconstructed or modelled, and by certain methodologies (research methods) that are employed to accomplish this. After what has just been outlined above, the subject fields of subject didactic research, whether in terms of reconstructing or modelling, encompass the academic disciplines as well as the educational sciences.

This may be exemplified by religious didactics: Its subject area can be defined as a theory of religious education (*religiöse Bildung*; Rothgangel, 2014, pp. 26–42). The adjective "religious" expresses its reference to the relevant content areas in terms of academic disciplines (theology, religious studies)[2]; the term "education" (German: *Bildung*) refers to the development of the individual, which is the focus of the edu-

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2 For a more precise definition of the term "academic discipline" or "subject-matter science" (German: *Fachwissenschaft*) see Bayrhuber, 2017.

cational sciences handling theories of education. The subject-matter area mentioned (religious education) acquires quite a different meaning if it is defined as a theory of "ecclesiastical" education or as a theory of "Christian" education (Hemel, 1984; Rothgangel, 2014). The same is true if the subject area is not characterized by the nominal term "education" (*Bildung*), but rather by the terms "learning" or "schooling" (*Erziehung*). Although the present chapter cannot describe the multifaceted discussion surrounding these diverse educational concepts in detail, we can exemplify them through the following working definitions.

The following definition gives us a first idea of current theories of learning: "Learning is understood as enduring changes to behavioral potentials as a result of experience" (Hasselhorn & Gold, 2013, p. 65).[3] Specific theories of learning in turn, differentiate the concept of learning further. Thus, if the concept of learning were the subject area of religious didactics, this discipline would inevitably refer to the educational sciences that are devoted to research on learning. Unlike the concepts of education (*Bildung*) or schooling (*Erziehung*), the definition of learning eschews normative implications. However, this should not obscure the fact that the use of the concept of learning as a guiding concept for a subject area itself pertains to an educational concept. This could be demonstrated by the German didactic concept of "literary learning." When it comes to the concept of schooling (*Erziehung*), instead, the person doing the schooling and his or her intentional actions are focused upon. This is expressed in the following definition:

> "Schooling (*Erziehung*) refers to actions by which people try to permanently improve the structure of other people's psychological dispositions in any way, or to preserve these dispositions' valued components or to prevent the emergence of dispositions that carry negative valuations" (Brezinka, 1978, p. 45).

In contrast, the concept of education (*Bildung*) expresses a pedagogical view centered on the person who is being educated. In this sense, Dietrich Korsch, for example, defines education as "the process-oriented mediation of the self and the world for the purpose of a self-confident, socially responsible and successful shaping of the world" (Korsch, 1997, p. 135).

There is, however, a commonality underlying all of these definitions of the subject area of religious didactics: On the one hand, the adjectives "religious," "Christian," or "ecclesiastical" refer to a specific subject area, namely religiosity and religion, by which the relevant academic disciplines such as theology and religious studies come into view. On the other hand, terms such as education, schooling, or teaching and learning refer to the educational sciences and not to the subject-matter area.

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3   This book also provides a good overview of learning theories under the following headings: "Learning as the build-up of association," "Learning as behavioral change," "Learning as knowledge acquisition," and "Learning as the construction of knowledge" (Hasselhorn & Gold, 2013, pp. 33–67).

Using these basic considerations, we can now infer systematically an understanding of subject didactics from the perspective of their traditional self-conceptualization as an academic discipline:

3.4   Critical commentary on the model presented

We would like to comment on this schematic overview for explanatory purposes, without any pretense that this model and its various aspects represent the current scientific theory of subject-matter didactics. Nevertheless, modelling subject didactics in this traditional way, as a concept "in between" or even partly "participating" in other disciplines can provide us with some insights and lead to further ones.

Let us assume that the subject area of subject didactics encompasses *subject-specific processes of education, of schooling, teaching and learning*. Various *methods* exist to research this subject area. Using the example of religious pedagogy, we were able to demonstrate that subject-matter didactics "mediates" between its respective academic discipline(s) on the one hand and the educational sciences on the other hand. Both together represent its *reference sciences*. Without being able to elaborate this in more detail here, we can understand this mediation process in different ways, for example, we can draw a rough distinction between a technical and a communicative concept of mediation. A technical concept assumes that the findings of the academic disciplines are communicated directly to pupils – i.e. they are "transmitted" by means of certain methodological techniques. However, the majority of subject didacticians tend to distance themselves from this problematic technical concept of mediation, because it implies the understanding that subject didactics is an *applied* science which neglects concepts such as education and schooling. In addition, this approach fails to consider sufficiently the subjective theories that students hold implicitly, which are present particularly in subject-matter teaching and learning and in the respective research.

The main reason for the frequent reduction of didactics to methodology (as is common in English-speaking contexts) probably lies exactly in this "technical" interpretation of mediation. However, as indicated above, mediation in the self-conceptualization of subject didactics can also be understood as a "communicative" process: Thus, if there is a conflict between two parties, one can try to mediate between them, for example. In this case, subject didactics mediates between the learners' needs on the one hand and the demands or requirements of a particular academic discipline on the other hand. Subject didactics based on this model adopts a bridging position between the educational sciences and academic disciplines. It seeks to strike a balance between the perspectives of the student and that of the subject-matter area.

Indeed, in pursuing this communicative concept of mediation, some subject-didactic scholars consider themselves as interdisciplinary or transdisciplinary mediators. This is to say that they mediate between the respective requirements of their

"Educational Sciences"	Subject didactics	"Academic disciplines"

Subject didactics as (inter/trans-disciplinary?)

- "Mediation science"
- Interaction science
- Integration science

- (Re)construction science

Reference sciences:	*Which didactics?*		*Which academic discipline?* ("School")?	Reference sciences:
- Pedagogy - Psychology - Cognitive sciences - Philosophy - Sociology - Theology	- Education-theoretical - Learning-theoretical - Social-constructivist		- … - … - …	- … - … - … - …

Basic concepts and theories:
- "Education"
- "Schooling"
- "Learning/Teaching"
- "Didactic principles"
- "Competences"
- "Instruction methods"/
- "Practices"

Basic concepts and theories of subject didactics

Research methods
- Empirical
- Historic hermeneutical
- Basic theory
- (Evidence-based?)

Basic concepts and theories:
"Knowledge"
"Objects"
"Domains"
"Discourses"
Subject-specific "competences"
"Topics"
"Subject-communication"

Institutional anchoring of subject
- University or school of education
- Educational sciences or academic discipline faculty, etc.

Research fields:
- primary/secondary school
- extracurricular areas
- university

Applications/outcomes:
- Reflection on and optimization of subject learning-/teaching- as well as schooling-/educational-processes and -results
- Mediation between the academic disciplines and the public

Systematic self-reflection:
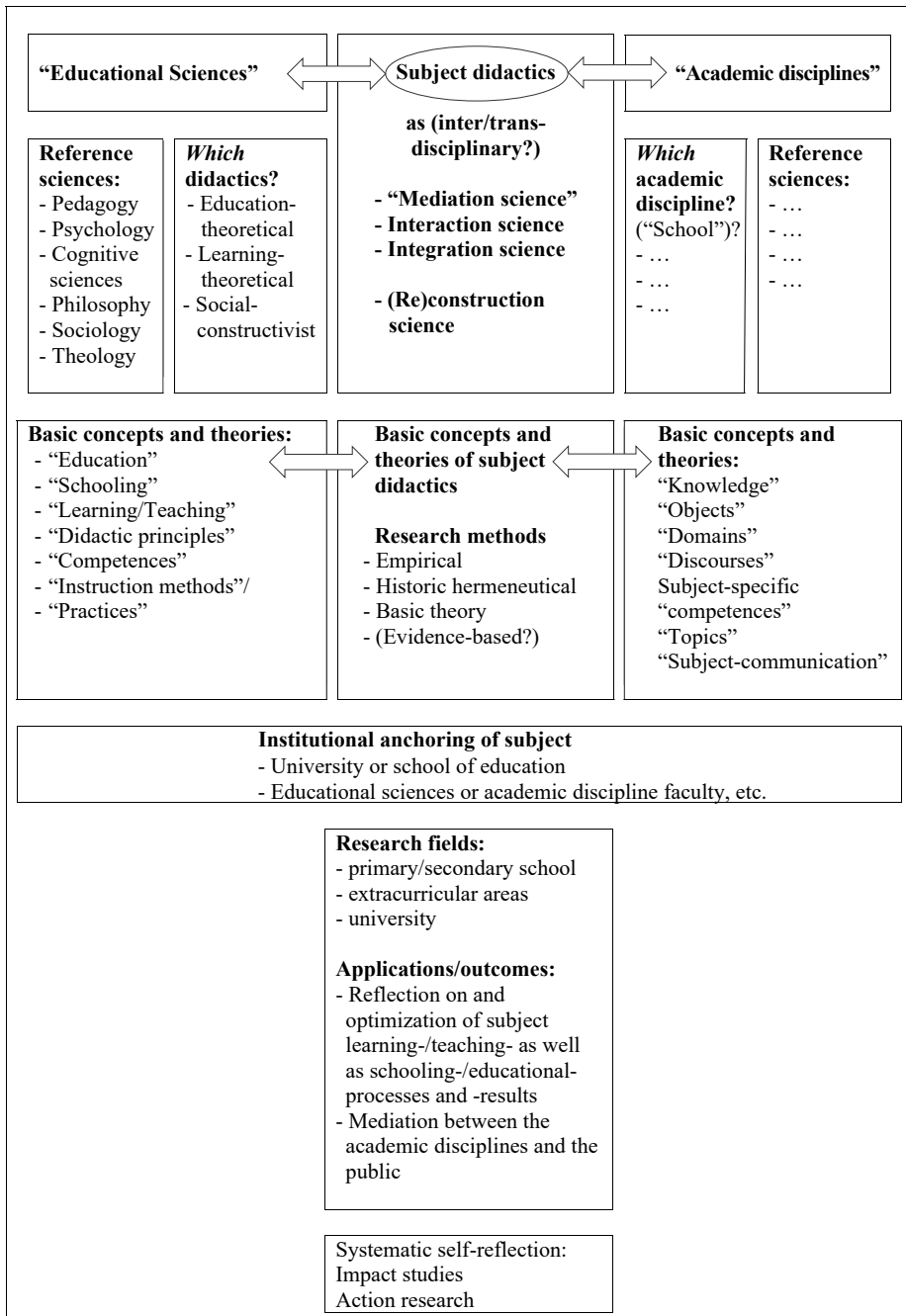Impact studies
Action research

Figure 1: The traditional positioning of subject didactics

subject area related academic discipline(s) – or, more generally speaking, between the given *academic disciplines* and *the educational sciences*.[4] Alternatively, subject didactics can be seen or termed as an *integration science* or as a *(re-)construction science*.

3.5   Problematizing the traditional position of subject didactics

So far, we have spoken of *academic disciplines* and *educational sciences* in a general manner. Returning to the example of religious pedagogy, we can demonstrate, however, that further distinctions need to be made here. When it comes to academic disciplines, religious pedagogy refers to theology and religious studies. But deciding to orient oneself primarily towards theology merely necessitates further scientific differentiation. The question that immediately follows is this one: towards which sub-disciplines should the scholar orient her- or himself now *within* theology (e.g. systematic theology or biblical studies?). The same applies to other individual subject didactics. Thus the didactics of German, for instance, refers to the academic disciplines of German and of general literary studies, of linguistics, of media studies, etc. Beyond the mere focus on the academic disciplines, another vital question is how didactics can come to reference certain *practices* through these disciplines. This is an issue that is particularly salient for music, for literary, media, and religious education as well as for environmental and health education.

Comparable considerations apply to the relationship between subject didactics and the educational sciences. Here, subject-didactic researchers in the German-speaking context traditionally have to decide which conceptualization of general didactics they adhere to.[5] The general didactic designs of teaching and learning pertain to the context of educational science and are to be supplemented by more recent research, especially by what is obtained in educational psychology. Since the mid-1990s, the close contact between the various subject didactics and educational psychology has given rise to *subject-matter teaching and learning research*.

In addition, when it comes to analyzing social conditions, general didactics also employs sociology as a reference science. In this sense, empirical educational research in the form of international comparative studies (e.g. TIMSS, PISA) highlights specific social conditions that determine the outcomes of subject-matter learning in school. Similarly, the analysis of anthropological conditions brings developmental

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4   This also applies to subject didactics as a (re-)construction or modeling science. Indeed, the various individual subject didactics themselves, as research disciplines of subject-matter teaching and learning, resemble academic disciplines of reconstruction sciences (see Bayrhuber, 2017).

5   In addition to established concepts such as educational theory, learning theory, communicative and critical-constructive didactics, recent developments such as constructivist and evolutionary didactics as well as neuro-didactics are also relevant here (e.g. Terhart, 2009).

psychology into consideration. The respective understanding of education as *Bildung* depends on the underlying concept of human beings and of humanity. And as a result, the reference science of anthropology also becomes relevant, e.g. philosophy as well as theology alongside the various human sciences.

Finally, one only needs to point to the currently popular neurosciences and thus to the long and varied list of sciences that they in turn relate to, in order to demonstrate that such lists require further amendment and differentiation.

Under closer scrutiny, both the reference academic disciplines and the reference educational sciences are characterized by their own basic concepts, structures and theories. The educational sciences include basic concepts such as *education*, *schooling*, *teaching/learning*, *didactic principles*, *competences* or *teaching methods*. Basic concepts on the part of the academic disciplines include *knowledge*, *objects*, *domains*, *discourses*, *subject-specific competences*, *topics* and *subject communication* etc. It is not necessary at this point to explain in more detail that each of these concepts can be further broken down and differentiated.

3.6 Institutional context and scientific status of subject didactics

Our discussion so far has skirted the social and institutional contexts of subject didactics. These, however, have played an important role in certain scientific theoretical approaches since the so-called "historical turn" (Kuhn, 1962). In terms of subject didactics, this means that its respective institutional anchoring is relevant: Is the institutional context a university or a teacher training college? Is the given subject didactics situated within the framework of an educational science faculty or within the faculty of its respective discipline? Or is it perhaps situated among a heterogeneous set of philosophical faculties? Accordingly, subject didactics research must elucidate the political reasons and interests that determine its given institutional situation, analyze the effects that this has on its conceptualization of its subject and evaluate this using the relevant scientific-theoretical concepts. Beyond this, it is important to have an understanding of subject didactics that pertains not exclusively to schools, but to extracurricular fields of action as well, including to the university level.

The final question that arises concerns the *tasks* and *goals* of subject didactics. There are two general aspects to emphasize here: First, subject didactics deals with the reflection and optimization of subject-based teaching/learning, of schooling (*Erziehung)* and of educational processes and outcomes (*Bildungsprozesse und –ergebnisse*). In this context, empirical teaching/learning research has grown in importance over the last twenty to thirty years, driven in particular by collaboration with educational psychology – with the didactics of natural and formal sciences, such as mathematics didactics, frequently playing a pioneering role. Second, in a sense,

subject didactics also concerns the mediation between science and the public, an aspect that is often insufficiently considered as a task in university reforms.

The preceding, largely abstract explanations are oriented towards the development of a practice of systematic, fundamental theory-building. The purpose was to provide a preliminary, systematic guideline for how to think of subject didactics from a scientific perspective. To sum up, subject didactics can be defined as theory of subject-matter education – where one has to keep the possible conceptual alternatives in mind, as mentioned above.

In the further course of this book, we will be coming back to the theoretical issues of defining and characterizing subject didactics. Right now it is time to describe in a preliminary way the nature and functions of General Subject Didactics as a theory of subject didactics.

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4. General Subject Didactics as a Theory of Subject Didactics

Martin Rothgangel and Helmut Johannes Vollmer

After having outlined in the previous sections our understanding of general didactics and of subject didactics as well as their relationship to one another at least to some extent, a short, but basic view on General Subject Didactics as a theory of subject didactics will be presented in this chapter. In particular, it will be demonstrated how General Subject Didactics is in a position to outline and qualify individual subject-didactic fields by observing and comparing them systematically and by theorizing about their commonalities and differences. In doing so, some of the reasons will become clear why such a strong upswing of General Subject Didactics took place in the German-speaking countries within the last five years.

4.1 Development of the theoretical approach

At the beginning, as already mentioned above, General Subject Didactics was a scientific construct of the Association of *Fachdidaktik* (*Gesellschaft für Fachdidaktik*, GFD) and its attempt to strengthen and empower all the subject didactics in Germany and also to unite them under one umbrella organization with a coherent theoretical framework. The starting point for this theoretical drive was the 2009 bi-annual conference of the GFD on "Empirical Foundations in Subject-Matter Didactics." During this conference, the impression and subsequently the insight arose among participants that recent subject didactic research was no longer sufficiently considered and acknowledged in theories of General Didactics, if ever. Therefore, the representatives of more than 20 subject-didactic disciplines within the GFD decided jointly to establish a work group on "General Subject Didactics", the task of which was to form a basic theory about all the different subject didactics.

In the subsequent research work of the group, it became apparent that the term "General Subject Didactics" was by no means new in the educational community, but rather that it had already been introduced within General Didactics some time ago. Thus, occasionally, it had already formed a controversial point of discussion within General Didactics since the 1980s (Rothgangel, 2017a). In this context, Gerd Heursen deserves special mention: he used the term "General Subject Didactics" in such a way that "general" was to be understood as the generalization of subject-didactic findings (Heursen 1994, p. 134). Ultimately, this is a point which is currently not at all or only little observed in the discourse of General Didactics. This is exactly what

led to the founding of the work group under the name of "General Subject Didactics", as described above.

In order to understand the term "general" in General Didactics the work of Wolfgang Klafki as one of the most influential didacticians in Germany until the 2000s, is informative. In his writing he emphasizes the hypothetical character of generalizations: "They must not only be concretized subject-specifically in the field of work or the area of subject didactics; rather, in the course of such attempts at concretization, they are in each case simultaneously examined to see whether their hypothetical, generalized claim to validity is tenable, whether, if necessary, it must be modified, restricted, perhaps even rejected subject- or area-specifically" (Klafki 1994, p. 51). These formulations describe an almost ideal relationship between General Didactics and Subject Didactics, which consists of a mutual complementation and productive correction. Such a relationship has not really been developed or materialized so far, due to a crisis in General Didactics itself (see above, Chapter 2; cf. also Meyer, Prenzel & Hellekamps, 2009; H. Meyer, 2021, for example).

Accordingly, General Subject Didactics follows an abductive logic consisting of the interplay of top-down reflections and bottom-up analyses (Rothgangel & Vollmer, 2017). The theories within General Subject Didactics are to be developed, supplemented, corrected, or even revised in a constant dialogue with the subject didactics themselves – and in the most favorable case, they prove successful and stand the test. In other words, General Subject Didactics takes on a task that was and is inadequately performed by General Didactics: To discover or elicit the 'general' within the subject-specific on the basis of a generalization process is to be understood dialectically. In other words, through comparing the different subject didactics and finding out about their commonalities, their subject-specific peculiarities become apparent at the same time and are likewise to be constitutively taken into account (cf. Rothgangel 2021c, p. 589 f.). The top-down considerations concerning General Subject Didactics have already been addressed, but so far in German only: they can be found in Volume 1 of our publication series *General Subject Didactics*. These theoretical contributions relate to the following issues: 1. General Subject Didactics between subject didactics and General Didactics (Rothgangel, 2017a); 2. General Subject Didactics between academic disciplines and the modeling function(s) of subject didactics (Bayrhuber, 2017); 3. General Subject Didactics as a meta-theory of subject didactics (Frederking, 2017).

So far we have started reflecting on the nature of General Subject Didactics in more theoretical or hypothetical terms, before we could check, confirm or falsify our assumptions later on. The question remains, however, to what extent one can anticipate or pre-define heuristically in a top-down reflective manner aspects, functions, or forms of General Subject Didactics without having ample and appropriate data to prove it. For this reason, empirical access to subject didactics, with the formulations of self-perceptions and self-definitions on the part of the subject didactics itself and with our bottom-up analyses of these data formed an equally essential part in the

establishment of General Subject Didactics. Already in Volume 1 (Rothgangel 2017b), a first comparison was made of the five subject didactics represented by the members of the working group, namely: Biology Didactics (Horst Bayrhuber), German Didactics (Ulf Abraham, Volker Frederking), English Didactics (Helmut Johannes Vollmer), Music Didactics (Werner Jank), and Religion Didactics (Martin Rothgangel). In volume 2 of our publication series (Rothgangel et al., 2021), the bottom-up analysis was the main focus then, and the number of subject didactics involved was expanded to include the following 17 ones: Didactics of Biology, German, English, Music, Religion, Chemistry, Geography, History, Computer Science, Art, Mathematics, Physics, Politics, Nature, Environmental and Social Studies[1], Sports, Technology, and Economics.

Ultimately, with regard to the development of General Subject Didactics, it can be stated that the aforementioned theoretical top-down reflections as well as these bottom-up analyses entered into fruitful dialogue and cooperation and that General Subject Didactics took on shape in this way, in a kind of circular, spiral process, so-to-speak.

For a long time, there was a consensus in the work group on General Subject Didactics being basically a meta-theory of subject didactics. One of the members of the group, Volker Frederking formulated this view in 2017 as follows: "The object area of *Allgemeine Fachdidaktik* results from the comparison of the individual subject didactics and the theories and metatheories developed by them. For this purpose, General Subject Didactics moves on to a meta-level established by it. On this meta-level, it formulates metatheoretical statements about similarities and differences of the theories, metatheories, questions, methods, etc. of the individual subject didactics. The theories of General Subject Didactics that emerge in this way can be understood as metatheoretical determinants of the subject didactic field as a whole." (Frederking 2017, p. 181). At this point, we will ask in more detail what exactly is meant by "metatheory".

4.2   General Subject Didactics as third-order observation

In order to define metatheory one could refer to the theory of "Objective Knowledge" by Karl Popper (1972/1995), as Frederking did. It should be noted, however, that in the publications about General Subject Didactics so far we have not yet ex-

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1   This school subject is called "*Sachunterricht*" in German and is particularly difficult to render in English, since it is a fairly new and highly integrated area of study in primary school, anchored in a holistic view on local conditions and regional experiences which are transformed into a scientific understanding of the world. In addition, it is a very culture-sensitive school subject. Our translation "Didactics of Nature Studies, of Social and Environmental Studies" comes close to its meaning in German.

Luhmann (1992)	*Observers on the first level observe something or someone*	*Observers on the second level observe observers on the first level and their observations*	*Observers on the third level observe observers on the second level and their observations*
Brezinka (1978)	Education (e.g. in school)	Theories of education	Meta-theories of education
Applied to Subject Didactics and General Subject Didactics	Subject-matter teaching and learning (= first order observation: Subject education e.g. in school)	Theories of subject-matter teaching and learning (= second order observation: Subject Didactics)	Meta-theories of subject didactic theories of subject-matter teaching and learning (= third order observation: General Subject Didactics)

Table 1: Subject Didactics and General Subject Didactics in the perspective of Brezinka (1978) and Luhmann (1992)

plicitly followed Popper's underlying methodology so far. But even beyond Popper's reflections on metatheory, the question to what extent General Subject Didactics is a metatheory or a meta-science is by no means trivial or simply solved. In this context, the work of another scholar by the name of Wolfgang Brezinka, this time from the Educational Sciences, also proved to be very helpful. In his "Metatheorie der Erziehung" (*Metatheory of Education*, 1978, p 38), he uses a three-level scheme for describing different activities in education and in educational research which can be related to understanding General Subject Didactics (Rothgangel 2020c). In particular, Brezinka distinguishes between a first level (education as object), a second level (inter alia, theories of education, and a third level (metatheory of education as theory of educational theories). This distinction of Brezinka's can easily be assigned to the three levels of *observation*, as formulated by the sociologist Niklas Luhmann in his Philosophy of Science (Luhmann, 1992, esp. p. 274, pp. 508 f.). Both theoretical approaches, that of Brezinka and that of Luhmann will be presented and related to one another in Table 1 below. In the next step then the insights and structural suggestions formulated by these two theoreticians (of education and of science as such) can be applied to and "translated" for didactics, in our case for subject didactics and General Subject Didactics. Accordingly, based on the models of both Brezinka and Luhmann, General Subject Didactics can be understood as *third-order observation* and thus as metatheory of subject didactics which itself operates on level 2. This interrelationship is illustrated in Table 1 below.

However, there are good reasons for General Subject Didactics not to be qualified "exclusively" as a *metatheory*, but also to be understood, at least in part, as an *object theory* at the same time. As such it identifies common and central topics or issues of

all subject didactics together on the second level, by looking and generalizing from above. This will be elaborated upon in the next section.

4.3 Generalization as a function of General Subject Didactics

One argument that General Subject Didactics should be understood not only as a metatheory, but also as an object theory, is based on the fact that it partly proceeds in a similar way as General Didactics in its movement towards theorizing: Both gain *the general* from generalizations (see Heursen, 1994, and Klafki, 1994 above). Therefore, it is stands to reason that generalizations in theories of General Subject Didactics can be seen or positioned on the same level as theories of General Didactics. However, theories of General Didactics are usually not metatheories, but object theories in the sense that they describe dimensions of teaching and learning in school, e.g. elements of lesson planning, of teaching goals, or of effective classroom teaching. In this regard, it is most indicative that there are quite many general didactic theories around in the literature and not just the well-known ones as listed by Jank & Meyer (2011, 14th ed. 2021) or the one most known in the English-speaking world, that of Wolfgang Klafki (1994) and his *Bildung*-centered approach. As a matter of fact, there are more than 100 models on the market – see the enumeration of 101 object theories of General Didactics in Scholl (2018, pp. 18–20), for example.

What follows from this is the insight that it would be inappropriate to understand General Subject Didactics exclusively as a metatheory; this would be an underdetermination of this concept. Rather, General Subject Didactics can also be understood as an object theory since it leads to results that are comparable to insights and concepts of general didactics, some of which are listed above. These types of results, also gained via generalizations, do not represent meta-theories of subject-didactic theories, rather they are on the level of object theories about subject-matter teaching and learning. This line of argumentation has to be supported by the data, presented later on in this book, in the in-depth comparison of the subject didactics themselves (see Chapter 9–14) and what follows from them (see Chapter 15). For the sake of illustration and better understanding of this generalizing function we would like to mention at least one example at this point already, namely the importance of Johan Amos Comenius, as mentioned by several subject didactics (see 15.2.1 for details). This result of the analysis is certainly not located on a metatheoretical level, but on the level of an object theory. Regardless of the respective level, it is interesting to see that Comenius seems to be not only the "founding father of didactics", but also the "founding father of subject didactics".

4.4 Scientific self-assurance as a function of General Subject Didactics

Beyond generalizations, however, there is another important point to consider, which could be called the self-assurance function of General Subject Didactics. In the discourse of many, if not all of the subject didactics we find strong elements of self-definition and of self-assurance, namely in asserting their *scientificity*, their scientific nature and quality as disciplines. This aspect was equally identified in our earlier project, as it is the case now, based on a broader set of data. It is even fundamental in both contexts (cf. Frederking, 2017; Rothgangel, 2020c) and leads almost by necessity to the level of metatheory and that of a philosophy of science.

Again, it is worth taking a side-glance at General Didactics: its current crisis, as outlined above, has led to the publication of a remarkable draft of a metatheory of General Didactics by Daniel Scholl (2018). Scholl's publication draws attention to the fact that a metatheory would be helpful and supportive, indeed advantageous and would advance General Didactics, because it serves to locate the object theories and thus to assure oneself in this way. As to General Subject Didactics, it also attempts to provide comparable services with regard to subject didactics: Individual subject didactics have considerable science-theoretical potentials of their own and for their specific subject-didactic fields of inquiry. But beyond this important fact, the issue arises as to how subject didactics in their entirety are to be characterized in terms of scientific theory-building. The answer to this question could, in turn, have some retroactive effects or a stimulating function for the future elaboration of science-theoretical concepts in the different subject didactics themselves.

If one tries to summarize the preceding considerations on the generalization as well on the self-assurance function of General Subject Didactics, then the following intermediate résumé suggests itself: General Subject Didactics is a theory that includes both object- and meta-theories. With regard to its generalization function, it often generates theories comparable to object theories in General Didactics. Furthermore, especially with regard to its scientific self-assurance function, it also develops theories that are comparable to science-theoretical concepts of individual subject didactics. In this latter respect, we see a core function of General Subject Didactics, because such a self-assurance should be carried out by the subject didactics themselves and not primarily by General Didactics. Again, we will already indicate two meta-theoretical examples pertinent in this context for reasons of illustration: What are the research objects of the different subject didactics? Which research methods are chosen and applied and how are they combined? These are typical issues related to and serving the self-assurance function of General Subject Didactics.

Later on in the book, after the analysis of the 17 reports of the subject didactics, we will come back to these two basic functions of General Subject Didactics (cf. Chapter 15) and identify them in more concrete terms and also illustrate them by giving a number of examples taken from the rich data set.

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Part B
Empirical Explorations into Subject Didactics: Two Examples

5. Comparing Subject-Matter Didactics

Procedures and Methodological Considerations

Helmut Johannes Vollmer and Martin Rothgangel

In the first Part A of this book we outlined the major topics and concepts of this volume, namely subject-matter didactics and General Subject Didactics, their development and their scientific status today. We also presented a first characterization of General Subject Didactics as a theory of subject-matter didactics, constructed across and above all individual subject-matter didactics. After having defined each of the two concepts and illustrated their relevance in theoretical terms, we concluded with first reflections on how best to translate these concepts which are of German origin into another language, namely into English. More specifically, we wondered how best to explain and transfer our newly gained scientific knowledge into another socio-cultural context, namely the Anglophone world, and share it with others internationally. We will come back to these issues later in the book, trying to link subject-didactic thinking to the ongoing international discourse on teaching and learning in school and on teacher education. Both aspects, that of translation and knowledge transfer as well as that of intercultural and international exchange will be given more attention in the last part of the book, in Part D. (see Chapter 16–22).

In the next two Parts B. and Part C., however, we will present empirical data collected from 17 different subject-didactic disciplines in Germany. These data and their interpretation through the whole bottom-up approach of research, of which they are part, will support and strengthen our theory-building on subject didactics and on General Subject Didactics – in addition to the theoretical characterizations and conceptual clarifications already published before (cf. Bayrhuber et al., 2017; Rothgangel et al., 2021).

In Part B we will start by presenting the bottom-up procedures applied in developing General Subject Didactics and by offering two original and authentic subject-didactic self-reports on the state of the art and on future research perspectives in full length, so as to give the reader an idea of the wealth of information and insight provided. The two examples are those of the "Didactics of Religious Education" and of the "Didactics of Foreign Language Education". They show how the subject didactics describe their own achievements and reflect about them and how they see the status of their discipline; specifically what is being researched and discovered and how this was achieved and what theoretical or practical insights follow from it.

This will be followed later in Part C by an extensive comparative analysis of all the data sets available, coming from a large number of different subject-matter di-

dactics in Germany (17 altogether) and their interpretation based on the procedures of the Grounded Theory (cf. Chapter 8 regarding methodology). Overall, in the next chapters of the book the reader will begin to understand in more detail how General Subject Didactics was identified and defined and how it developed as a scientific field.

5.1 Bottom-Up Approach as a Complementary Procedure to Top-down Reflections

As indicated before, the development of a *generalized* or General Subject Didactics is based on two parallel methodological movements: a top-down approach of describing and defining GSD in theoretical terms and a bottom-up approach of collecting data, testing certain assumptions or hypotheses and securing further insights through empirical studies and comparative analysis. This leads to detailed descriptions of the commonalities and of the differences between the diverse subject-didactic disciplines. Both columns are necessary for developing General Subject Didactics as a generalized theory of Subject Didactics.

In this part we will now turn to the empirical and bottom-up side of constructing General Subject Didactics. We will outline our empirical approach and characterize the data base, from which we draw our findings and conclusions. This is done first by way of presenting the two examples out of the set of 17 self-reports mentioned above. These will not be analysed further at this point, but rather drawn upon to gain insights into the general data structure and for concrete illustrations. It is only in Part C that all of the different 17 subject-didactic disciplines participating in the study will be related to one another and compared with each other, including the two sample didactics. The goal is to investigate their unique features, their specific differences as much as their commonalities.

The examples of subject-didactic self-reports that we chose to present in full length at this point, cover the content areas for which the authors of this book were responsible. These two reports, originally written in German, were translated into English and are published here as written in 2020; they are a snapshot in time and were not updated for this book, for reasons of comparability with the other 15 self-reports to which we will turn later. This is to give the international reader a proper impression of the structure, substance and validity of this type of text on which the later comparisons and the comparative analysis were based.[1] These two exemplary

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1   It must be pointed out that these reports were written in 2020. They could not be updated for this book for reasons of validity, since the whole comparative analysis was based on the versions of 2020 for all the participating subject-didactic disciplines. Within the last three years, however, some major social and educational changes or shifts took place (e.g. influence of artificial intelligence, spreading of multilingualism world-wide, reduction of denominational belonging / attachment and of religious beliefs and behavior altogether). All of these could not yet be dealt with in the reports at hand.

reports will already provide us with an impressive scope of qualitative data, enabling first intuitive insights as well as theoretical reflections and modelling activities. The data base is detailed enough to allow a close reading of many passages and identify topics or problems addressed therein. At a later stage we will additionally give an extensive summary in English of the most important structural and comparative findings of all the 17 subject-didactic reports under scrutiny (see Chapter 9–14) plus short résumés for quick reference (see Chapter 17).[2]

The authors of this book were centrally involved in the theoretical construction of a General Subject Didactics as a concept and its empirical validation.[3] The results and insights gained through both the theoretical and the empirical work were successively published first in German, namely through two comprehensive volumes on GSD, one in 2017, another one in 2021[4], with a number of accompanying smaller contributions either in German, English or French.[5] Overall, these new ideas and approaches plus the constructs emerging from them have spread rather quickly, especially in the German speaking areas, but even beyond e.g. in Northern Europe. They already entered handbooks (Rothgangel, 2021d) and overview articles (e.g. Rothgangel & Vollmer, 2020; Rothgangel, 2021e) and led to a number of invitations of the authors to other countries, to other research groups and to subject-didactic associations or agencies outside of Germany.

As we decided to show more international presence, we published a first systematic contribution of our findings and their theoretical implications in English, for Anglophone scholars and general readers alike, entitled "Towards a Theory of Subject-Matter Didactics" (cf. Rothgangel & Vollmer, 2020). Meanwhile we had also founded an English-speaking international journal for the study of subject didactics, entitled "Research in Subject-Matter Teaching and Learning" (RISTAL.org), covering all the research areas involved in our studies in the widest sense. Encouraged by the positive reception of the 2020 paper within international scholarly circles, we subsequently planned to write and publish a more comprehensive volume in English in which most of our previous work, our findings and the relevant publications would be summarized and presented for discussion to a non-German audience. This required some substantial translation of existing papers or book chapters, but also the re-writing

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2   As mentioned earlier, the German "Association for *Fachdidaktik*" *(Gesellschaft für Fachdidaktik)*, an umbrella organization for all subject-matter didactics in Germany, comprises some 32 individual subject didactics as academic disciplines. Out of these, a selection of 17 participated in this first round of comparative research (cf. Bayrhuber et al., 2017; Rothgangel et al., 2021). This number and the scope of issues included in a survey can and will be extended in the future. A similar number of participating subject-didactic disciplines were involved in another empirical study, this time specifically focusing on digital education (cf. Frederking & Romeike, 2022).

3   We gratefully acknowledge the contributions of our colleagues Ulf Abraham, Horst Bayrhuber, Volker Frederking and Werner Jank.

4   See Bayrhuber et al., 2017, and Rothgangel et al., 2021.

5   Vollmer, 2013, 2014; Bayrhuber et al., 2018; Frederking & Bayrhuber, 2020; Rothgangel & Vollmer, 2020; Vollmer, 2021a, 2021b: Vollmer & Klette, 2023.

of introductions, summaries and transitional passages, so to make the English text readable, smooth and acceptable for the intended readership. In doing so, it soon became apparent that there are quite a few additional challenges and even potential limitations in our efforts to transpose our scientific knowledge gained into another language and culture, namely from German into English and into the Anglophone world altogether (cf. Vollmer, 2022). Nevertheless we hereby present the central ideas and findings from the last 10 years of our research on the issue of General Subject Didactics as a new field of study.

5.2 Subject-Matter Didactics Compared – An Empirical Study and its Results

In Volume I of our German book series "*Allgemeine Fachdidaktik*" (General Subject Didactics) we already tried to balance the two columns of top-down and of bottom-up approaches for describing and defining the central concept in question. Accordingly, we already included – alongside a number of theoretical contributions on the nature of General Subject Didactics – this bottom-up approach as a complementary avenue to constituting GSD: *in a first attempt* it compared five different subject didactics, each represented by a member of the work group: Biology Didactics (Horst Bayrhuber), German Didactics (Ulf Abraham, Volker Frederking), English Didactics (Helmut Johannes Vollmer), Music Didactics (Werner Jank) and Didactics of Religious Education (Martin Rothgangel). These texts, produced as self-reports and self-reflections, were written on the basis of three underlying impulses: they were concerned with reflections about A. the *history* of the subject, B. about the learning *within* the subject and C. about the learning *beyond* the subject (Rothgangel & Vollmer 2017). These reports were then compared and analysed at the time (Rothgangel, 2017b), using Grounded Theory as a qualitative research method (Strauss & Corbin 1996; Strübing 2008; Rothgangel & Saub, 2017).

At a later stage, this bottom-up approach was continued and extended in Volume 2 of the publication series "General Subject Didactics", with 17 subject didactics participating and a number of topical distinctions introduced in order to gain more specific information. Accordingly, the three topics for self-reflection and self-presentation for each of the subject didactics from the publication in Volume 1 were now subdivided once more by two aspects each, leading to a more nuanced guideline along the following six dimensions (see survey questions 1.–6. below) (cf. also Rothgangel, 2021a, pp. 15–16):

A. Historically significant contexts, developments in the subject and its related subject didactics
   1. *History and definition of the subject-matter*
   2. *Origins and development of the specific subject didactics*

B. Learning within the subject and its scientific study
    3. *Goals, content and competences of the subject*
    4. *Perspectives of didactic research and development*
C. Learning beyond the subject area and researching it
    5. *Linking content across subjects and generalising subject-specific competences*
    6. *Networking research in subject-matter didactics*

Ultimately, these six impulses or dimensions related thematically to the three areas of investigation in Volume 1 (A., B. and C.), but they were further broken down now in order to identify the specifics of each school subject and each respective subject didactics dealing with it. This structure was agreed upon unanimously beforehand by all the participating representatives for the different individual subject didactics. Accordingly, the texts to be written by the 17 subject didactics had to focus on *subject-matter issues and perspectives* on the one hand (A.1, B.3, C.5) and on *research issues within the corresponding subject didactics* on the other hand (A.2, B.4, C.6). The resulting reports were produced by key players of the respective subject didactics themselves, mostly by a team of at least two. Nevertheless a certain subjective component cannot be ruled out, which is always present and sometimes even visible in these individual reports. The overall text corpus was presented in German as the original language of reporting in Volume 2 (Rothgangel et al., 2021) and then analyzed in-depth by Rothgangel, (2021b) and discussed by the whole group, according to the six specific points laid down in the guidelines for the reports. The results of this comprehensive comparison and analysis provided the data base for this book, once the findings had been translated into English and summarized for reasons of readability and intelligibility.

It should be noted at this point that the impulses listed were still deliberately limited in scope. They were chosen in a selective, exemplary manner so as to capture some important aspects of the various subject didactics and their internal discussions and the impressive work done within these areas. In this way, a basis for comparison was pragmatically formed which was manageable in size and in terms of time investment. Independent of that, other issues could and may be dealt with similarly in some follow-up studies in the future. [6]

Let us now turn to the two examples chosen and see in detail, how each of the two disciplines presents itself with their specific claims, structures and achievements, including appropriate theory-building. In doing so we get a first picture (albeit from the year 2020) of the state of the art within two specific subject didactics and the challenging research perspectives ahead.

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[6] As a matter of fact, one specific issue, urgent and relevant for all subject didactics alike, has been studied and analysed meanwhile, applying the same procedures (structured reports, comparative analysis, publication and discussion of findings): it is the question of *digitalization*, especially as a research focus in the different subject / content areas in school (Frederking & Romeike, 2022).

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6. Didactics of Teaching and Learning English as a Foreign Language

State of the Art and Research Perspectives

Helmut Johannes Vollmer and Karin Vogt

The focus of this contribution is on English as the first foreign language predominantly taught in German schools and on the didactics of English as a school subject.[1] Many of the observations and findings also apply to French as a first foreign language and to "foreign language teaching" in general. Accordingly, the term "foreign language teaching" will be used where explicitly applicable because otherwise the term can also be problematic. Despite basic common features among all foreign languages and the teaching and learning of them, major differences must not be overlooked or concealed. These include the respective histories and subject-specific traditions, self-definitions, and the impact of the sequence and varying intensities in which languages are taught in school (cf. the discussions in Bausch, Burwitz-Melzer, Königs & Krumm, 2008; Surkamp, 2017).

6.1 Historical developments in English as a Foreign Language and in English Didactics

History and conceptualization of the subject matter and the school subject[2]

Since the early Middle Ages, dealing with and acquiring a foreign language has been explicitly related to the *'classical'* foreign languages Greek and Latin (Hüllen & Klippel, 2002). The overriding goal of foreign language teaching and learning was and still basically is the comprehension of another language (different from one's first language) and its progressive mastery and use. For centuries, the grammar-translation

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1   This contribution was written in 2020/2021. Recent developments (e.g. advances in multilingualism, in digitalization (AI) or with new forms of assessment) could not be included into the analysis. As such, the text has been commented upon by Sabine Doff and partly by Daniela Caspari. We would like to thank them for their help. An earlier version was critically reviewed by Wolfgang Hallet and Bernd Tesch, whom we would also like to thank for their comments and suggestions. A first and second version of this overview paper was published in German; see Vollmer, 2017b; Vollmer & Vogt, 2021).

2   In the following, only the broad lines of development in the history of English language teaching and of English didactics can be presented (cf. also Vollmer, 2017b).

method, which originated from Latin instruction, dominated as a methodological procedure. Mostly literary texts or stories about important personalities were translated interlineally from the foreign language into German and, to some extent, vice versa. As a rule, the first language was simultaneously the starting point, the reference system, and the language of instruction. Teaching was strongly cognitively oriented; grammar learning was done deductively: sample sentences and exercises were presented or derived from a given rule. The aim was a cognitively formal and 'cultural' education of the pupils. They were meant to gain *'insight'* into the language rules of the target language and the development of cultural, linguistic, and literary *'knowledge'* of the target language.

In the first half of the 19th century, the Latin schools in Germany developed into humanistic grammar schools with a curriculum that included Latin, Ancient Greek, and French as a third foreign language. At the end of the century, additional schools were established: the *Realgymnasium* and the so-called *Oberrealschule*, both also leading to the Abitur. A clear shift towards modern languages in these school types became apparent: Latin still dominated, but English and French followed in the *Realgymnasium*, while only English and French were taught in the *Oberrealschulen*. In view of an expanding student body and a heightened sense of reality, a 'reform movement' prevailed (cf. Wilhelm Viëtor's pamphlet "Language teaching must be reversed", 1882), which ultimately established the concept of *'modern'* – in contrast to *'classical'* – foreign languages and thus the so-called 'Direct Method'. The principle of sustained monolingualism (without translation) and inductive derivation of grammatical rules as well as the emphasis on oral communication was strongly advocated (cf. Schröder, 1977).

Since the end of the 19th century, English has come to prevail as the first foreign language in connection with the new school types. This was accompanied by a strong emphasis on the functional aspect of learning English in terms of usefulness and expanding real opportunities for action, although even then (between the two wars), international understanding and peacekeeping were being discussed. After the temporary usurpation of foreign language teaching to promote German ethnic chauvinism and nationalism, an approach to foreign language learning prevailed after the Second World War which was essentially based on the principles of the Direct Method while simultaneously opening up to the behaviourist procedures of the audio-lingual method imported from the USA (Imitative Learning, Pattern Drill; cf. Lado, 1964) and later to the audio-visual method (taken from French didactics; cf. Guberina, 1965). The latter primarily aims at the presentation of clear interactive situations (stimuli) in order to trigger stereotypical linguistic actions and reactions and thus to contribute to the formation of speaking habits. Both approaches were only partially successful; they were adopted as trendy solutions at their time, but never in their pure form, especially in the English classes of the grammar school. They were also applied in a moderate form to lower secondary schools, where a foreign language, usually English, was made compulsory for the first time in the course of a

comprehensive educational reform (*Hamburg Agreement* of 1964; kmk.org). This expansion of English instructions to all types of schools in Germany and the extension of professional teacher training to the non-grammar school sector was accompanied by an increased development of teaching methods (e.g. situated learning, contextualisation, simplification of rules) for less abled learners. This led to a major academic debate on appropriate teaching methods for different learner groups and on didactic approaches to learning English in general (Appel, 2004).

In addition to this, in the wake of intellectual currents promoted by Noam Chomsky (1965; 1968) and under the influence of Soviet learning theorists such as Vygotsky (1978; 1986) and Galperin (1957; Leont'ev & Galperin, 1974; Leont'ev, 1974; cf. Baur, 1979), new approaches developed in favour of stronger cognitivisation in foreign language teaching. To this day, however, it remains controversial whether practical language mastery can actually be promoted by explicit awareness or rational knowledge and understanding of the principles of language use (e.g. Ellis, 2009) or whether language acquisition only occurs implicitly, solely through actual language use or through repetition and application (Berry & Broadbent, 1984). Meanwhile, it seems to be clear that thinking does play a paramount role, at least in one's own self-directed foreign language learning, as a means of raising awareness, of supporting decision-making, or of self-correction, especially for adults (e.g. Doff, 2010; Gnutzmann, 2013; Vollmer et al., 2017; Sinn & Vollmer, 2019).

With the communicative turn in the 1970s, the functional view of language and of foreign language acquisition was further strengthened and ultimately prioritized. Based on the groundwork laid by Hymes (1972) and Hans-Eberhard Piepho's successful didacticisation (from 1974 onwards), "communicative competence" largely became the goal of foreign language teachers. At the same time, however, a false distinction was introduced between learning grammar and grammatical competency, on the one hand, and the ability to speak the target language, on the other hand. This contradiction has largely been resolved by now.

Today, English is taught in all sixteen federal states of Germany from grades 1 or 3 until graduation (*Abitur* at the end of grades 12 or 13). In addition, bilingual subject teaching, in which English (or another foreign language) is used for content teaching and learning, is gaining importance. Innovative teaching and learning materials extending far beyond textbooks, and including inspiring digital media, have evolved in the past decades. These materials aim to prepare learners for the future and to impart higher motivation, incentives, and a sense of accomplishment in English language learning on everyone. The standard use of literary texts has nonetheless has remained relevant.[3]

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3   The history of institutionalised foreign language teaching is only partially documented (De Cillia & Klippel, 2016). Exceptions are Hüllen & Klippel, 2002; 2005; von Walter, 1982, on the early history of English teaching at secondary schools; Doff, 2002, on foreign language teaching for girls in the 19th century; Lehberger, 1986, on teaching English under the regime of National Socialism

6.2 Teaching English as a Foreign Language – origins and developments

As early as 1840, a concept for language studies in schools under the title "Modern Humanity Studies" was developed (Mager, 1840/1844). According to Flechsig (1962), this can be described as being 'education-driven and theoretical' and as the first comprehensive didactic conceptualisation of language teaching (cf. also Christ, 2013). The new-language reform movement at the end of the 19th century not only reinforced the view on the necessity of language mastery, but also on the necessity of studying cultural realities and teaching anthropology as equally important (introduction to the "intellectual world of foreign language speakers").

Since the restoration after 1945 until the 1970s, English didactics defined itself primarily through its practical contributions to the improvement of teaching in school and to teacher training in various contexts. It was all about successfully designing the respective curricula: teaching methodology was primarily intended to be a pedagogical sub-discipline to support in-service teachers, to reappraise the (unspecified) subject-specific principles, to compile appropriate lesson proposals, and to provide procedures with which to evaluate the learning and teaching success. Subject didactics was essentially experience- and less theory-based; it was largely conducted by university professors who had once been practicing teachers. Yet English didactics already began to deal with fundamental questions concerning the curriculum, concerning suitable course structuring or 'teaching sequences' and the objectives of the school subject in a dynamically changing world – done through deliberative reflections and selective surveys (Hüllen, 1979).

In the 1970s, a new focus was established: empirical language teaching research. For the first time, this approach dealt with actual 'language learning' in the classroom as well as with the related 'teaching' of languages in a controlled way; it was claimed to be scientific and appeared to make rationally justifiable teaching decisions possible. This was to be implemented through a systematic compilation of the variables ("complexity of factors") involved in foreign language learning (some foci were: learner and teacher variables; institutional, medial, and social influences on teaching goals and methods as well as on the interaction in the classroom; more precise didactic analysis of the respective subject matter to be taught; description of difference between the learner's linguistic resources and the target language). This new empirical approach to language teaching research (under the programmatic label "Sprachlehrforschung") contributed considerably to the rise of language didactics in status and acknowledgment as a scientific discipline: specifically so, since it was able to establish a 6-year priority funding programme at the German Research Founda-

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and finally Konrad Macht, 1986/1987/1990, who reviewed the methodological history of teaching English as Foreign Language over many decades).

tion (*Deutsche Forschungsgemeinschaft*, DFG), within which a series of fundamental empirical studies on foreign language learning and teaching in Germany have been launched and completed (Bausch, Christ, & Krumm, 2003).

At first, there was a certain confrontational relationship between traditional foreign language didactics and language teaching research of the new type, but this initial controversy soon proved to be "unproductive" (Timm & Vollmer, 1993a+b; Königs, 2004; Bausch et al., 2016). It dissolved further in the course of an intensified debate, mainly within the annual "Spring Conference on Research of Foreign Language Teaching" to which selected scholars were invited, and also through cooperation between representatives of the different approaches. In light of this development an increasing empirical orientation in foreign language didactics, the German Association of Foreign Language Research ("*Deutsche Gesellschaft für Fremdsprachenforschung*", DGFF) was founded in 1989. The Journal of Foreign Language Research ("*Zeitschrift für Fremdsprachenforschung*", ZFF) was established in 1990 as a peer reviewed journal, continuing its professional tasks until today.

In the long run, this highly rationalistic approach to language teaching research could hardly maintain its position on the university level as a cross-disciplinary and overarching discipline that intended to cover all foreign language subjects and all aspects of them. It was too scientifically minded and did not integrate the experiential dimensions of teaching, the wisdom of teachers as practitioners and their "art" of teaching. While *Sprachlehrforschung* remained a minor branch within the respective research community, foreign language didactics in general expanded enormously, content-wise and in relation to academic staff. This was supported, among other things, through the integration of colleges of education into German universities (except in the state of Baden-Württemberg where they still coexist). By that time, the research criterion was finally established as part of the scientific self-concept of didactics (Vollmer et al., 2001). At the same time, the career opportunities of emergent academics improved dramatically: With empirical research projects beginning to be more widely available from about the year 2000 onwards. Today, with the establishment of relevant graduate colleges and other initiatives to promote research (e.g. set up by the German Research Foundation or the Federal State of Germany), a broad range of follow-up offers is provided, although quite different in quality and location and without the prospect of permanent posts for all through subject-didactic professorships). The topics range from working on the core fields of foreign language teaching and learning to the theoretical processing of new target dimensions, stretching from experimenting with new teaching methods to research on the professionalisation of teacher training. The many challenges of diversity and inclusion in the classroom (Bongartz & Rohde, 2015; Burwitz-Melzer et al., 2017; Roters, Gerlach & Esser, 2018; Eisenmann, 2019) as well as the realities of multilingualism and the need for digitalisation (Burwitz-Melzer, Riemer & Schmelter, 2019) are also increasingly being addressed. Generally speaking, this broad research orientation has significantly contributed to the development and establishment of English didactics and of foreign language didactics in general as an academic discipline.

In the last 20 years, the didactic discussion has strongly been influenced by the paradigm of competence orientation in connection with interculturality within English teaching. The central focus was not the development of foreign language *literacy*, but building up *competencies* in the different (sub-)fields of expertise. Competence means knowledge acquired and used appropriately in various future contexts. This dispositional character was called into question by many colleagues in the field. In their opinion, the competence orientation as introduced by PISA and other large-scale measurement projects has indirectly led to a skills-based orientation of language teaching in Germany, e.g. through the formulation of educational standards largely on the skill level (can-do statements) and the focus of attention of many language teachers placed on those areas of competence which are verifiable through measurement. This critique was formulated more than once, e.g. by Bausch et al., 2005, in view of the lists of competence goals for different types of school, as handed down by the federal states, represented by the Standing Conference of the Ministers of Education and Cultural Affairs of the Länder (*Kultusministerkonferenz*, KMK, 2003; 2004). This development is accompanied by central testing and comparing empirical outcomes as instruments of state educational policy and of nationwide education monitoring. In contrast to this rather narrow definition of competence critics argue that foreign language teaching must always espouse broader educational goals and training perspectives than just functional ones, such as the development of personality, ability to self-reflect critically, promotion of knowledge and attitudes which allow the learner to participate in social and political life, based on the mastery of the respective language. This philosophical perspective of a rather classical education-theoretical position on foreign language learning has to be urgently mediated with a more functional perspective on language acquisition and language use, if we do not want to uphold these views as contradictory in the long run. For the time being, there are still great (but not unresolvable) tensions between these positions within the English language teaching community and within English didactics (see the discussion under 6.3.1 *Goals* below).

6.3 Learning in English as a subject and research in English didactics

6.3.1 Goals

As already indicated, communicative competence has been the primary goal of foreign language education (Piepho, 1974; Legutke, 2008) since the mid-1970s. This gave action orientation and comprehensibility in speaking priority over linguistic correctness and literary analysis. Greater tolerance of mistakes (and their self-correction) slowly developed at least outside of grammar school (German: *Gymnasium*). Learners were encouraged to bring in personal statements or make comments. At the same time, non-fictional texts became more accepted and gradually gained preference over

fictional texts in English lessons. The limits of a narrow, situation-embedded communication competence were quickly reached, however, due to a lack of foreign language resources for in-depth exchanges on demanding topics and for expressing complex perceptions and relationships in the target language. In recent years, more precise descriptions of the required aspects of foreign language competences have been developed, including comprehension of complex texts, ability for creative or argumentative writing, acquiring interactive conversational skills (e.g. Council of Europe, 2001, 2016, 2020; KMK, 2012).[4] All of these have even been broken down and incorporated into the framework of operationalized can-do statements, as much as possible. These approaches are presented below (under B.1.2 *Competencies*); they have had a lasting impact on the teaching and learning of English. This implied that a reductionist view of target dimensions in terms of skills-oriented competence definitions, as advocated by the KMK in 2003/2004 for the middle grades of schooling and as criticized heavily at the time (Bausch et al., 2005), is gradually being overcome – as is the apparent arbitrariness of content in the teaching of English as a Foreign Language (EFL). Nevertheless, the relationship between knowledge, content and competences has never been clarified systematically within the field of English didactics (Vollmer, Tesch & Nold, 2017) nor has the overriding role of academic language proficiency in connection with the development of linguistic or cognitive discourse functions been considered enough within English language teaching. Only recently have the Council of Europe and, as a consequence, several European member states begun to widen the scope of stated language goals, including sociolinguistic and cognitive-discourse functions as cognitive tools to be taught in all subjects (cf. Vollmer, 2011; see the Companion Volume to the Common European Framework of Reference for Languages, below: Council of Europe, 2020; Europarat, 2020; Quetz & Rossa, 2019).

In recent decades, *interculturality* or *transculturality* as constitutive characteristics of all foreign language activities (understanding as much as orally interacting) have received further attention. Furthermore, foreign language learning has been embedded in a comprehensive concept of multilingualism (Baur & Hufeisen, 2011). As far as the first point is concerned, the ability to communicate *'interculturally'* as an extended description of competence has enormously expanded the scope of English teaching and, with it, the perception of its complexity and educational potential. It is generally recognised that foreign language teaching and learning mediate central experiences, insights, values and attitudes and help acquire skills for living together in today's heterogeneous societies. '*Transcultural*' approaches go one step further; they rightly assume that all those involved in an intercultural encounter are not only representatives of certain culture(s), but that their respective identities are nurtured by a variety of different sources: they are multifaceted individuals or members of groups

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4   Precursors to these extended models of foreign language ability include Vollmer, 1982; Bach & Timm, 1989; Deutsche Gesellschaft für Fremdsprachenforschung (DGFF), 2008; 2012; Hallet & Königs, 2013a; Hallet, 2011; Küster, 2003; Zydatiß, 2005.

(Freitag-Hild, 2010; 2013; Siepmann, 2016). However, the equivalent assumption that every individual tends to be, or actually is also "multilingual" in its widest sense and is thus capable of drawing on a range of linguistic experiences and repertoires (Kramsch, 2010) is less developed in the mind of practicing teachers. Yet it is slowly gaining acceptance in the field: such a theoretically based expansion in the perception of learners and their linguistic-cultural multilayeredness is increasingly shared from a didactic perspective. Consequently, other languages and linguistic realities or perspectives are selectively included in English lessons, and a more conscious handling of different language skills, also of pupils with unique migrant backgrounds, takes place. Research areas relating to the description of plurilingual competences and to designing plurilingual learning approaches (Candelier et al., 2009), with aspects such as language comparison, language change (code-switching), and language mixing (translanguaging), are therefore strongly growing. In the long run, this might lead to a new tension in English lessons with the demand for monolingual teaching (in the sense of immersive language bathing or maximum exposure) and plurilingual competences to be acknowledged and fostered. Also, the tensions between the teaching of English as a national or cultural language, on the one hand, and of English as a lingua franca, on the other hand, might increase. The latter allows for speakers who are less norm-oriented and immersed in other languages and diverse cultural influences (hybridities), depending on the origin and the characteristics of the persons concerned, their biographies, their preferences, their forms of plurilingualism, etc. (cf. Kramsch, 2014; Garcia & Wei, 2014).

Interestingly, media and literary didactics (as sub-areas of English didactics) have gone through various phases of development – in response to the challenges posed by the profound cultural changes during the last two decades. Foreign-language multi-literacies that go far beyond media-technological innovations are seen as an inevitable future for all (Hallet, 2013; 2016). In both the public and the private sphere, texts increasingly do not appear in isolation any more, but in combination with other forms of meaning, such as images, graphics, visual designs, or process markers, for example, in combination with products of other symbol systems. All of them together create meaning. English lessons have started to prepare for these realities as well as to react to fundamentally changed media habits of the learners. Yet according to majority opinion, the isolated, targeted analysis of literary texts still contributes best to the development of a comprehensive (aesthetic-literary) education and thus represents one of the foundations of personal education through EFL, closely linked to intercultural sensitization, understanding of others, inter- and transcultural learning. Through engaging with fictional characters and their constellations and the guided discussion in the classroom this educational objective will be achieved (Bredella, 1999; Bredella & Hallet, 2007; Küster, 2013; Küster, Lütge & Wieland, 2015; Schiedermair, 2017).

Overall, there are major controversies regarding the objectives for teaching and learning EFL as for any other foreign language in the school curricula, such as a

cultural, a cognitive or a socio-pragmatic perspective and the degree of openness towards multilingualism and an increasingly heterogeneous student body. Above all, EFL education requires a more precise definition of its *educational dimensions*. Some foreign language didacticians pit a personal-anthropological educational perspective against a 'mere' competence orientation that seems geared towards functional usability. Such views are extremely one-sided. What we desperately need is mutual acceptance and integration of both: a personal perspective in combination with functional education. Later on, we will deal with such central issues in more detail. Suffice it to say that in this context older, but influential documents (e.g. KMK, 2003; 2004) are repeatedly referred to in general terms, instead of dealing with more recent approaches of an extended competence modelling and the educational potential contained therein (KMK, 2012; Council of Europe, 2020).

In particular, the concept of foreign language education and how this is related to language competence is controversial: Küster (e.g.: 2003; 2013) speaks of "plural education" and thus means both aesthetic-literary and intercultural aspects of 'education', as illustrated by examples from the didactics of Romance languages. Others, such as Schröder, Tesch & Nold (2017), in their understanding of the educational value of EFL, refer to the training of formal-logical thinking through language analysis and the construction of relations between form and meaning, as well as to the appreciation of language as a system and as a tool of communication in their understanding of the educational value of EFL They also refer to the development of language awareness and language learning competence, to transcultural learning, and to approaches to multilingualism – as it is recorded in the more recent conceptualisations for advanced foreign language teaching. According to these authors, dealing with interculturality and multilingualism must also explicitly serve the purpose of reflecting on one's own linguistic and cultural resources and identities – in comparison to the new linguistic and cultural experiences that impact the acquisition of a foreign language (cf. the contributions in Tesch et al., 2017). Such extended objectives have only been debated in exceptional cases, e.g. by Caspari & Schinschke (2009), by Caspari (2017) and by Vogt (2016), who have discussed the inclusion of dimensions of interculturality in assessment.

Generally speaking, the goals of teaching EFL today are being further developed towards notions of general foreign language discourse ability or competence (Hallet, 2008; Legutke, 2010; Zydatiß, 2013; KMK, 2012). In applied linguistics, this is understood as the capacity of embedding one's own messages in the respective communicative context and as the general ability to express complex thoughts and ideas (Hallet, 2016), even if the linguistic means at hand are (still) somewhat limited. An advanced concept of this discourse ability, however, refers to much more, e.g. to intellectual and social participation, to having a say in the relevant discourse communities, to taking part in the (major) debates and in decision-making processes on a local or regional level or on the future of our planet (cf. the two concept variants, as compared in Hallet, 2016, 19 ff.).

6.3.2 Competences – Specific areas of competence

The communicative acquisition, mastery, and use of the target language for various purposes in life is at the heart of the competence-oriented approach of teaching and learning EFL. Because the ideal of a native speaker standard is no longer tenable, the issue has been reduced to defining degrees of comprehension and communication ability to be achieved by certain points in time. Both are as practical as they are self-reflective because they aim at navigating specific situations, speaker intentions, interaction partners, forms of conversation, and text (genres) as well as communication goals. Using appropriate and effective linguistic resources and communicative strategies to achieve the respective goals represent the criteria for successful language learning, albeit under the conditions of interculturality. Given this context, the Council of Europe (2020) has defined the *intercultural speaker* as the norm and as the obvious goal.

The ability to communicate in the target language always involves the whole person in relation to themselves and to the world. In the educational standards of the KMK (2012, pp. 11–12) for the advanced language instruction (English/French as foreign langusges) in upper-secondary level, such educational demands are explicitly formulated in the context of a corresponding competence model. This model, although a compromise, is currently the only one in Germany that is clearly structured, mature and comprehensively embedded in theory and practice. It also operationalises foreign language discourse competence. It distinguishes five areas of competence:

1. *Functional Communicative Competence*: Five sub-fields are distinguished here, namely: a) Viewing or listening comprehension, b) reading comprehension, paraphrased as the ability to understand texts using different means, c) the ability to speak, d) writing, and e) language mediation as the summarising reproduction of an utterance, of a thought, or a whole topic in one or the other language (in both directions), a clearly complex, integrative ability. With the extension of the concept of mediation in the Companion to the CEFR, it will clearly become even more complex as it integrates non-linguistic competences as well. Functional English language competence is the basis for all other language competences. It serves a supportive function in the framework of communicative objectives and use: vocabulary, grammar, pronunciation, and spelling skills as well as knowledge of different sentence types, and forms of utterance are linguistic devices. Besides *linguistic correctness* and *comprehensibility* we also speak of *communicative strategies,* meaning the conscious selection of *appropriate* language actions (among different correct choices), depending on the topic, the addressee and the situation etc. In addition to the development of more complex linguistic actions with the help of linguistic-cognitive discourse functions like describing, explaining or arguing, knowledge of general speech or writing conventions (knowledge of text types or genres) and of patterns for certain types of textualisation (editorial versus journalistic feature) are equally part of basic

communication as well. With this distinction in mind is a coherent structure of oral and written contributions possible, with cohesion, coherence and comprehensibility taken into account.

2. *Intercultural communicative competenc*e requires, above all, a certain level of socio-cultural orientation in terms of basic knowledge of English-speaking countries and societies. Thereby, content-related aspects (information, practices, conventions, unresolved issues) come to the fore. In addition, this field of competence is about the development and promotion of intercultural sensitivity, trying to understand what sounds or looks 'foreign'. By acknowledging and processing this (first) impression one could arrive at the development of a differentiated perceptiveness as well as a capacity to identify commonalities and differences and act accordingly in bi- or multilingual contexts (Bredella, 1999; Bredella & Christ, 1995). This includes the development of critical self-reflection on one's own cultural background and practices and a comparison of target culture and own culture in terms of values and behaviours (Hu & Byram, 2009).

This field of competence is extremely demanding, encompassing many challenges for the knowledge and identity of the learners and their further development because it is about confrontation with otherness, about processing and overcoming experiences of strangeness, and about mutual acceptance in the face of difference and diversity. In the end, this competence area touches upon the linguistic features and fabric of personal and cultural identity-building while acknowledging and relating to the diversities of self-expression and the complexity of individuals, societies and the world. The development of such an intercultural capacity for dialogue and reflection therefore goes far beyond acquiring and using EFL for simple, everyday communication: it is of fundamental importance in transcultural encounters within and outside of one's own immediate surroundings. This competence is also important for respectful, empathetic interaction as well as for democratic cohesion between citizens with different attitudes, values, beliefs, and language repertoires (Byram, 2010; Siepmann, 2016; Council of Europe, 2016; 2020; Vogt, 2018).

3. *Text and media competence* as the third competence area refers to the ability to deal with all types of textual constructions in an intertwined way, i.e. to adapt spoken, written, and other media-based "texts" in an advanced and nuanced manner and to produce one's own texts. This field of competence was specifically underlined in reaction to criticism of the earlier KMK competence model for lower secondary schooling, in which explicit mention of textual and particularly of textual-literary competencies was missing (cf. KMK, 2004). In this extended model of foreign language competencies the following features and functions of texts to be taught and learned in the EFL classroom are listed: knowledge of the characteristics and peculiarities of texts from a variety of media (form, structure, function); knowledge of the analysis and reconstruction of coherent statements (spoken / written), procedures and

skills to uncover implicit, covert meanings. On the productive side, knowledge of the appropriate structuring of content-related utterances, ability to adequately outline content messages, ability to plan and construct longer sequences and arguments, are mentioned.

Some EFL subject didacticians suggests replacing the term 'text and media competence' with the notion *discourse or genre competence.* Genres (not to be reduced to or confused with literary genres in the literary scientific tradition) are understood to be relatively fixed patterns of mental-linguistic expression with specific functions and historical embeddings and transporting cultural conventions: They reflect the utility of major discursive forms for specific discourse communities (e.g. journalists, geographers, biologists, or consumers). Accordingly, *'genre competence'* is characterised by an observation of given linguistic terms and patterns, by respect for historically grown forms of human communication, and by recognition of social conventions.

This group of colleagues understand their suggestion to be more appropriate, given the conceptual developments implied in cross-media, semiotic perspectives and its critical reception. The discussion on the suitability of the concept *genre* and the advantages of *generic learning* has been ongoing internationally for quite some time, linked to a systemic-functional approach to language. It is also anchored in *English for Specific Purposes* nationwide and cross-culturally (cf. Swales, 1990), while it has only begun to be discussed in Germany as a possibly better term (e.g. Hallet, 2016). The majority of the subject didactic community, however, still adheres to the notion of text type (German: *Textsortenbegriff*) as the more traditional and less demanding one.[5]

For the first time two more areas are being conceived as separate fields of competences within a model of foreign language ability, because their operational importance for foreign language teaching and learning has become obvious within the last years: they are *Language Awareness* and *Language Learning Competence.* Both competence areas are of a reflective nature and are closely linked. They can have positive effects on all other competence fields of foreign language learning, at each level; cognitively speaking, they are meta-competences in relation to the other three competence areas mentioned so far. They can indeed positively influence every other learning activity and lead to different individual characteristics of all other competences. Let us look at them in more detail.

4. *Language awareness* focuses on the comparison of languages, on the recognition of similarities and differences, but also on targeted reflection about the new foreign

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5 The term 'text type' comes from a specialist, strictly linguistic discourse context, while 'genre' is derived from a systemic approach, based on social scientific insights. For genre, the socio-semiotic dimensions of meaning and form are important accordingly: what is the tradition of this form of discourse, what are its predecessors and models, how has it been used in the past, what addressees are addressed, what functions does it fulfil?

language itself in its structural characteristics and as a system of use, e.g. on certain grammatical or pragmatic rules or requirements in a foreign language situation (Fehling, 2008; Vollmer, 2017). Language awareness is determined by the perception of one's own language use and it aims at contemplating the removal of possible linguistic or socio-linguistic uncertainties. Whether a "feel for the language" (German: *Sprachgefühl*) is part of language awareness or whether it always requires an act of conscious and deliberate decision-making is a controversy among the experts (Burwitz-Melzer, Königs & Krumm, 2012; Sinn & Vollmer, 2019).

5. *'Language learning competence'* by contrast includes the willingness and the ability to independently observe, analyse, and control one's own language learning in the different stages of development. Learners draw on their previous language learning experience and on their psychological as well as multilingual repertoire. Not only can they reflect on their respective learning outcomes and evaluate these against competing alternative options, but they can also re-construct the mental paths they took to gain this knowledge. Just like language awareness, language learning competence can lead to more controlled language behaviour and, in the long run, to more learner autonomy (Gnutzmann, 2016).

There are no overall descriptions of foreign language competence available in Germany, except for the KMK's competence model presented here and apart from the "Common European Framework of Reference for Languages" (CEFR; Council of Europe, 2001) with its revisions and further developments in the Companion Volume (cf. "Companion Volume, With New Descriptors"; Council of Europe, 2020; in German, Europarat, 2020). Although the latter document lists and models many new fields of competence, it does not intend to re-structure the curriculum or even set the individual areas against each other. The same applies to both the European Language Portfolio (www.coe.int/ portfolio) and the "Reference Framework for Plural Approaches to Languages and Cultures" (REPA; Candelier et al., 2009), which is considered to be more of a helpful additional instrument with which to describe plurilingual and multilingual teaching and learning. The significance and validity of the CEFR is greatly debated in English didactics. Some fear that it will lead to a reduction of foreign language learning to aspects that are easily teachable and testable, while others see it as an extremely helpful designation of relevant teaching and learning categories, in conjunction with suggested levels of achievement, from which at least target structures for different groups of learners can be compiled. This also applies to the above-mentioned additional documents that accompany the CEFR by now, which, among other things, refer to new, important competence fields, such as perception and use of multilingualism, inclusion of cognitive abilities to process larger text/discourse structures including literary texts, and, above all, various extended forms of language mediation between different speakers and languages. Thus far, only a few foreign language didactic analyses of the new Companion to the CEFR have been published, such as the discussion paper by the German Association of

Foreign Language Research (DGFF; Bärenfänger, Harsch, Tesch & Vogt, 2019) or the articles in the Journal of Foreign Language Research (Quetz & Rossa, 2019).

6.3.3 Content

The foreign language is both the object and the medium of the acquisition of linguistic and socio-cultural content. Both happen only in part through explicit knowledge acquisition (grammar knowledge, cultural studies knowledge), but to a large extent through a rule-governed, communicative use of the language itself (including text reception). This initially takes place during classroom interaction, but also through encounter projects or tele-collaboration, and *task-based learning*, usually in response to a real problem or need, often based on an authentic text or other media (cf. task-based learning; Ellis, 2003; Müller-Hartmann & von Ditfurth, 2011; Long, 2015). The concept of content in relation to English learning is therefore ambiguous or even fuzzy; it means both *'linguistic content'* (linguistic elements, texts, language as a system) and *'thematic'* or *'cultural content'*. All three fields are closely linked; they are normally regarded as being equal, yet in the course of school learning and development, they might change in importance over time.

The discussions on a so-called *canon* of language content beyond vocabulary and grammatical structures as well as texts and topics to be dealt with by everyone in English language teaching has subsided in recent years. Nonetheless, the criteria for content selection are still insufficiently clarified, and no consensus has been reached across all *Länder* (Vollmer, Tesch & Nold, 2017). The undefined relationship between thematic and linguistic content remains as one of the main problems (Bausch, Burwitz-Melzer, Königs & Krumm, 2007). In addition, there is a clear tension between the desire to deal with authentic texts, on the one hand, and the need to didacticise most of these texts for reasons of comprehensibility, on the other hand, that is to reduce the complexity of language or content in order to deal with them appropriately in school. Overall, *literary documents* of cultural practices in the various target cultures have a special status and significance and still enjoy a privileged curricular status, especially in upper secondary education, while non-fictional texts such as newspaper articles or analytical reports, especially when they require the use of specialised, subject-specific language, are often considered to be less valuable or appropriate. Nor are they given equal importance up to the upper school levels.[6] As mentioned before, the decisive reference point for choosing material still is, next to some content considerations, the level of linguistic challenge, as assumed by the teacher or a textbook author. In the attempt to develop more of a conscious *learner orientation* in English teaching, pupils are partly invited to participate in determining the respective topics or texts to be dealt with. This leads to an increasing connection

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6   According to Decke-Cornill & Küster (2014), this was apparently different in the 1970s and 1980s.

between language learning at school and the interests of learners and thus to more personal relevance in learning English (Hallet, 2011; Vollmer, Tesch & Nold, 2017).

Overall, the notion of content as having a dual focus on both linguistic-textual and on thematic-cultural learning mirrors the two sides of foreign language education: the personal and the functional aspects of learning and their interplay. The reflective relationship between learning object and learning subject significantly affect both the development of specialist knowledge and the search for personal identity and thus the learners' relationship to both the world and to themselves.

6.4 Perspectives of Didactic Research and Development

Research orientation within foreign language didactics has become stronger: (Caspari et al., 2016). It can be differentiated either by research fields or by research approaches as they are traditionally defined in the educational and social sciences. Although the respective research questions are derived from the subject-didactic context of knowledge acquisition and focus particularly on processes of subject-specific teaching and learning including negotiation of meaning, the study methods applied are largely adaptations from of general scientific methodology. Even in psycho- or socio-linguistic research the projects hardly develop new and specific L2-related research approaches. But what we can identify as a special feature is the integration of several and different procedures of an interdisciplinary nature in a number of studies, particularly in large-scale studies (Bausch et al., 2011).

With regard to the thematic focus of the research done within foreign language didactics, the following fields can be roughly distinguished: a. basic research on the learning and teaching processes in foreign language education; b. interactions and discourse styles in the classroom; c. research on learner and teacher variables d. influence of learners and teachers on the organization of the learning process at school; on goal setting, on content decisions or on evaluation procedures; e. research on the role of methods, tasks, and teaching materials; f. institutionalised forms of subject-specific content and competence research; g. use and effects of different media and of digitalization; h. managing diversity and/or multilingualism; i. feedback strategies, evaluation and test research and, k. teacher education (e.g. Aguado, Schramm, & Vollmer, 2010; Hallet & Königs, 2013a; also Doff, 2012; Jakisch, 2015; Caspari et al., 2016; Burwitz-Melzer et al., 2016; 2017; 2019; Diehr, 2018).

6.4.1 Research Methodology

As far as research methodology in English didactics is concerned, we have already noticed a certain absence of unique research approaches for the study of foreign language learning and teaching. However, in the last two decades, new empirical approaches have evolved such as lesson planning studies or task and materials devel-

opment projects. Aside from qualitative research, which accounts for a large part of young researchers' work, there are comparatively few projects with clearly quantitative research designs.[7] Quantification often only refers to independent variables such as teachers' attitudes or learners' social backgrounds, or their interest in the subject English. It focuses less on dependent variables such as performance data and their growth, which would have to be explained as precisely as possible in order to draw conclusions for future directions. For example, progress in knowledge and achievement and their possible explanation through intervening factors are less frequently studied – except in larger projects where subject didactics closely co-operates with educational psychology or with educational sciences (see below). A coupling of both qualitative and quantitative approaches (in terms of a mixed-method procedure) has become the rule now in subject-specific educational research and dominates current discourse. In English didactics, however, there are only very few large-scale studies. On the one hand, comparative studies on the English performance of third, sixth, and eighth graders across all German school types (VERA, 2009; 2012) have been conducted in recent years by the Institute for Quality Development in Education (*Institut zur Qualitätsentwicklung im Bildungswesen*, IQB) under educational-psychological directorship and coordination.[8] On the other hand, the school achievement project DESI (*Deutsch Englisch Schülerleistungen International*; DESI-Konsortium, 2008), conducted in close co-operation of language didacticians, school researchers, and test experts, also used a large sample of English learners (almost 11,000 pupils): based on a differentiated understanding of teacher and learner variables and their interaction, they compared achievements in the school subjects German and English in grade 9 (age 16) of all school types. In this way, it was possible to transform a variety of target areas into tasks and postulate models of the underlying competences (this was only achieved to a limited extent). Apart from these large-scale projects, other areas in the field are under-researched; comparative language studies, for example, and historical studies (De Cilla & Klippel, 2016) are still relatively marginal in the field.

Action research, aimed at effecting immediate changes in practice and at being more accessible to teachers, has remained marginal to this day, even in the context of teacher training (Riemer, 2013). However, it is receiving increased attention again in the context of the more comprehensive research approach called *Design-Based Research*. In this framework, researchers co-operate with in-service teachers, by de-

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7   In their review of doctoral research in language education in Germany within the time span of 2014–2018 the authors talk about a "monoparadigmatic tendendy" (Heine, Marx, Doff & Schädlich, 2020, p. 354).

8   Subject Didactics is still missing a national research center of its own, endowed with sufficient resources plan and undertake the appropriate research initiatives under its own guidance and responsibility. At least for some subjects or groups of subjects, there are already active centers in operation which promote subject didactic research in a coordinated way (e.g. Center for Research in Mathematics Didactics at the University of Dortmund and the Institute for the Pedagogy of the Natural Sciences and for Mathematics (IPN) at the University of Kiel).

veloping the research questions together and by co-operating closely in the research process with the aim of running iterative processes of developing, testing, and adapting suitable teaching sequences for a specific learning item, learning area or learner group (cf. the co-operation of several subject didactics in Bremen as an example: Creative Unit "Fachbezogene Bildungsprozesse in Transformation (*FaBiT*)", Doff & Komoss, 2017).

6.4.2 Competence Research

In the field of competence research, there are a number of critical voices concerning the legitimacy and effectiveness of such approaches (cf. individual contributions in Bausch et al., 2007). They express particular concern regarding the possible reductionist effects of competence standards on schools, following a narrow understanding of education and of foreign language education in particular. It is feared that such an understanding reduces education to the acquisition and testing of mere language skills, thus changing the notion of competence which used to be defined as the authentic ability to think and act in subject-appropriate terms, including the transformation of knowledge and insights into situation-appropriate action (according to Weinert, 1999, 2001). Contrary to such reservations, there are a number of theoretically justified models of individual competence areas circulating in the community, defined as functional sub-areas, such as listening comprehension, reading comprehension, language mediation (see above; Caspari, 2013; Kolb, 2016), foreign-language writing (Krings, 2016; see Schmölzer-Eibinger & Thürmann, 2015), and, to some extent, multilingualism (Hufeisen, 2013; 2016) which seem to be acceptable. Nevertheless, there is still a lack of conceptualisation for areas such as language awareness or language learning competence from an English didactic perspective. In recent years, the field of literary and aesthetic competencies has increasingly been focused upon, modelled, and operationalised (Steininger, 2014; Hallet, Surkamp & Krämer, 2015). There are more ideas and suggestions as to the development and evaluation of intercultural competence in the foreign language classroom. This construct has been intensely studied, subdivided into its potential components and followed in its development over time. There have also been attempts to observe and evaluate it within the foreign language classroom (e.g. Jäger, 2011; Eberhardt, 2013). But it seems difficult to validly identify positive changes in the knowledge and attitudes of English learners through intercultural teaching and learning or through corresponding real-life encounters, as it were (e.g. international student exchanges), and to demonstrate these mental or attitudinal changes as long-term effects (Papenberg, 2010; Eberhardt, 2013; Siepmann, 2016; summarised in Caspari & Burwitz-Melzer, 2017). Overall, we are still waiting for a comprehensive and valid competence theoretical modelling, which does not exist as a construct likely to be agreed upon (cf. Vogt, 2016).

Apart from this complex area requiring the application and integration of many methods of inquiry, *specific research formats* in English didactics cannot be identified

otherwise – unless corpus-linguistic procedures (focusing on lexical frequencies, semantic meaning developments or conventionalized pragmatic features) are seen as unique for quantitative language acquisition research. However, these formats are mostly in the hands of disciplinary specialists, with at best marginal participation of English didactics. Also, recent efforts for different subject didactics to co-operate, under a comparative perspective, are a step in this direction. In this context, the emergence of local or regional research alliances is remarkable. These alliances operate either in connection with researchers' training groups (organized by professional associations), via priority funding programmes of the German Research Foundation (DFG), or through excellence funding initiatives to improve the training and education of future teachers (cf. the Quality Initiative for Teacher Training by the Federal Ministry of Education and Science, *Bundesministerium für Bildung und Forschung*, BMBF, 2017, 2020). All of these activities imply a great mixture of methodologies and approaches which cannot easily be kept apart if one wants to study their relative effects and importance. To what extent basic research is being performed within these collaborative projects and to what extent 'only' subject-related didactic developmental work is done can hardly be distinguished. According to the self-conception of subject didactics, basic as well as applied research, including practice-related work, are of equal value. Both are constitutive parts of subject didactics as a science. They help students and teachers understand the different layers of "reality" in the classroom and in school and help to explain these to the actors involved as well as to external stakeholders (see also GFD, 2015).

6.4.3 Internationalization and Co-operation

As far as the embedding of English didactics within the international discourse is concerned, there are many obstacles to be overcome. Apart from a few exceptions, the German community of English didacticians is currently not very oriented towards international exchange and presence, at least judging by the bibliographies of many relevant publications. A great number of German scholars only publish sporadically in English, which results in a limited participation in (larger) international debates and a reduced influence on the exchange of scientific findings. Of course, the political, social and cultural conditions for teaching EFL are quite different in different parts of the world. Exceptions can be seen in the area of genre research, in language competence studies, and generally speaking in language testing research, especially in relation to the Common European Framework of Reference for Languages (CEFR) and its applications and adaptions – here, the connection to the international and global discourse is increasingly sought and established. On the other hand, one could occasionally question whether the Anglophone world is really interested in what is being researched and discussed in Germany these days and whether exchange beyond the familiar cultural-linguistic scope leads to any new reflection or insight. So at least it might be understandable to a certain extent why so many colleagues in the field

mainly write for a limited national audience, for the people involved in their specific subject or a neighbouring one, in subject-based education as such (teachers, students, parents, teacher trainers, researchers, etc.). They all share the (national) traditions and conventions established, accept school subjects as historically grown socio-cultural units of existence and more or less all go along with a type of didactic thinking in which "wisdom of practice" is seen as a necessary complement to scientific research and knowledge.

Generally speaking, the willingness to co-operate with representatives from other school subjects and with other subject didacticians is gradually increasing. For EFL this could be particularly true with other language subjects, because of a growing awareness of the omnipresence of multilingualism among learners and teachers and their experience of a rising number of topics with global relevance. But in practice there is not even a minimal curricular coordination in some small topical areas such as comparison of grammatical forms, of semantic networks or approaches for conceptually structuring an identical theme. And if a topic of general scope (like climate change, sustainability, destruction of the tropical rain forest or racism) is picked up within English lessons, they have generally originated in other subject areas than English. Often, one and the same topic is dealt with several times, within the context of more than one school subject, which is not only boring for the learners, but a potential reason for demotivating learners to discover links and conceptual differences between subject-specific approaches. Whether co-operation also means mutual exchange among teachers about their practices and methodology of teaching one and the same topic from different disciplinary angles remains questionable, however. There seems to be a certain tendency within the EFL teaching community to feel self-contained with one's own subject and its relative success among learners, so that there is little need to open up to the demands of co-operation or joint projects from the outside.

On a scientific level, however, the above-mentioned interdisciplinary research projects, especially in co-operation with the educational sciences, as well as the selective opening towards the neurosciences (Arndt & Sambanis, 2017) can be considered examples of co-operation with other sciences. Research on English language teaching and learning with an increasingly heterogeneous student population has recently gained support (e.g. Chilla & Vogt, 2017; Springob, 2017; Schmidt & Würffel, 2018). But other research areas are still somewhat under-developed, e.g. historical research or the exchange about theoretical issues, especially concerning the theory of English didactics as a whole or the status of subject didactics in relation to the professionalisation of teachers.

6.5 Learning and Research beyond English as a School Subject: Linking content across subjects – Generalizing subject-specific competencies

When acquiring a first foreign language, many issues arise with regard to questions and content of other subjects. Every new language is always learned on the basis of already existing world knowledge experience and language repertoires. This also applies to the first foreign language which is often already the third (or fourth) language for learners with a migration background and sometimes also for dialect speakers. As we know, linguistic knowledge and skills from the first or heritage language as much as life experience and their specifics play important roles in the process of foreign language learning, regardless whether this connection is made explicit and made use of in the classroom. As far as multilingualism is concerned, concepts of plurilingual language education have been developed in the meantime (e.g. Candelier et al., 2009), which also include a sensitisation for different cultural backgrounds and implications. In addition, the notion and potential of language across the curriculum have been further studied and described, which can support both subject-based and interdisciplinary language learning, with one of the goals to develop academic language use and proficiency as a generic ability in each learner (e.g. Beacco et al., 2016). The role of English as a global *lingua franca* is vital in this context.

6.5.1 Academic Language Use in English and Other Subjects

In terms of closeness to other school subjects and chances of co-operation for EFL, the proximity to German as a subject is particularly striking. This refers both to general reflections on the history and use of the language and to approaches of linguistic analysis. Here, the English teacher as well as the learner could make ample use of prior knowledge in different forms, available through the experience of first language acquisition. The more insights and conceptual frameworks the learners bring with them from German or other language lessons in general, the easier it will be for them to rediscover, name and develop an understanding of certain phenomena in the foreign language, without necessarily being able to communicate better at first. The same applies to using basic language functions or text types, and even more so, to activating and applying of available language learning skills. In this context, the potential of consolidating prior knowledge and of making knowledge transferable or more flexible across subjects are obvious (cf. the discussion about the development of cross-curricular language education and the establishment of academic language use, e.g. in Thürmann & Vollmer, 2017; Vollmer & Thürmann, 2013; Caspari, 2017).

The structured development of spoken and written communication skills and the critical examination of communication models are also some joint concerns of both subjects. However, it remains to be seen whether transfer actually occurs between them and if so whether it happens "by chance" or is specifically encouraged by teach-

ing. The same issues present themselves on the level of teacher education: Do teachers learn to relate their experiences and insights between their different areas of training and knowledge formation? There is a great need for future research in this matter (e.g. see the efforts for dealing with language didactic knowledge in an interdisciplinary way; Kilian & Rymarczyk, 2019). Overall, the acquisition of EFL is seen as a cognitive-constructive process and is therefore individualised to a large extent. Drawing on existing language experiences, especially on the learners' first language(s), might therefore be of considerable help to them (Yu & Odlin, 2016).

But the same also applies to the teaching of other foreign languages, which might be taught either in parallel or at a later stage. Such cross-linguistic connections have been examined in more detail in recent years from the perspective of multilingual didactics or in developing an integrated comprehensive language curriculum, respectively (e.g. Meissner, 2007; Hufeisen, 2011; 2013; 2016). This topic is now increasingly being examined on an empirical basis, often in co-operation with psycho- and neurolinguistics.

Another link can be seen with *religious studies'* and *'ethics education'*. The reference here is "interculturality", the fact that both subjects and subject didactics deal with people who hold idiosyncratic beliefs and ideas, who may act or sound "foreign", who are acculturated differently and belong to a different social group or society and who thus require and deserve a closer look at their values and their situation as human beings. In addition, foreign language learning and teaching also deals with religiously marked language and with specific, linguistically codified patterns of thinking and of behaviour at the everyday or ceremonial/ritual level. So, what EFL Education and Religious Education as school subjects have in common is the attempt to develop sensitivity and mutual understanding (e.g. by training perception and the ability to infer meaning including symbolic action as well as to interpret such meaning without judgment). They also both attempt to establish appropriate communication skills to exchange, to discuss and negotiate these mutual perceptions as well as the underlying differences and similarities in order to deal with them in a constructive manner, interpersonally and interculturally. The overlap and the differences between the two subjects involved and their respective approaches and procedures should be worked out more precisely.

6.5.2 Language Dimensions in All Subjects

Aa a matter of fact, all subject-specific learning in all non-linguistic subjects generally has much in common with English language learning in that they share similar challenges and depend on the same linguistic-communicative repertoire in reference to both the availability and control of central cognitive speech acts (or discourse functions) and subject-relevant genres. Meanwhile we know that foreign language acquisition, with its shares of everyday language, of academic language, and of technical language, contributes to the development of general academic language proficiency

as a specific variety of thinking and expressing, which, although it differs from subject to subject, is structurally comparable in all content areas and can be used throughout life (cf. academic language proficiency or the German term *Bildungssprache*; Schleppegrell, 2004, 2012; Zwiers, 2014, 2016; Beacco et al., 2016; Gogolin & Lange, 2011; Gogolin, Lange, Michel & Reich (2013); Vollmer & Thürmann, 2013; Thürmann & Vollmer, 2017).

Conversely, languages like English, but also French or Spanish, have established themselves since the 1990s as working languages in the teaching of non-linguistic subjects – with the aim of enabling both content learning and foreign-language learning simultaneously, to integrate them both into one pedagogical concept (see *"Content and Language Integrated Learning"* (CLIL) as a collective term for many different varieties of this approach all over Europe) (cf. Bach & Niemeier, 2010; Rüschoff, Sudhoff & Wolff, 2015). Without going into further detail on the different forms of CLIL, it can generally be said that this bilingual approach is theoretically well-founded and leads to better results in foreign language learning than regular (monolingual) classroom teaching – without losses in content knowledge, at least after some years of continued bilingual teaching. In other words, aside from a remarkable increase in handling the foreign language, the subject-specific knowledge balance only happens if CLIL is pursued over a longer period of time, at least for four or more years (Vollmer, 2006). It is assumed that subject-specific learning goals are initially more difficult to reach, due to the obstacles of the second language (low level understanding of complex ideas and sentence constructions). In the long run, however, CLIL leads to comparable and, above all, to better and more sustainable learning outcomes than regular classroom instruction. This seems to be mainly due to semantic in-depth processing of the content and its appropriate multi-modal, multi-level storage, taking place in the bilingual mind (Heine, 2010). Similar advantages apply to the intensification of foreign language learning through CLIL, due to the increased language exposure, heightened motivational stimulation and more demanding subject content involved (cf. for example Zydatiß, 2007).

Beyond CLIL, there are also many connections to other subjects on the level of competence definition and goals. In some cases, comparable competences in other subject-specific contexts are sought (particularly in German as a first language, as already mentioned). In other cases, the goals for a teaching unit or a lesson can be specifically linked to those of English, so that interdisciplinary and cross-curricular potentials might arise (this could happen e.g. in music, geography, social studies, or religion). Topics dealt with in the teaching and learning of English can also touch upon contexts in other subject areas, as in the case of genetic manipulation, climate change, the future of the European Union, the resurgence of nationalism, or aspects of social and political globalization: these could be typical issues or content fields in upper secondary education. On the cognitive level, for example, the linguistic control and conscious manipulation of a subject-specific proposition or contribution and its transformation into other forms of representation (like graphs, pictures, numbers,

etc.) are important goals and components of literacy or competence, not only in the acquisition of English as a communication system, but in many subjects, such as in biology or the natural sciences in general. At the same time, the subject-specific expectations, specifities and differences in defining and dealing with such cross-curricular aspects of education need to be explored and described more precisely.

6.5.3 Intercultural encounters and communication

Especially the awareness of ubiquitous (inter)culturality, the dependence of thought in general and of identity formation in particular can be generalized as a paradigm beyond English: In this respect, any encounter of two people, of two minds or two positions can be characterized as a process in the search of common ground, of looking for underlying assumptions or hidden values. And it is an act of moving closer, of rapprochement – on both the personal and professional level, requiring focused listening, constant rephrasing, and often change of perspective or simply empathy. In this respect, the inter- and transcultural ability of a learner to communicate in a foreign language such as English is only a special case of human communication: namely, an attempt to clarify the rules and conditions of interpersonal contact and joint action in trying to construct a common frame of reference and mutual understanding. Such a common ground cannot be presupposed, but must be established successively, again and again, in the interaction itself. This experience and insight is of utmost educational value.

For the reasons outlined, the acquisition of skills, competences and dispositions in EFLcan claim some general significance beyond the school subject itself, not only on the personal level, but also on a functional level. For example, in declaring the development of foreign-language discourse competence as a primary goal, English teaching and learning pursue both a personal and a practical educational dimension: The acquired steps and stages of discursive competence in an additional language implies a basic reconsideration of self-conception. It gives an extended basis for self-reflection and strengthens the competence to decide how to continue and what to do with these skills and capacities. In applying new knowledge and extended competences to all possible communicative purposes inside and outside school, in other subjects, to a deepened understanding of the world, in participating and decision-making with others, in all areas of life, these competences or capacities are become functional, yet they clearly have the potential of personal growth. New gains in linguistic, sociolinguistic and mental terms now serve a particular function in navigating the world of work, in acting as a social and political being, in relating to new challenges and content areas and in mastering life in general. The effective use of a foreign language also implies the activation and use of basic cognitive-linguistic patterns of verbal thinking and appropriate expression (cf. speech acts like inquiring or summarizing, discourse functions like questioning or explaining, genre structures like giving a report or writing an evaluation; Vollmer, 2011; Hallet, 2016). To the extent that such

behaviour patterns are established as basic elements of content-related thinking and of structuring knowledge, also in other contexts, a network of building blocks for a generalizable, flexibly usable ability to analyse, interpret and handle new situations and communicate about them is created within the learner. Such goals clearly have a functional and a personal aspect at the same time, they contribute to the education or *Bildung* of the learner in a multiple sense (cf. Byram, 2010).

The same applies to the development of text and media (or genre) competence in English language teaching, including the successful handling of digital information with variable, multi-layered meanings. All this implies the ability to draw on differently coded meanings and forms of representation, to relate them to one another and to integrate them into an overall statement or argument: becoming competent or literate in this area requires working with printed texts of different sources and also with pictures, cartoons, audio materials, songs, music, video clips, and games, apps, films etc., or with internet-based encounters and interactions in a thematic setting or project. At the same time, such multimodal text units in an additional language are usually culturally charged, i.e. they convey meanings that can only be adequately grasped and appreciated on the basis of cultural comparison. Consequently, the development of text and media competence in one subject (here: in English as a foreign language) is essentially aimed at developing an integrated capacity. It is also necessary for the (re)construction and expression of meanings in the various semiotic forms of representation, as demanded by other subjects or even cross-sectionally, as a matter of fact. In other words, the same requirements would apply to education in German, but also to history, geography, or arts, etc. Therefore, English as a subject contributes to an extended understanding of the concept of meaning and thus prepares students for effectively dealing with multimodality and becoming more literate in the knowledge society. The important thing is that learners stay in close contact with the content, with substantial problems of relating to the world at the same time, as they are increasingly taking digitally available tools into account (cf. Burwitz-Melzer, Riemer & Schmelter, 2019). Only then is the functional as well as the personal side of education being served.

Finally, English language teaching contributes to the promotion of *'language awareness'* in general, beyond the specific school subject, by creating an awareness of the linguistic form and its relationship to the meaning expressed (with all its connotations and implications). Language awareness also sharpens the senses regarding the relationships between different languages and their speakers, about language development over time and ways of making different use of the language system itself (Vollmer et al., 2017). These are basic competences of a reflective communicative nature, they are partly observable on a skill level, since they are necessary in all subjects. They have already been taken up in some competence models, e.g. in science subjects on the lower secondary level, in geography, or also in mathematics (cf. Prediger & Link, 2012). This potential for communicative attention and cognitive awareness (as stimulated and established in learning EFL, for example) can contribute considerably

to the strengthening of a self-concept, based on positive subject-specific experiences. It can also contribute to the formation of a knowledge base which will be useful in future decision-making processes, on the personal as well as content level. In this respect, the challenges and learning opportunities in English, deeply embedded into subject-based experiences, can be educationally effective far beyond that subject. To what extent such transfer actually happens or how the generic nature of certain competences is supported by teachers or students is difficult to say. In English didactics, we only know of small scale research activities concerning cross-curricular learning based on EFL or, more specifically, about studying the potential transfer of learning outcomes or generalizing them for other school subjects or out-of-school contexts. These out-of-school learning spaces or projects are sometimes given more attention than transfer possibilities in the school (cf. Feick, 2014; 2018; Rymarczyk, 2013). As a consequence, subject-didactic research should focus much more on issues of transformation and transferability and on actual transfer processes in longitudinal studies, analysing the short-term as well as the long-term effects.

6.6 Interlinking Foreign Language Didactics Research

The previous sections have focused on teaching and learning EFL and largely on the desired and observable learning outcomes. They also addressed the view of English subject didacticians on learning processes, their importance and results. Within English didactics, the exploration of *teaching* English in its various forms and with its many implications is again coming to the fore, both with regard to major fields of "instruction", to teaching methods (e.g. task-based approach, project-based approach, lexical syllabus or content-based orientation) and to institutional conditions into which teaching is embedded. Also, forms, functions and improvements of professionalization are in the focus. Some issues are controversial or clearly under-represented in research agendas (as indicated above), others are in the process of becoming prominent. For example, increasing learner diversity and its consequences for teaching and teacher training attracts more research efforts and will be given even more attention in the future because of the many unresolved questions involved. A general communicative competence orientation, critically seen in large parts of the subject-didactic community, poses great challenges in the practice of the classroom and in evaluating progress, especially on the higher levels of performance. On the other hand, the goals of teaching EFL have never been stated as clearly as today, and ever since the publication of the Companion Volume to the CEFR (Council of Europe, 2020) in a more appropriate and sophisticated way.

English didactics is undergoing a process of change, in terms of researcher generation and conceptualisations (Doff & Grünewald, 2015). On the one hand, it is a generational change that has already taken place in large part. On the other hand, it is a change in the research culture of English didactics (as probably of any other

individual subject didactics), in the wake of which new research priorities and academic practices are becoming apparent. There are good opportunities for emergent researchers to become trained and qualified on a fairly broad basis as researchers, but not necessarily as educators. There is a lack of long-term projects, of strategic research planning with regard to priority setting and of national co-operation (Vollmer, 2015). But above all there is a lack of vision concerning the educational role of English. An increasing control of the research topics by third-party funding cannot be overlooked. At the same time, many young researchers are networking successfully, consulting each other about their proposals and career perspectives (as was already the case earlier with regard to collective applications to the German Research Foundation at the turn of the century, cf. Vollmer et al., 2001). Yet many of these qualified researchers have little practical experience in the classroom and the gap between theory and practice is potentially widening.

Considering the many contact areas between learning English and learning in other school subjects, it is remarkable that the number of interdisciplinary research projects involving more than one subject is rather low. However, the focus on one's own subject area seems to be necessary to some extent. Only by controlling certain levels of investigation and by comparing variables systematically with great research effort do the specific features and perspectives of a single subject become apparent in relation to another one. In English didactics, there are selective forms of interdisciplinary co-operation between two or more subject didactics, e.g. in the field of research on bilingual teaching and learning (Diehr, Preisfeld & Schmelter, 2016). Another example would be the co-operation with a number of other subject areas and with the empirical educational sciences (*Bildungswissenschaften*) on modelling subject-specific professional knowledge and didactic competences (cf. Kunter et al., 2013; Krauss et al., 2017; cf. also Kraus & Schilcher, 2016; Vollmer & Klette, to appear / meanwhile appeared in 2023). This domain-specific approach to researching professional teacher competences was recently specified by a comparative study on explanatory competences of subject teachers in many content areas including EFL(Schilcher et al., 2020). Research projects of this type show that representatives of different disciplines need to firmly engage with each other. They must learn to understand and appreciate each other's language categories and conventions and negotiate the interpretation of empirical findings in a unified, yet differentiated way. For a field like English didactics this would be extremely helpful, even if this occasionally entailed enforcement through criteria set by external funding agencies. Yet the very specific topics and questions concerning education as *Bildung* through EFL have to be sorted out first within the subject-specific disciplinary discourse itself.

Meanwhile, interdisciplinary exchanges on pressing educational policy issues and their pedagogical consequences have progressed further and are being targeted, for example, in the field of finding appropriate approaches and solutions for inclusion (e.g. Roters, Gerlach & Eßer, 2018; Blume et al., 2019) or digital education (e.g. GFD, 2018), either within the framework of subject teaching and learning or beyond, across

subjects. Another example is the attempt to better understand certain neuroscientific foundations of foreign language learning, independent of the question whether results can be expected for classroom teaching. In some projects, the aim is to apply for funding together with the educational sciences, e.g. in reconstructing and re-designing teacher education. But more frequently now representatives of different subject didactics co-operate directly with one another, without the support or intervention from the educational or social sciences. The basis for contacting one another lies in the joint membership in the national Association for Fachdidaktik (*Gesellschaft für Fachdidaktik*, GFD), in which almost 30 subject didactics are formally organized, with the goal of pursuing common interests, sharing their research approaches and practices as well as their theoretical understanding of *Fachdidaktik* as a scientific discipline (cf. Vollmer, 2021b).

The dominant form of "interdisciplinarity" in research projects in the field of English didactics, however, is that research approaches or specific methods of other disciplines are sifted through and incorporated into one's own research repertoire and disciplinary thinking. In this case, Heckhausen (1987) has suggested using the term of *'intradisciplinarity'*, a procedure that borrows from other related sciences, but integrates everything into one's own procedural framework so that one can do without formal or external co-operation. Whether this really leads to a appropriation of the thinking and research approaches of neighbouring disciplines must remain open.

Outlook

Learning English as a first foreign language in school is meaningful also outside the immediate context in which the formal learning takes place. Whether English is suitable as a basis for multilingualism or at least as a stepping stone towards learning other (foreign) languages more quickly is an open question (Jakisch, 2015) – as is the reverse perception of some pupils, parents, and educational policy-makers, namely that English makes the acquisition of other foreign languages (almost) superfluous, since it seems to satisfy the need to make oneself understood globally. English has been referred to accordingly as the "killer language number one" (e.g. Trudgill, 2012). There is relatively little research about this dominant role of English world-wide and about the challenges this could represent. Even the creeping danger of instrumentalising the subject in the direction of teaching English as a global *lingua franca only,* without clear cultural embedding or stable identities, has hardly caused any greater concern so far. One of the reasons may be that English learners themselves are increasingly seeking membership in this very group of *lingua franca* speakers for whom intercultural learning and identity-building is not at the forefront of their subjective learning goals. Instead, they may be fine-tuning their cultural perceptions and self-conceptions with the help of concepts like fluidity, hybridity, multiple identities and

open, dynamic structures (Burwitz-Melzer, Königs & Riemer, 2013). On the other hand, given the quality of newly available electronic translation devices and their accessibility in almost all kinds of situation, it would not be surprising if the interest in institutionalised forms of teaching and learning massively decreased in the future.

As we saw above, the teaching and learning of EFL as a school subject can nevertheless contribute substantially to the expansion of knowledge, perception, sensitivity, self-reflection, linguistic ability, and communicative competence. All of these capacities are applicable in new contexts inside and outside school, including in other subjects. But the acquisition and development of these different abilities take place in the subject itself ("Learning *within* the subject"), before they are linked and expanded. By dealing with issues of more general concern or following cross-curricular questions and co-operating with other subjects, learning takes place *beyond* the immediate limits of the subject, yet still within the individual subject as well, as for example in CLIL. This type of learning can still be considered subject-based, but by linking it to another content area or discipline, it simultaneously becomes wider, more general ("Learning *beyond* the subject"). Finally, the acquisition of English as a second communication system (next to the first one) has a great deal of educational potential for the individual learner, as a person, as a social being, as an employee, or a citizen. These potentials can become all the more evident when the learner has mastered the foreign language to a certain extent and has had new intellectual, social, and (inter)cultural discourse experiences. In this respect, learning English can become an opportunity for increasing self-formation and self-cultivation, but it can equally contribute to an expansion of world knowledge, widening the radius of action and understanding, as illustrated above. This generic type of learning can be characterized as "Learning *through* the subject". This labelling of a third type of learning is justified in that the subject-specific learning results carries with them general, transferable and subject-independent perspectives which are meaningful for the unfolding personality of the learner as much as for their functional existence as social, economic and political beings. Ideally, these learning results transform into wide ranging capabilities which stay with the learner beyond the original situation of acquisition or even for life. Whether these multifaceted processes happen simultaneously, sequentially or through some sort of conscious integration we do not know yet (cf. Vollmer, 2014, 2017a). They certainly have a different pace and less visibility. So the two additional developmental sides of subject-based learning (in this case through EFL) can be identified as education or Bildung on the personal level and as education or Bildung on the functional level (cf. Frederking & Bayrhuber, 2017; Bayrhuber & Frederking, 2020; Vollmer, 2021a). These two dimensions are (potentially) part and parcel of every subject learning, they are co-served and co-addressed right from the start, they are engrained in the power structure of the subject. As such they are to be discovered and unfolded through powerful teaching, leading to powerful results – more knowledge in terms of semantic and epistemological structures to be integrated on the one hand, more knowledge enacted in terms of competencies and skills to be used appropriately on the other hand.

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7. Didactics of Religious Education

State of the Art and Research Perspectives

Ulrich Riegel and Martin Rothgangel[1]

From an international perspective, there is a wide array of formats of religious education and the related didactics of religion, ranging from strictly scientific to catechetical forms. For this reason, the present contribution is limited to the discourse in Germany and concerns both Protestant and Catholic religious instruction, including the didactics associated with both subjects. Although these two denominations make up for the majority of relevant teaching and research in quantitative terms, they do not cover the entire spectrum of religious education in schools in Germany. In addition to Catholic and Protestant religious instruction, other examples include Jewish religious instruction, courses offered by Muslim religious associations, instruction by Orthodox churches and the subject Life Organisation – Ethics – Religious Studies (LER). For all these subjects there are also discourses on the didactics of religion, and Islamic religious didactics in particular is increasingly gaining institutional presence at German universities.

In the following text the term religious education studies is often used. This is a working term that translates the German term "Religionspädagogik". In principle, religious didactics can be understood as that part of religious education studies which refers in particular to the institutional context of school, whereas religious education studies also reflects other religious learning places such as family, confirmation work, religious adult education etc.

A. Historically significant contexts and developments in the subject of religion and religious didactics

Religious education has existed since the formation of the first Christian communities, and catechetics related to it were also developed in early Christianity. In contrast, the school subject of religion and religious pedagogy or didactics are of more recent origin.

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7.1 History and understanding of the subject and the subject matter

The historical roots of Christian religious education reach back to the beginnings of Christianity (Baus, 1985, pp. 315–318; Paul, 1993). At the turn of the third century a catechumenate was established to instruct candidates for baptism in Christian doctrines and practices. For a long time the catechumenate remained the central form of religious education in Christian congregations (Baus & Ewig, 1985, pp. 318–329) and was initially directed almost exclusively towards adult applicants for baptism, although in practice infant baptism was on the rise.

In the eighth and ninth centuries the first catechisms in the question-and-answer format appeared, the aim of which was to convey basic Christian knowledge (Fleck, 2011, pp. 25–26). In terms of content they were oriented towards the confession of faith, the Ten Commandments and instructions on prayer and proper behaviour. In addition to these catechisms, attempts were made to make the Gospel and episodes from regional church history accessible to the mostly illiterate Christians by means of pictorial representations in the churches and sculptures of saints. During the ensuing Middle Ages, when society was thoroughly permeated by religion, basic skills such as reading, writing and even arithmetic were learned by applying them to religious content wherever possible.

In the sixteenth century, in the context of the Reformation, the genre of the catechism was revisited and became the central means of teaching the faith. The religious ignorance he perceived on the part of a large portion of the Protestant population and even within the parish community led Martin Luther (1483–1546) to formulate his "Small Catechism" (1529) and "Large Catechism" (1529). Here he demanded that rote learning of the Catechism should ultimately serve to internalise the articles of faith and apply them to everyday life (see Rothgangel, 2005, esp. pp. 42–46). In the course of the confessionalization the Catholic side responded through the Jesuit order: Petrus Canisius (1521–1597) worked out three catechisms (1555–1558), which are divided into the doctrines of faith, the sacraments, God's commandments and prayer.

Up to the 18th century, the only forms of religious instruction (the term is not used either) in existence were catechesis and "Christian instruction", mere precursors to what was to come later (Schröder, 2010, p. 51). It was not until the Enlightenment, especially in the 1770s, that the use of the terms "Unterricht in Religion" (translatable as "instruction in religion") or "Religionsunterricht" (translatable as "religious instruction") became established (Lachmann, 2010, p. 108 f). Thus, denominational religious instruction became part and parcel of the compulsory program at Prussian schools, which also stood under supervision by the church at the elementary school level. Parallel to the establishment of religious instruction as a regular subject of school education, a debate on the appropriate forms and contents of this education began at the end of the 19th century (Schröder, 2012, pp. 84–125). On the one hand, there were calls for religious education at school as a place of learning to be closely

linked to the two churches, which alone claimed authority in religious questions. On the other hand, there are voices that see religious education as raw material to be used in moral and civic education. Such an education would have to sever all church ties and exclusively serve the purposes of the state (Baader 2005). Manifold didactic concepts, which take into account the interplay between the requirements of both the state and the church, can be found somewhere between these two opposing views.

The National Socialist *Gleichschaltung* during the Third Reich led to religious education being the only subject manifested in Article 7 of the German constitution ("Grundgesetz"), with recourse to Article 149 of the Weimar Constitution. This is the reason that today religious instruction is considered an ordinary subject, which according to Article 7.3 of the German constitution is taught "in accordance with the principles of the religious communities". Its denominational character is due to this provision, i.e. religion at German public schools is usually described as Protestant, Islamic, Jewish, Catholic etc. Religious instruction is given. As a so-called "res mixta", its contents are the responsibility of the respective religious community, which must however subordinate itself to the educational goals of the type of school. This means that the religious community and the state work together in the realm of religious education (Meckel, 2011). Students who aren't members of any religious community or decide not to attend religious instruction for reasons of conscience can generally choose an alternative or substitute subject, which usually includes ethical or philosophical instruction. In a few federal states there are regulations which deviate from this (Article 141 GG, the so-called "Bremen clause"), for example, Berlin only offers religious instruction at public schools as a voluntary optional subject.

These observations are based on religious instruction in Germany. Nevertheless it should be mentioned that on the one hand there is a tendency in European countries to follow a religious education for which the state alone is responsible (see e.g. Norway, Canton Zurich, Liechtenstein); on the other hand there are many European countries with highly catechetical forms of religious education (such as Poland as Greece).

7.2 Origins and developments of religious education studies and religious didactics

Our current conception of religious education is relatively young. The first linguistic evidence of it can be found in Max Reischle (1889). Notwithstanding this, considerable arguments can be put forward to support the claim that religious education studies or religious didactics already originated during the Enlightenment: a prerequisite for this is the establishment of an independent school of pedagogy at the beginning of the 19th century. This led religious education to fall under the influence of pre-

dominant, pedagogical currents such as the Herbartian or, later on, the progressive education movement.

From an institutional point of view, religious didactics is determined by three factors, namely the university training of pastors, the training of primary school teachers and the practical reflection of religious education teachers (Schröder, 2012, pp. 473–477). Since the sixteenth century pastors have been prepared for their future work at their own universities. The training program also includes catechetical lectures, which are intended to prepare future pastors for their teaching tasks in parish and school. In the course of the nineteenth century, this training was also passed on to prospective teachers of religion for high school or grammar school. At the same time, during the Weimar Republic, an academization of the profession of elementary school teachers began, which replaced the traditional training model and led to a theory-based preparation for later practice. In this context, the preparation of these teachers for religious education is also reformulated in a theory-based manner. Finally, the reflection of teachers of religion on their practice, which takes place above all in professional associations and so-called catechetical societies, forms an important cornerstone of modern religious didactics. In these associations and representations, questions of religious education were considered from a decidedly practical perspective.

These historical roots characterize current religious didactics. Theory formation and reflection on practice form the two cornerstones of their research (cf. Englert, 1995, pp. 147–151) and their subject matter is religious education processes at the various places of learning, with the analysis of religious teaching and learning in school contexts dominating (cf. Schröder 2012). Within these benchmarks, however, no continuous development of the discipline can be reconstructed. "Instead, far-reaching revisions, corrections and reform efforts, up to the explicit revocation of earlier academic programs, are repeatedly encountered." (Schweitzer et al., 2010, p. 317)

In the first third of the twentieth century, for example, so-called liberal religious education studies developed, which was seen as a modern alternative to the catechetics that had previously predominated. In the reception of liberal theology in the sense of Friedrich Schleiermacher, Albrecht Ritschl or Ernst Troeltsch, people oriented themselves towards contemporary religious psychology and propagated the (re-)experience of religious phenomena with the explicit aim of promoting the education of pupils (Kabisch 1910). Liberal religious education studies was thus concerned with religious education that made the needs of the learners the starting point of its approach, and teaching and learning itself became the subject of scientific reflection. In the counter-movement called Protestant instruction (Möller, 2016) or material-cerygmatic religious instruction by Catholics (Bitter, 2016), which was triggered by the widespread experience of crisis during and after the World War, the proclamation of the Word of God in religious education was once again emphatically demanded. Religious education was no longer conceived as education in the academic sense, but as a deliberate interruption of this education by proclamation. Bible, hymnbook and

catechism were the didactic means of choice in these religious-didactic concepts. The object of the research was not so much the analysis of teaching and learning processes as the question how "the church could be brought into school".

Both paradigms reflect the two points of reference of religious-didactic research, which is oriented both towards religious teaching and learning processes, above all under the conditions of the school as a place of learning, and towards linking the contents of religious learning to lived faith – and here above all within the institutional framework of both the Catholic and the Protestant church. Since the 1970s, both points of reference have been consistently taught together in terms of religious didactics (Heger, 2017). Decisive milestones of this mediation are the correlation didactics on the Catholic side (see Würzburg Synod resolution "Religious Education in Schools", 1974) and on the Protestant side Karl Ernst Nipkov's approach to convergence theory (see Nipkow, 1975). Both approaches link religious traditions and the life situation of the pupils, thus combining the object and the subject in the didactics of religion. This is also made possible by the fact that since that time religious didactics has broadly accepted the concept of "Bildung" (Nipkow, 1990, Schweitzer, 2014a). Due to its origin in German mysticism this term is theologically relatable, emphasizes a subject-oriented view (unlike the term 'Erziehung'), it can be used as a basic pedagogical category due to its normativity, and is suitable for the theoretical integration of the different fields of action in religious education (family, kindergarten, children's service, youth work, confirmation work or sacrament catechesis, religious education, adult education, education for the elderly etc.) (Nipkow, 1990).

At present, religious education is challenged above all by the social processes of secularization and religious pluralization (Schweitzer et al. 2002) and globalization (Simojoki, 2012). On the one hand, the question is raised as to what future denominational religious education has in a society in which religious references on the one hand are disappearing more and more from the public sphere (Gärtner, 2015) and on the other hand are emerging in a new intensity and partly in radicalized forms relevant to the broader public. Models of denominational cooperation (Schweitzer, 2013) and a new definition of the concept of denominationality (Tautz, 2015; Schweitzer, 2017) are the first results of this discussion. On the other hand, consideration is being given to how these phenomena can be responsibly dealt with didactically in religious education. Two prominent concepts of this discussion are the competency-oriented and the performative didactics of religion. Both receive a great deal of attention but are also controversial. While the former deals critically and constructively with the current educational policy and educational science trend towards competence orientation (Sajak, 2012; Rothgangel, 2014; Obst, 2015), the latter is related to the so-called 'performative turn' in cultural studies (Leonhart & Klie, 2003). As an argument it uses the so-called 'breaking with tradition' of religion, which leads to a situation where fewer and fewer pupils have had experiences with religion in the family and community that can be reflected in religious education. Accordingly, it focuses attention on

the staging of religion on a trial basis or intends to offer participation on a temporary basis (Mendl, 2008).

What all these considerations and approaches have in common is that they are not so much comprehensive religious-didactic drafts or large-scale concepts, but rather address a specific problem of religious education in a targeted and selective manner. As a consequence, the current religious-didactic discussion is characterized by a multitude of such approaches and concepts, some of which are unrelated to each other (see Grümme, Lenhard & Pirner, 2012; Schweitzer, 2014b). In order to emphasize this plurality, four further examples may finally be mentioned in keywords: Inter-religious learning (cf. Schweitzer, 2014c), inclusive learning (Pithan & Schweiker, 2011; Pemsel-Maier & Schambeck, 2014), constructivist religious didactics (Mendl, 2005; Simojoki, 2014) as well as children's and youth theology, which emphasizes the intrinsic value of the religiously relevant constructions of the pupils (Büttner et al., 2014). From the designations alone it is clear that these approaches are by no means competing, but rather complementary.

B. Learning in the subject of religion and its subject-matter didactic research

7.3   Aims, competences and contents of the subject religion

7.3.1 Goals

The central goals of Protestant as well as Catholic religious education in Germany can be gathered from the titles of the two Protestant memoirs "Identität und Verständigung" (1994) and "Religiöse Orientierung gewinnen" (2014). Current religious education is primarily concerned with enabling pupils to orientate themselves in the diversity of religious traditions and concepts of meaning found in the everyday world, to develop their own point of view on those traditions and concepts of meaning, and to deal respectfully with people who have a different religious point of view from their own. These goals can be summarized in keywords by the term "ability for plurality" (EKD, 2014, p. 12 and others). In no way does this dilute faith or render it meaningless. Rather, it shows a way to deal appropriately with religiously and ideologically plural situations in the context of one's own faith. (Schweitzer, 2015, p. 25) Religious education at schools as places of learning intends to ensure that pupils' religiosity is formed by coming to terms with their own denomination and with other religions and world views (Hemel, 1988; Angel et al., 2006). In this sense, the most recent document of the DBK (2016, p. 11) also states: "Confessional religious education aims, by imparting knowledge and skills in dealing with the Christian faith and other religions, to develop religious awareness in personal and social life. (…) In dealing with the claim

to truth and the existential significance of the Christian faith, which challenges the organisation of life, pupils can examine and, if necessary, revise and further develop their own religious and moral convictions."

These formulations also highlight the denominational relevance of the debate on religion at the school as a place of learning, because the preoccupation with religious diversity and the question of what place one wants to occupy within this diversity takes place within the scope of the Christian confession. This denominational reference is justified above all by the life-world argument that there is no Christian faith beyond denominational reality (DBK, 1996, 50–57; Schweitzer, 2017, 50). Such a denomination – despite all openness towards other denominations – has existential depth, fundamentally shapes the identity of a person and is therefore not arbitrarily negotiable (Woppowa, 2015). In this sense, there are also analogies to Jürgen Baumert's definition of religion in the canon of school subjects as a representative of a "constitutive rationality" (Baumert, 2002, p. 113).

In order to open up to the pupils an access to themselves and the world, religious education tries to promote their religious competence. In this application, competence does not match the concepts of the same name, which can be operationalised by educational standards and which can be clearly verified empirically, and which dominate the discourse on competence in educational science (Hemel, 2012, pp. 21–23). Rather, this concept of competence refers to the goal of the abilities and skills, operationalized in educational standards, and describes a dimension of human personality. Religiousness is thus defined as an anthropological dimension, analogous to, for example, musicality and linguistic ability, which can and should be developed (Hemel, 1988, pp. 543–690). A promise of the category 'religiosity' is that it can be connected to theology and the human sciences. From a theological perspective, religiosity proves to be the anthropological reference point of God's revelation, which can be described in the perspective of the humanities as a specific way of interpreting the self and the world in its different dimensions and life-historical changes. It is the merit of Ulrich Hemel that he took up this anthropological category of 'religiosity' as early as 1988, differentiated it into five dimensions and derived religious competences from them in turn. Accordingly, he divides religious competence into the affective dimension of religious sensitivity, the cognitive dimension of religious content, the expressive dimension of religious expressiveness, the interactive dimension of religious communication and the ethical dimension of religious lifestyle (Hemel, 1988, pp. 564–573).

7.3.2 Competencies

Hemel's model of religious competence can easily be transformed into a model of religious competence, which is embedded in educational standards to guide religious instruction in schools (Obst, 2015). Thus, obvious analogies between Hemel's dimen-

sions and the process-related competencies can be found in the EKD model. The latter are (EKD, 2011, p. 17):

1) "Ability to perceive and represent: perceive and describe religiously significant phenomena",
2) "Ability to interpret: understanding and interpreting religiously significant language and testimonies",
3) "Ability to judge: to judge well-founded in ethical matters",
4) "Ability to dialogue: to participate in dialogue with other religions and world views by arguing",
5) "Ability to shape and act: to act and participate in shaping religiously significant contexts".

Hemel's general competences for Catholic religious education also take up dimensions analogously. They are e.g. for the area of the secondary level I (DBK, 2004, p. 13):

1. Perceiving religious phenomena
2. Understand and use religious language
3. Understanding religious testimonies
4. Represent religious knowledge
5. Judge in a well-founded manner in religious matters
6. Communicate on religious issues and beliefs
7. Acting out of religious motivation.

Both models of educational reform implement the competence orientation that has come to the fore. On the basis of the – implicit or explicit – orientation towards a fundamental model of religious competence, the specific religious rationality is taken as the starting point for the conceptualisation and operationalisation of subject-specific competences and educational standards. This is not trivial in view of the school as a learning environment. For example, Hemel's ethical dimension, which has found its way into the respective models in the competencies "ability to shape and act" and "acting out of religious motivation", requires a precise definition of content, because religious education cannot demand a religiously motivated way of life for theological (unavailability of the Holy Spirit) and pedagogical reasons ("prohibition of indoctrination", freedom of the person). However, it is part of the essence of a confession that one wishes to express in one's life what has assumed existential importance. In order to grasp the specifics of religion, religious education therefore also requires an examination of the ethical dimension of religious convictions. This facet of religious competence thus points precisely to the range of possibilities of religious education at the school as a place of learning: It is about an examination of the fact that people shape their lives according to their (religious) convictions. For success at school it is crucial that learners recognise this connection. Moreover, it is perfectly legitimate for

pupils to find this religion or belief unconvincing and that it does not motivate them to shape their lives according to its principles. In this sense, the ethical dimension of religious competence is a necessary characteristic of religious education in public schools. At the same time, however, it also marks the limit of this kind of education, because it shows that religious identification processes and faith cannot be operationalized. Here ultimately the unavailability of education and Christian faith takes effect, which simply cannot and should not be functionalized.

The EKD and DBK competency models supplement these process-related and general competencies with subject and content areas. The model for Protestant religious education uses a rationale for this that covers the pupils' own faith, the Christian faith and other religions and world views, and religious, cultural and social contexts on a global horizon (EKD, 2011, p. 17). In this rationale the individual view is thus placed in larger contexts. In the model for Catholic religious education, however, the content areas are oriented towards the classical discourses of theology, namely "Man and World", "the Question of God", "Bible and Tradition", "Jesus Christ", "Church" and "Religions and Worldviews" (DBK, 2004, p. 16). What both systems have in common is that they link back the generally held abilities and skills to subject-specific contents, which Hemel's concept of religious competence addresses.

In the Protestant model of subject-specific competences, the process-related competences and the subject areas are viewed as two dimensions of a matrix, from the interlocking of which eight competences for the subject of religion are derived. These are (EKD, 2011, p. 18):

1) "Perception and expression one's own faith and experiences and reflection against the background of Christian and other religious interpretations.
2) Understanding of basic forms of biblical tradition and religious language.
3) Knowledge and ability to participate in individual and church forms of the practice of religion.
4) Providing information about the evangelical understanding of Christianity.
5) Perception of ethical decision-making situations in individual and social life, understanding of the Christian foundation of values and norms and ability to act in a reasoned manner.
6) Dealing with other religious beliefs and non-religious world views in a well-founded, rational way, handling criticism of religion and demonstrate the justification of faith.
7) Respectful communication and cooperation with members of other religions and with people of other world views.
8) Identify religious motives and elements in culture, reflect them critically and explain their origin and meaning".

Based on these eight competencies, the Protestant model formulates concrete educational standards, i.e. several educational standards are derived from each of the eight

competencies. For example, two educational standards in the context of the fourth competency above are "Pupils can understand the foundations of the Christian faith and interpret them in conversation" and "Pupils can represent focal points in the history of Christianity and take a well-founded stand on them".

In the Catholic model, on the other hand, the content areas are operationalised directly on the basis of four to five educational standards each and these are further specified by more or less extensive lists of content reference points (DBK, 2004, pp. 18–29). For example, one educational standard on the subject area "The Question about God" reads: "Pupils can use examples to show which human experiences raise the question about God today". This is further differentiated by the indents "show by example that human amazement, searching and questioning can reveal an access to God" and "set existential experiences (e.g. basic trust, love, longing, suffering) in relation to the question of God". In this way a close-knit network of subjects and operators is created, which do not define Catholic religious education in detail, but describe it very precisely in terms of content.

In this context, it should be expressly noted that the formulations in both models are not yet educational standards in the strict sense, due to insufficient empirical verification. Rather, these formulations are in a sense on their way to becoming educational standards for religion (Bayrhuber, Leinfelder & Faber, 2011; Rothgangel, 2009). This is also due to the fact that the discourse on religious education has long focused on the theoretical discussion of the pros and cons of such competency models for religious education. In the meantime, however, there seems to be a broad consensus that certain areas of religious education can be standardized without covering the entire field of religious education (e.g. Korsch, 2006).

7.3.3 Content

Goals and competencies cannot be formed without content. Thus there is a canon of basic knowledge which refers to the traditional theological tracts of the specialist science of theology. This canon includes, for example, biblical texts (from secondary school onwards, increasingly in conflict with Old Testament and New Testament science, which requires, among other things, a basic knowledge of the history of Israel or the environment of Jesus, as well as knowledge of the text genres, e.g. of psalms, miracles and parables), basic features of church history (e.g. monasticism, Reformation, Church under Nazism), foundational topics of dogma (e.g. question about God, creation, life after death) and ethics (e.g. preservation of creation, "What should I do?") as well as basic knowledge in religious studies regarding other religions and world views. In addition, there are further sources for the contents of religious education: e.g. religious symbols and practices, identity issues of the pupils as well as current social problems (e.g. poverty – wealth, war – peace). It is obvious that each denomination sets its own priorities. The Reformation and Martin Luther, for

example, are also covered in Catholic religious instruction, but take no more space in Protestant religious instruction.

In general, religious education is shaped by the social environment in which it takes place. The respective historical and social context also determines the development of the contents of religious education. Thus, Protestant instruction or material-cerygmatic instruction could rely on the fact that the Protestant or Catholic milieu in which the pupils live gives meaning to the subjects taught. In this environment a solid explanation of the core content of the respective faith is sufficient. Today's religious education is aimed at more or less religiously socialized pupils who live in a more or less religiously plural and often secularized environment in the sense of Charles Taylor (2009). A solid education about the core of the respective denomination is of no importance, because it has largely faded away in the day-to-day life of many pupils. Therefore it is important on the one hand to discover and decipher religious symbols and motives in everyday culture, which turns popular movies, music or clips into essential contents of religious education. On the other hand, some hold the controversial view that a trial staging of religious events (e.g. festivals, prayers) is an important prerequisite for pupils to be able to reflect on their religious subject matter in the first place.

To put it pointedly one could summarise: Today's religious education is no longer about differentiating the content of a religious competence brought into the classroom and explaining it in a subject-specific way. Instead, it concerns itself with developing such a competence among the pupils. Not only is the choice of content geared to this task, but also the way in which it is introduced into the lessons.

7.3.4 Methods

In our opinion, subject-specific methods that are used exclusively in religious education do not exist. One reason for this is that specific religious practices (e.g. prayer) are not part of the methodological repertoire of religious education for theological and pedagogical reasons. On the other hand, specialized theological methods such as the hermeneutical method or techniques of historical criticism, which are adopted mainly in higher grades of religious education, are also common in domains of social and literary studies. In addition, methods from the cultural sciences or their adaptation for religious education (e.g. bibliodrama, bibliolog) increasingly play a role, but are not limited to religious education.

7.4 Perspectives of research and development in religious education

Formats of religious-didactic research

The traditional classification of religious-didactic formats is strongly determined by the methods chosen. Thus Bernd Schröder (2012, p. 274) lists five dimensions of religious education reflection, each of which has its own methodological profile, which is not necessarily free of overlaps: historical, empirical, systematic, comparative and action-oriented. Such a rationale is reflected, for example, in terms such as 'empirical religious education studies' (Porzelt & Güth, 2000) or in working groups such as historical religious education studies. However, this approach conceals the fact that relevant projects in religious education usually include several of the methods mentioned. Empirical projects, for example, are based on a systematic reflection of their object of inquiry and often lead to didactic reflections.

If one follows the definition of a document published by the German "Association of *Fachdidaktik*" (GFD), a format is defined by "the totality of all content, methodological and research-organizational aspects […] that can be described in the planning, implementation, evaluation and utilization of results of a didactic research project" (GFD, 2016, p. 2). According to this view, a primarily method-oriented logic is insufficient. Alternatively, we choose characteristic questions of religious-didactic research as the starting point for the following description, because these condense the research project. Without claiming to be exhaustive, the following fields of research in religious-didactic research can be cited:

a) the legitimation of religious education and self-assurance about its character and history,
b) the development of concepts of religious-didactic education and the scientific-theoretical reflection of religious education studies,
c) the analysis of the religious starting conditions of teachers and learners and the analysis of factors that determine religious education (e.g. curriculum and textbook analyses);
d) the analysis of teaching and learning processes in religious education;
e) the didactic reconstruction of teaching subjects.

Ad a) Religious education in Germany is currently confronted with a dual challenge. On the one hand, its existence is being questioned in the face of an increasingly secularized society. On the other hand, in view of religious diversity, its denominational character is no longer considered up to date and there are many calls for religious education to be delivered in a more academic framework. Both questions stimulate a norm-oriented format of religious-didactic research that, in dealing with the epistemological concepts of denominationality/rationality of religion and edu-

cation, ensures the specific character of religious education and discusses its legitimacy in public schools. Methodologically, this format is dominated by systematic reflection, on the basis of which the normative implications of the epistemological concepts mentioned are interpreted and legitimized (e.g. Dressler, 2006; Gärtner, 2015). However, there are also historical projects working in this format (Schweitzer et al., 2010) as well as, increasingly, comparative methods to elaborate the specific nature of denominational education (e.g. Jäggle, Rothgangel & Schlag, 2013).

Ad b) The development of religious-didactic concepts is another format that works strongly with systematized methodologies. Here, however, the focus of reflection is not a given standard, but the interpretation of theoretical concepts, on the basis of which a new view of the reality of teaching and corresponding innovations are possible. In this process, the stimulating concepts are often borrowed from neighbouring disciplines such as philosophy (e.g. Alterity with Grümme, 2007) or sociology or psychology (e.g. Biography with Lindner, 2007). In quantitative terms, this format is likely to dominate current research on religious education. Examples include constructivist religious didactics (Mendl, 2005) or the theology of children and youth (Büttner et al., 2014).

In view of the plurality of concepts of religious education studies, considerations of the theory of science on religious education studies prove to be indispensable, which contribute to confidence in oneself and determine a place in the context of theology as well as in an interdisciplinary context (e.g. Gennerich & Riegel, 2015; Rothgangel, 2014).

Ad c) The format of the analysis of conditional factors of religious education is realized e.g. by curriculum and textbook analyses, with qualitative content analysis often being used as empirical method (e.g. Fiedler, 1980; Spichal, 2015). The analysis of the religious initial conditions of teachers and learners is also mainly based on empirical methods, with qualitative and quantitative methods balancing each other by now. The aim of this format is to determine as precisely as possible the limits of understanding within which learning processes take place in pupils and the attitudes of the teachers in their lessons. Topics of this format are, for example, the religiosity of children and young people (qualitatively e.g. Prokopf, 2008; quantitatively e.g. Streib & Gennerich, 2011) and (future) RE teachers (e.g. Feige et al., 2001) or attitudes of RE teachers to RE lessons (e.g. Rothgangel, Lück & Klutz, 2017).

Ad d) The format of the analysis of teaching and learning processes in religious education also generally employs empirical methods. They range from the qualitative reconstruction of teaching processes (e.g. Dressler, Klie & Kumlehn, 2012) to intervention studies in pre-post-design (e.g. Riegel & Kindermann, 2017) and didactic development research (e.g. Schwarzkopf, 2016). The aim of this format is, on the one hand, to better understand how learning subjects are presented and processed in class and, on the other hand, to test the extent to which didactic concepts meet the expectations associated with them.

Ad e) The format of the didactic reconstruction of teaching subjects is currently gaining greater attention within religious didactics. Systematic and comparative methods dominate here, often in combination with didactic reflection. The discourses of systematic theology are usually points of reference for this format (e.g. Schambeck & Pemsel-Maier, 2015), but also literature (e.g. Langenhorst, 2014) or current events (e.g. Zimmermann, 2016). Because of the wide range of topics that are now covered in this format, we will not provide a more detailed list of examples here.

Competence research

As a result of Ulrich Hemel's "habilitation" (postdoctoral thesis), published in 1988, the religious education discourse was able to draw on important preliminary work for the discourse on competence after the so-called "PISA shock". Seen as a whole, this discourse in the last fifteen years is characterized by three main features: First, a controversial discussion on whether the competence discourse should be adopted at all. Thus, from an education theory perspective, the unavailability of education was emphasized and an incompatibility with measurable standards and competences was derived from this (e.g. Ritter, 2007). Secondly, a broad theoretical discussion on the establishment of competence models took place, which led to various competence models of religious education (Obst, 2015). Thirdly, there are empirical studies to test and, if necessary, revise these competence models (e.g. Benner et al., 2011; Hennecke, 2012; Ritzer, 2010; Schweitzer et al., 2017; in the context of teacher professionalism e.g. Heil, 2006). However, this research is not yet as far developed as, for example, that in the mathematical-scientific domains.

Relationship to other sciences and professional practices

Unlike in some other European countries such as England or Sweden, where didactics of religion is assigned to the educational sciences or religious studies, didactics of religion in Germany is usually understood as part of theology (see Gennerich & Riegel, 2015; Heger, 2017; Schambeck, 2013; Schweitzer, 2006, pp. 271–276). It represents a "regional segment" (Englert, 1995, p. 154) of practical theology, which is constituted by its object of research – namely religiously relevant educational processes. Undisputedly, the other theological disciplines, i.e. Biblical, Historical and Systematic Theology, form central points of reference for religious-didactic reflection and theory formation (see Plasger & Pemsel-Maier, 2015; Rothgangel & Thaidigsmann, 2005), and there are subject-specific partial discourses within religious didactics in church history and biblical didactics. However, the concrete relationship of religious didactics to the other theological disciplines proves to be complex. On the one hand the just mentioned partial discourses mainly mirror the theological disciplines: Scientific insights into their teachability and learnability are questioned and incorporated

into corresponding teaching scenarios and concepts. The relationship to the relevant theological faculty is only explicitly discussed in a few relevant studies, and here again it is primarily the significance of this faculty for the corresponding didactics that is the subject of discussion, while the significance of didactics for the faculty is rather scarce (e.g. Lindner, 2007, pp. 307–311). On the other hand, didactics of religion itself speaks of a "convergence model" (Lämmermann, 1998, p. 86 f) or "dialogue model" (Heger, 2017, p. 537) or model of "interdisciplinary cooperation" (Schweitzer, 2005) when it comes to its relationship to the other theologies. According to this model, didactics of religion ties theology back to its biographical, socio-cultural and (developmental) psychological contexts and through this contextualization itself has a theological productive effect (see Kunstmann, 2005; Rothgangel & Thaidigsmann, 2005). Didactics of religion helps the other theological disciplines "to see and understand that in the context of the acquisition of faith convictions also these themselves change, that faith is always a dynamic process, and that therefore religious learning and education processes are particularly suited to producing a living theology, which also does not remain without consequences for theology itself." (Heger, 2017, p. 539)

Beyond theology, the educational, human and social sciences are important points of reference for religious-didactic reflection, with the definition of the relationship of religious education studies being reflected on under point 6 "Networking Religious Education Research".

After religious learning was for centuries closely integrated with religious practices, from the 1960s onward religious practices played a rather subordinate role, especially in the context of certain concepts of religious education (e.g. hermeneutical religious instruction; problem-oriented religious instruction). Only in the context of symbol didactics (cf. Halbfas, 1982; Biehl, 1989) from the 1980s onwards and finally with the so-called performative religious education studies the importance of religious practices for religious didactics was again emphasized. In this context, religion is primarily understood as a practice of physical performance that is to be presented as an experiment in the context of public schools (Leonhardt & Klie, 2003). As controversial as this approach is in detail (Mendl, 2016), it draws attention to the problem that increasingly pupils attend religious instruction without having experienced religion as practice in the family context.

C. Learning and research beyond the subject religion

7.5 Linking content across disciplines and generalising specialist skills

As a human being one cannot avoid interpreting one's life and the world. One of many forms of self- and world-interpretation is the religious one. By fostering the students'

ability to reflect on themselves and the world, the subject of religion fundamentally contributes to a nuanced interpretation of themselves and the world (Hemel, 1988). This general perspective is expressed beyond the school subject of religion in relation to quite a number of different other subjects (see Pirner & Schulte, 2010). At this point, only two examples will be mentioned:

(1) The effect of the Bible is manifested in many ways, for example, in the history of literature and art in Europe. Here it concerns aesthetic modes of reception, processing and further development of biblical contents, which on the one hand are to be appreciated for their own sake, on the other hand are insufficiently understood without religious education. In this sense, there are joint projects with German and history classes, art and music classes (Pirner & Schulte, 2010).

(2) Certain content areas such as the biblical stories of creation require, beyond the subject of religion, a definition of relationships with the big bang theory of physics and the evolutionary theory of biology, since creationism and scientism are widespread among young people and in society. Both creationists and scientists misjudge the differences between the religious and scientific modes of world encounter each in their own way (Bayrhuber, Leinfelder & Faber, 2011; Rothgangel, 2009). The distinction between religious and scientific perspectives, which is necessary for an appropriate determination of the relationship between science and religion, has an educational potential that is ideally promoted by phases of cooperation between religious education and physics and biology lessons.

The potential for generalization of religious competencies can be illustrated by taking the above-mentioned five process-related competencies of religious education of the EKD (2011) as examples. Their formulation alone initially describes the competence in a more general, "religion-independent" form; only in the concretion after the colon is there an explicit professional reference to religion. Two examples will substantiate this in the ensuing text. The first refers to "ability to engage in dialogue: to participate in dialogue with other religions and world views by arguing": Ability to engage in dialogue is developed through learning in the subject of religion on the basis of dialogue with members of other religions and world views. At the same time, interreligious learning is an essential component of intercultural learning and thus generally also supports the ability to engage in intercultural dialogue.

The second example comes from the process-related competence "Perception and representation skills: Perceiving and describing phenomena of religious significance": In the subject of religion, through the examination of selected psalm words (Baldermann, 1986; Oberthür & Mayer, 1995) or elementary sentences from the Book of Job (e.g. "My eye is darkened with sorrow, and all my members are as a shadow", Job 17:7; cf. Oberthür, 1998, pp. 89–131), students' ability to perceive and describe their own emotions such as grief, lamentation, despair, joy, etc. can generally be promoted.

On the basis of the latter example it can also be shown that it would mean a narrowing of religious education if it were limited to religious competence and operationalisable aspects. Rather, the unavailable and non-operationalisable aspects

contained in the concept of education are essential for the subject of religion and characterize a central interdisciplinary dimension of religious education. It is precisely this area of education that must be given sufficient space and time in religious instruction so that, among other things, a capacity for perception, expression and communication can develop with regard to questions of identity and sensitive areas of personality. Dealing with certain biblical words serves the purpose of self-education, and ultimately it is unavailable and must be respected in which framework pupils are prepared to express and communicate deep emotions.

7.6 Networking research in religious education

The majority of religious-didactic researchers define their own relationship to the educational, human and social sciences as interdisciplinary (Schröder, 2009, p. 268). According to this, in research and thinking on religious didactics theological, educational, psychological, sociological, etc. theories and concepts interpenetrate each other in a "dialogue-critical relationship" (ibid.), in which the convergence of these theories and concepts leads to a better understanding of religiously relevant educational processes without concealing the divergences of these theories and concepts. Thus the interdisciplinary model sets high standards, which raises the question to what extent it corresponds to the reality of religious education (see Rothgangel 2014). In fact, only a few research projects are also staffed on an interdisciplinary basis (e.g. Forschungsgruppe, 2015; Gärtner & Brenne, 2015; Kraus et al. 2017). If one goes into detail, the interdisciplinary constellation often compensates for a lack of competence without the project having any noticeable impact on the cooperating discipline (e.g. Research Group, 2015), or the reflections of the participating scientists take place primarily in the context of their own discipline (e.g. Gärtner & Brenne, 2015).

In view of this assessment, it seems more appropriate for us to understand the relationship of religious didactics towards the educational, human and social sciences as intradisciplinary in the sense of Johannes van der Ven (1990, pp. 103–130). An intradisciplinary relationship is characterized by the fact that a science adopts theories and methods from other sciences for its own research and integrates them into its own knowledge process. In fact, every religious-didactic project is faced with the challenge of developing its research question in the context of its own discipline, of searching for suitable methods and concepts to answer this question, in which case it is also necessary to look into the reference sciences, and of reintegrating the knowledge gained with the chosen methods into the religious-didactic discourse. There is no question that the critical dialogue with theories and methods of education and human sciences, which is emphasized in the interdisciplinary model, plays an important role in this process. It is precisely the adoption of theories and concepts from the reference sciences that creates innovative potential for religious didactics, and the integration of such theories and concepts into religious-didactic paths of

knowledge ensures that innovative approaches can be connected to the previous religious-didactic discourse. At the same time, the intradisciplinary model takes the burden off the actors of research in religious-didactics. Although they must be able to competently and consciously embrace the theories and methods borrowed from the reference sciences, excellence in these theories and methods in the sense of the reference sciences is not necessary.

Outlook

In the preceding three sections, the distinction between religious learning and its religious-didactic investigation was constitutive, which ultimately reflects the distinction between the first and second level of observation according to Niklas Luhmann. Religious learning is currently challenged by the processes of secularization, globalization and religious pluralization, so that research on religious education must also react to these processes. This leads on the one hand to methodological specialization and on the other hand to the internationalization of corresponding research. Both of these factors can lead to a situation in which didactic research on religion moves away from the practice of religious learning, because the relationship between the two levels of observation is no longer obvious. But both can also lead to the clarification of the practice of religious learning on the ground, which can appear in a new light through precise methods and international comparison.

The same ambivalence arises for the networking of research on religious education with that of other subjects. On the one hand, this networking is indicated because the school as a common reference point allows and suggests comparative perspectives. On the other hand, the particularity of the individual subjects sets limits to the extent of networking, which not least of all shows the contingency of the general concepts of educational-psychological research.

Especially for research on religious education, however, it seems appropriate for us to take up the challenges of methodological specialisation, internationalisation and subject-related didactic networking in order to reflect and further develop the logic of religious learning in the light of general scientific concepts.

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Part C
Comparative Analysis and Results
From 17 Subject-Matter Didactics

So far we have documented the two examples of subject-didactic reports, taken from English as a Foreign Language and Religious Education: The other 15 self-reports about the state of the art and the future research perspectives within the respective subject didactics have been structured the same. They were all published in German next to one another in one volume, so to allow for detailed comparison and checking back and forth (cf. Rothgangel et al., 2021). These documents reflect a richness of description, of reflection and of insight, which did not exist before, certainly not in sequential organization. These reports invite a comparative analysis along the six dimensions under scrutiny and for searching commonalities as much as distinct differences among the individual subject didactics in relation to the points defined. In the following Part C we will look at the major results of the comparison among the 17 subject-didactic disciplines and summarise them in English, hoping for an international exchange about them.

8. Comparison and Analysis of the Subject-Didactic Reports

Helmut Johannes Vollmer and Martin Rothgangel

In the following we will present the sequential analysis of the 17 subject-didactic reports written by key persons from the different subject didactics involved (see below). We have looked at those reports as highly informative "texts" reflecting much of the professional discourse within each of the subject disciplines and compared them under certain categories with the help of Grounded Theory (see below), based on six topical areas of self-reflection to which all authors of those reports responded, after having agreed to them beforehand.[1]

The topical areas which were addressed and covered by the self-reports, initially comprised three underlying dimensions: they were concerned with reflections about A. the *history* of a subject, B. about the learning *within* that subject and C. about the learning *beyond* the individual subject (cf. Rothgangel & Vollmer, 2017). At a later stage, we extended the scope of our survey in order to gain more specific information. In particular, every single one of these three original dimensions were rephrased and subdivided further into two new dimensions each. This led to a relatively substantial data-generating approach in which a number of central issues in the self-understanding of the subject-matter didactics were addressed, whereas others had to be reserved for a later treatment in follow-up studies, based on the same comparative design principle. By subdividing the original dimensions with a focus on *subject-matter and the school subjects* on the one hand and a focus on the *related subject didactics* and their research on the other hand, we gained a more precise and a more differentiated picture of the state-of-the-art and the research perspectives of each subject-didactic discipline. Accordingly, their self-presentations were all structured alike along the following six dimensions (*in italics, below*) (cf. also Rothgangel, 2021, p. 15–16; Rothgangel & Vollmer, 2020):

A. Historically significant contexts, developments in the subject and the related subject didactics (Dimension 1+2)
   1   *History and definition of the subject-matter*
   2.   *Origins and development of the specific subject didactics*

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1   In the following, we will use the term "text" or "subject-specific text" as well as "report" or "self-report" accordingly when referring to the 17 subject-specific contributions in response to the six dimensions or survey questions listed. These texts are the data base for the six sections of analysis and their summaries following.

B. Teaching and Learning *within* the subject and the scientific study of it (Dimension 3+4)
  3. *Goals, content and competences of the subject*
  4. *Perspectives of didactic research and development*
C. Learning *beyond* the subject, researching interdisciplinarily (Dimension 5+6)
  5. *Linking content across subjects and generalising subject-specific competences*
  6. *Networking research in subject-matter didactics.*

Ultimately, the six dimensions related thematically to the three areas of investigation A., B., and C., as shown, but the tasks and questions were further differentiated so to catch and cover the specifics of each school subject and of each respective subject didactics:

Dimensions 1 + 2: The focus here lies in the historical dimensions of the development of school subjects and of the respective subject didactics dealing with those school subjects, reflecting and researching them over time. This includes looking at how they were developing themselves gradually as scientific approaches and thus establishing themselves as academic fields at university.

Dimension 3 + 4: These two parts concern themselves specifically with the goals and the content and indirectly also with the intended effects of subject-matter teaching and learning. This comprises the intended elements and structure of knowledge and competence to be strived for in a specific school subject on the one hand, as seen, interpreted and supported through the respective subject didactics. On the other hand, it deals with the self-definition and self-reflection of exactly these subject didactics as research disciplines: analyzing and evaluating subject-matter teaching and learning, also reflecting and evaluating their own achievements and progress as scientific endeavors and academic disciplines.

Dimension 5 + 6: These last two dimensions have to do with attempts and perspectives of individual school subjects to look beyond their own (self-defined or institutionally imposed) limits in content and procedural terms and how to start some forms of curricular cooperation with other subject areas in the interest of a more integrated and holistic education of the learners. On the level of subject didactics, this will be followed by reflections about attempts and movements towards interdisciplinary cooperation between two or more subject didactics, in terms of joint research planning and potential networking, as far as these already exist or are envisaged.

By focussing in parallel on *subject-matter issues* and the *school subjects* on the one hand and on *research within the corresponding subject didactics* on the other hand, the resulting texts became longer than anticipated, but also more meaningful and conclusive. The written reports were produced by small teams of key representatives of the respective subject didactics themselves in an independent way. In spite of their efforts to present the findings and the discourse within their subject-didactic disciplines as

objectively as possible, it should be noted that certain subjective accentuations by the authoring teams were unavoidable and shows in the data sets of these 17 texts.

The overall text corpus was then analysed in-depth through established procedures, providing the data base for a comprehensive presentation of the results, which were first published in German (Rothgangel et al., 2021). These are now being presented in a translated version in English for the first time. In terms of research methodology, these comparative bottom-up procedures were again based on Grounded Theory (see for the following in detail Rothgangel & Saup, 2017). The two general techniques that form the basis for the coding strategies used in Grounded Theory are *constant comparison* and constantly *asking questions* (Strauss & Corbin, 1996, p. 44). In this sense, grounded theory may be described as an analytic method of constant comparison (Glaser & Strauss, 1967, pp. 1 and *passim*). Grounded Theory distinguishes between three basic coding methods which are frequently merged in practice (Strauss & Corbin, 1996, p. 40): open coding, axial coding and selective or theoretical coding.[2] Wiedemann (1991, p. 443) provides the following formulation to summarize the "basic idea" of these three types of coding procedures: "Open coding relates to the formation of categories; here, the data are broken down into as many categories as possible. Axial coding aims to enrich and develop each category. Lastly, theoretical coding serves to integrate the different categories into a single model." The analysis of the 17 reports was primarily based on open and axial coding. This is quite in line with Grounded Theory, since its methodical steps are not to be understood as "rigid" laws, but as "rules of thumb" that can be varied depending on the object of study (Strauss, 1987, p. 7; Strauss & Corbin, 1996, p. 41).

We are aware that Grounded Theory is not the only method of comparison available, but one among others in terms of dealing with the interpretation of data in a bottom-up manner, as indicated before. Overall, these elaborate procedures led to substantive and relevant information on the observations of subject didacticians about their own field of study (on the second level of observation according to Luhmann, 1992, see above Chapter 4) and thus on the empirical side of the two constitutive columns for defining and characterizing General Subject Didactics (top-down theory *and* bottom-up data gathering and interpretation, as will be demonstrated in more detail below). At the end of Part C we will reflect on the empirical analysis. In doing so, the theoretical explanations of General Subject Didactics presented in Chapter 4 will be concretized and at the same time verified with examples from the analysis. In other words, we will be merging our top-down considerations with the empirical findings resulting from our bottom-up procedures (see Chapter 15).

We are also aware that the dimensions dealt with in the reports are still limited in scope at this point. This was intended and by design, however, as a first step. The issues to be reported about were chosen in a selective, exemplary manner so

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2   In the earlier literature, this was referred to as "theoretical" coding in the narrow sense.

to be manageable by a small group of researchers developing the concept of General Subject Didactics. At the same time, the issues chosen for the current study had to topicalize important aspects of the various subjects and subject didactics; backed up by the professional discussions going on within them. In this way, a good basis and size for a first systematic comparison was formed – independent of potential future extensions in the number of issues to be included and dealt with in later comparisons. We were able to involve a large number of subject-didactic disciplines, so that a total of 17 subject-specific reports were produced, comprising more than 400 pages of data: these came from Biology Didactics, German Didactics, English Didactics, Music Didactics, Didactics of Religious Education, Chemistry Didactics, Geography Didactics, History Didactics, Computer Science Didactics, Art Didactics, Mathematics Didactics, Physics Didactics, Didactics of Political Education, Didactics of Nature Studies, of Social and Environmental Studies[3], Sports Didactics, Technology Didactics and from Economics Didactics. The reports of about 20–25 pages each formed the basis for the current comparative analysis. In doing this, we will refer to the different subject didactics and more specifically to the written reports in German as sources and for evidence, since these texts have been published fully in German only (cf. Rothgangel et al., 2021). In the presentation of the results of our analysis, therefore, we will largely use acronyms in referring to those different subject-didactic texts – for reasons of authenticity, of clarity, of quick reference and readability. Here is the list of abbreviations or short keys which will be used throughout the comparative analysis:

List of the 17 Subject Didactics under investigation – with their respective acronyms and names of authors

BioD   *Biologiedidaktik* (Biology Didactics)
         (Horst Bayrhuber)
ChD   *Chemiedidaktik* (Chemistry Didactics)
         (Ilka Parchmann, Bernd Ralle)
DD   *Deutschdidaktik* (Didactics of Mother-Tongue Education)
         (Volker Frederking, Ulf Abraham)
EngD   *Englischdidaktik* (Didactics of Teaching English as a Foreign Language)
         (Helmut Johannes Vollmer, Karin Vogt)
GeoD   *Geographiedidaktik* (Geography Didactics)
         (Michael Hemmer)

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3 This school subject is called "*Sachunterricht*" in German and is particularly difficult to render in English. It is a fairly new and highly integrated area of teaching and learning in primary school, anchored in a holistic view on local conditions and regional experiences which are transformed into a scientific understanding of the world. In addition, it is a very culture-sensitive school subject. Our translation "Didactics of Nature Studies, of Social and Environmental Studies" comes close to its meaning in German.

GeschD *Geschichtsdidaktik* (History Didactics)
(Waltraud Schreiber, Wolfgang Hasberg)
ID *Informatikdidaktik* (Informatics Didactics)
(Johannes Magenheim & Ralf Romeike)
KuD *Kunstdidaktik* (Art Didactics)
(Constanze Kirchner)
MaD *Mathematikdidaktik* (Mathematics Didactics)
(Kristina Reiss, Frank Reinhold & Anselm Strohmaier)
MusD *Musikdidaktik* (Music Didactics / Music Education)
(Werner Jank, Jens Knigge & Anne Niessen)
PhyD *Physikdidaktik* (Physics Didactics)
(Horst Schecker)
PolD *Didaktik der Politischen Bildung* (Didactics of Civic / Political Education)
(Georg Weißeno & Peter Massing)
RelD *Religionsdidaktik* (Religious Didactics / Religious Education Studies)
(Martin Rothgangel & Ulrich Riegel)
SuD *Sachunterrichtsdidaktik* (Didactics of Nature, Social and Environmental Studies)
(Claudia Schomaker & Sandra Tänzer)
SpoD *Sportdidaktik* (Sports Didactics / Physical Education)
(Verena Österhelt, Erin Gerlach & Elke Grimminger-Seidensticker)
TechD *Technikdidaktik* (Technology / Technics Didactics)
(Andreas Hüttner)
WiD *Wirtschaftsdidaktik* (Economics / Economy Didactics)
(Holger Arndt)

All of these authors agreed to write their contributions under the same sub-title in German: *Bestandsaufnahme und Forschungsperspektiven* [State of the Art and Research Perspectives]. In the analysis following, reference to these different subject didactics and their reports are often accompanied by page numbers as evidence for a specific entry or argument in the original texts (these relate then to the published German versions of the reports as a primary data source; cf. the list of references at the end of this chapter; cf. also Rothgangel et al., 2021).

The results of the comparative analysis for each of the six dimensions will be presented in separate chapters, namely in Chapter 9–14 following. It is worth noting early on that in addition to those chapters a condensed summary of the comparative results for each of the six dimensions will be offered in the form of shorter résumés, extracting the most important empirical findings of our study. These will be connected later on with open questions and suggestions for international discussion and commentary (see Chapter 17). The résumés will be serving as the basis of a quick overview for non-German-speaking scholars and for international experts in the field, who can respond

more easily to the résumés than to the extended description of findings in Chapters 9–14.

Each of the following six chapters is devoted to one of the six dimensions under scrutiny as described above. In the subsequent Chapter 15 we will then evaluate the whole process of top-down and bottom-up procedures in merging these two approaches. We will demonstrate how General Subject Didactics can be seen as both a Meta-Theory as well as an Object-Theory, contributing to the self-reflection and self-definition of individual subject didactics as much as to their self-assurance as academic disciplines.

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9. Origins and Development of School Subjects

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As already indicated, in the first two parts of our analysis we will deal with the historically significant contexts and developments of subject-specific teaching and learning in school and the constitution of the school subjects themselves (Chapter 9). This will be followed by an analysis of the origins and developments of subject didactics as emerging academic fields (Chapter 10). In particular, we will analyze the self-reports from the 17 different subject didactics under both perspectives and compare the relevant findings, statements and views presented. Originally, there were only four pages of reporting forseen for this area of reflection within the overall text document, but this proved to be too little space. This point has to be stressed here, because it is central for understanding the complexity of historical developments and the quality of the subject-specific contributions: their reflections on the history of school subjects and on that of related subject didactics were too differentiated and simply could not be done on just four pages. Nevertheless, we cannot expect a detailed and comprehensive description of the history of subject-specific teaching and learning over time nor of each of the subject didactics in themselves – as much as this would be desirable in the long run. For reasons of space, we find that certain sub-dimensions of the topic are only dealt with selectively in certain reports, while in others some items are made more prominent – perhaps more or less by chance. The presence or absence of certain aspects in a report does not tell anything about the overall relevance of these items for subject didactics in general, by the way. Rather, we have to assume an exemplary mode of reporting and analzing: e.g. if an item such as "educational organizational aspects and interest groups" highlights the importance of teachers' associations in certain subject contributions, it may be that this aspect is considered as equally relevant in other subjects, without having been mentioned accordingly, however – due to the required brevity of the presentation, leading to refrain from too much (interesting) detail in this context.

Generally speaking, it is important to underline once more that this as well as the following part of the survey is not to be misunderstood as a piece of historical research. Rather, it serves the purpose of indicating certain historical points of reference or anchoring in history what is common or shared and what is different or unique in the subject-specific self-perception, relating to their origins and development of the respective school subjects. This in turn might help to stimulate more historical research within and across subjects in the future (cf. Schneuwly, Chapter 18, in this volume) and also across subject didactics, possibly as a joint venture with

the historical branch of the educational sciences or with history as an academic field, as a science.

The basic procedure underlying the analysis in this section (as any one to come yet on the next 120 some pages) is one of focussing on factors which are clearly mentioned in the written reports, either in one text specifically or in several texts parallel. In the current case, the issue was to find out what was named as having contributed to the establishment and development of school subjects and how both were perceived, discerned and identified in the course of history. In this context, it is primarily important to note how the individual subject didactics themselves observe and reconstruct the historical developmental process of their respective school subjects, because this will influence which variables or factors are emphasized and which ones receive less attention.

In this chapter, there are above all three perspectives to be distinguished: first, specific historically meaningful contexts and personalities (section 9.1) and secondly, specific organizational and educational conditioning factors (section 9.2), as mentioned in connection with forming and developing certain school subjects. Although these factors can also influence one another mutually, they are described separately. Thirdly, some fundamental issues are raised within this topical area, namely earlier forms or antecedents of school subjects as well as basic forms of their establishment and development. These are also dealt with in a separate part (section 9.3). The distinctions made within our analysis are clearly triggered by the data itself and the results found. Although these insights are based on German observationsand embedded into that specific socio-cultural context, we believe that they might also hold a wider significance and meaning beyond Germany and that there are possible implications for other national or regional contexts as well.

9.1 Historically meaningful social contexts and influential personalities

9.1.1 General observations

Within the framework of the 17 subject reports, significant historical contexts and personalities are addressed, ranging from antiquity to the present. Chronologically, beyond the determining historical contexts as outlined in 1.2 below, there are a number of time periods worth mentioning specifically, at least in passing, because they reveal typical conditioning factors and their main characteristics (such as *religious*, *economical*, etc.), as highlighted in italics in the texts. These are important for the development of the subject(s) in question, including their preceding variants.

Antiquity

The influence of historically prominent forerunners for certain school subjects include the following *persons or conditions* (listed here by way of examples):

– in the Didactics of history: Herodotus (5th century BC) as the first "didactician of history" (GeschD, p. 155),
– in Music didactics: reflections of Plato (428/7–348/7 B.C.) in the "Politeia" on the "educational effect of music" (MuD, p. 262) as well as on its belonging to the septem artes liberales,
– in Mathematics didactics: Euclid (3rd century B.C.) and the didactic imprint and effect of his "Elements" (MaD) and
– in the Didactics of religion: the catechumenate for baptismal candidates, which was already established in the early times of Christianity.

It is worth noting that generally speaking the subject didactics – apart from the last example – focus on the period of antiquity primarily through certain personalities who are significant for that subject area and the content of the subject-matter itself.

Middle Ages

The Middle Ages as a ubiquitously *religious period* are mentioned from the perspective of several didactis: e.g. for chemistry didactics, it is important that "in the course of the 12th century, the *schola exterior* for secular professions were also established in the monastery schools" and thus "the study of chemistry was initiated" (ChD, p. 53). Similarly, the "professionalized instruction in singing" (MuD, p. 262) in monasteries is mentioned by music didactics. A deeper insight into that time period is provided by the contribution of German didactics as a mother tongue, namely:

> "Literacy, vernacular writing and mother-tongue education have played a certain role in Germany locally since the 13th century […]. However, in the cathedral schools, the monastery schools, the city, the *Winkel* and the humanist schools etc., Latin and Greek were the focus of language teaching and learning. Content which today figures as part of German instruction were treated here in the framework of the medieval liberal arts (*artes liberales*), that means in the sub-disciplines oratory, stylistics, declamatory or poetics" (see DD, p. 75; cf. also EngD).

Early Modern period

Here, too, *religious influences* are crucially important, as can be seen from the significance of the Reformation for a number of subjects (GeschD, RelD, PhyD) as well as from the pedagogy of Pietism (cf. WiD). In the latter context, the Francke Foundations play a special role (ChD, SaD). Furthermore, with the industrialization in the 18th century, another factor of great influence emerges, namely that of economics,

which is by no means only relevant for the teaching of technology and economics (cf. TD, WiD; but also cf. PhyD, SaD, SpoD).

Modern history

The further development of *industrialization* in the 19th century is particularly worth mentioning from the perspective of the "didactics of an integrated natural and social studies approach in primary school" (*Sachunterrichtsdidaktik*, SaD). In addition, *sociopolitical motives* are highlighted in connection with the March Revolution of 1848, which is accompanied by a direct rejection of *religious influences* (SaD). Furthermore, *national influences* on the development of school subjects are clearly discernible through the so-called *Stiehlsche Regulative* (1854) and through the founding of the German nation-state in 1871 (DD, cf. GeoD).

After the catastrophic events of World War II and the subsequent formation of political blocs between East and West, the competition between these two had a considerable impact on school teaching which cannot be overlooked and should not be underestimated: First, the Sputnik shock (1957) and the educational reforms following this event played an important role in the development of several subjects (SaD, MaD; cf. BioD, PhyD in Section 2, KuD in Section 2). At the beginning of 2000, the so-called PISA studies[1] were also followed by another 'shock' of a different kind, namely resulting from the international comparison of students' achievements in a large number of countries, where Germany unexpectedly figured only moderately in the rankings. As a consequence, e.g. in mathematics (MaD), more student activities in subject-matter learning were initiated and included into classroom teaching.

9.1.2 Determing historical contexts for school subjects in general

As already indicated above, the historical time periods from Antiquity to Modern History dealt with so far left out specific historical contexts, which are nevertheless equally relevant and also turn out to be very decisive for school subjects and their development. The following *events, periods or historical phases stand out* in this matter as contexts that have had a particular impact on quite a number of different school subjects:

– Enlightenment (cf. PhyD, ChD, BioD, RelD, GeschD, WiD, SpoD),
– Fin de siècle (turn of the century) (cf. BioD, EngD, RelD, KuD, MuD, TD, SpoD),
– Nazism (cf. PhyD, BioD, SaD, GeoD, DD, EngD, RelD, PolD, TD, SpoD).
– The 1970s (cf. DD, EngD, GeschD, GeoD, MuD, SaD, SpoD, TD),

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1 PISA is an acronym for "Programme of International Students' Assessment", a series of large-scale international comparative studies on students' achievements, mainly in Reading ability, Mathematics and the Natural Sciences.

– The existence of the German Democratic Republic and the fall of the Berlin Wall (cf. PhyD, ChD, SaD, GeoD, DD, TD, PolD, SpoD).

Without going into detail regarding the positive (e.g. Enlightenment with promotion of *'Naturlehre'*) or negative aspects of these historical contexts (e.g. Nazi period with the effect of instrumentalization and ideologization of instruction) as qualified in the reports, attention will now be drawn to more specific points in individual subjects for the sake of comparison with the general ones just outlined.

9.1.3   Specific contexts for individual school subjects

Some historical contexts that were either specifically *supportive* or *impeding* for the development of specific subject areas, are cited in the empirical data, such as:

– Dicoveries made by European explorers in the 15th century for geography didactics (GeoD),
– The Seven Years' War (1756–1763) for biology didactics (BioD),
– Failures of the German artisanal trades at the World Fair in Paris (1867) for art didactics (KuD),
– Competition between East and West Germany that arose with the Olympic Games of 1968 (Mexico City) and of 1972 (Munich), concerning the teaching of physical education (SpoD),
– The developments in chemical industry for chemistry didactics (ChD).

At this point, it should be emphasized once again that comparable special contexts could also exist in other subjects, yet they may not have been addressed, due to the limited space available for reporting. From the perspective of General Subject Didactics, however, it is primarily interesting to observe that – in addition to the determining contexts that are very significant for several subjects at the same time (as reported in section 1.2) – there are other historical contexts that are specifically relevant for the developmental process of one individual subject only.

9.1.4   Personalities and their impact on subject-matter teaching and learning

In the historical contexts described above, certain persons or personalities are highlighted again and again who have had a defining effect on the development of certain school subjects or subject didactics. In the presentation of 'antiquity' above, it became obvious, for example, that certain persons such as Herodotus (GeschD), Plato (MuD) and Euclid (MaD) were characteristically foregrounded by the respective didactics. In the further course of history, other personalities were cited who also had a strong influence on subject didactics and school subjects. In these self-reports, there are sometimes few (PhyD, PolD), sometimes more numerous (ChD, KuD) references to personalities who were influential for the development of the respective subject didactics as well as for the teaching of the related subject (or the preceding forms of it).

The following three examples, taken from different subject-didactic areas, demonstrate this:

– Friedrich August Finger (1808–1880), who "presented the basic principles of 19th century Heimatkunde in his work '*Anweisung zum Unterrichten in der Heimath-skunde*' (1844)" and "is thus considered its 'father'" (SaD, p. 346);
– Wilhelm Viëtor (1850–1918), who with his polemic statement "Language teaching must change direction!" (Der Sprachunterricht muss umkehren!; 1882) made an important contribution to the establishment of modern foreign language education, advocating a *direct method* in foreign language learning (EngD, p. 473);
– Leo Kestenberg (1882–1962), who in the 1920s shaped the entire German musical education system with his reforms and introduced the "(now no longer limited to singing) school subject music" (MuD, p. 262).

In addition, other well-known personalities from the history of pedagogy such as Johann Amos Comenius (1592–1670; BioD, SaD, ChD, KuD), Jean-Jacques Rousseau (1712–1778; KuD, SpoD), Johann Heinrich Pestalozzi (1746–1827; SaD, KuD, WiD), or Georg Kerschensteiner (1854–1932; KuD, WiD), etc. are repeatedly listed in this context, mainly because of their importance for more than one school subjects; this cannot be dealt with here in any more detail,however.

9.2 Conditional factors of educational policy and educational organization

9.2.1 Regulations and reforms in educational policy

Due to the brevity of the subject-didactic presentations on the history of the school subject and the teaching and learning of subject-matter, it was not to be expected that a comprehensive overview of educational policy regulations and reforms could be gained from the data given. However, aspects of educational policy are clearly conditioning factors for school subjects or – in the terminology of Grounded Theory – *intervening* or *causal* factors. These could offer an interesting field for further studies and subject didactic research, e.g., in terms of systems theory.

From the numerous educational policy regulations and reforms mentioned, the following two examples are listed here for the early modern period up until the Weimar Republic:

– the *Humboldt-Süvern reforms* (1810/1812/1816), by which, among other things, singing was established as a component of general school education (MuD), German was introduced as an examination subject (DD), and also the subject "realia" was "given 50 hours of teaching" (for comparison: 170 hours for the 'languages' Latin, Greek, and German) (PhyD, p. 291);

– the Weimar Constitution (1919): in Article 148.3, civic education and "practical work education" were designated as school subjects, with the "National School Conference" (*Reichsschulkonferenz;* 1920) held the following year concretizing these regulations (TD).

For post-war, contemporary Germany, several decisions by the Ministers of Education and Cultural Affairs (KMK)[2] are mentioned from the perspective of several subject didactics and their significance for teaching the related subjects (e.g. *'Hamburg Agreement'* of 1964). In particular, the existing federal structure of the German education system is topicalized, with (up to) 16 different jurisdictions (after re-unification). This had the effect that certain school subjects are represented differently within the German *Länder* in terms of number of hours, types of schools chosen or level of schooling involved (PolD, WiD, TD). Even the naming of a school subject can differ between the different federal states (*Länder*) in Germany (cf. GeoD: *Geographie vs. Erdkunde*).

The extent to which historical contexts are capable of conditioning educational policy provisions can be seen in the fact that the policy of equalization (*Gleichschaltung*) during the Nazi era led to religious education being the only school subject to be enshrined in the Basic Law of the Federal Republic of Germany (*Grundgesetz of 1949, Art. 7.3*).

9.2.2 Aspects of educational organisation and influence of interest groups

At various points, the *importance of organizational structures* such as subject-related movements (KuD: art educators' movement), teachers' associations (SaD: Leipzig Teachers' Association) or professional societies (PhyD, BioD, ChD, MaD, e.g. Society of German Natural Scientists and Physicians) becomes obvious in the educational policy struggle for the establishment and development of school subjects. Two examples will serve as an illustration.

a) The *Gesellschaft Deutscher Naturforscher und Ärzte* (GDNÄ, Society of German Researchers of Nature and of Medical Doctors) played a prominent role for the natural sciences as well as for mathematics: this society supported the Meran Reform of 1905, which, among other things, "demanded an equal school education between the mathematical-scientific and the humanities-based disciplines" (ChD, p. 54; cf. also MaD). Likewise, the GDNÄ was also instrumental in getting the ban on biology as a subject lifted again in Prussia (cf. BioD).

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2 KMK (= *Kultusministerkonferenz*) is a collective body of all the Ministers of Education and Cultural Affairs from the 16 different federal states (*Länder*) of Germany. Since the regulation of educational matters largely falls under the jurisdiction of the individual States, there is a need to harmonize these different measures on the federal level.

b)   The second example refers to the time after 1960, where in relation to the *Saarbrücken Framework Agreement*[3] it is stated from a chemistry didactic perspective:

> "It was only thanks to the great commitment of professional, scientific associations such as the *Gesellschaft Deutscher Chemiker* (GDCh), the *Verein für den mathematischen und naturwissenschaftlichen Unterricht* (MNU), and the *Fonds der Chemischen Industrie* (FCI) that the teaching [of chemistry] could be maintained despite adverse personnel and material circumstances" (ChD, p. 55).

In addition to such basic lobby work of professional associations, these are also responsible for the educational standing of certain school subjects, e.g. in terms of number of hours taught, levels taught and school types involved. Again, as a result of the federal political system in Germany already mentioned, there are always struggles going on in educational policy about the value and importance of a particular subject, its status or its competiton with other school subjects, depending on some principles and the self-definition of an educaitonal policy within a particular state. It can be traced in the course of history that some subjects, such as the classical languages Greek and Latin, are losing ground over time, while other subjects, such as physics, have been able to establish themselves more firmly over time – with great difficulty, however, but ultimately with success.

A final point in terms of the influence of educational organization: the importance of academic training institutions becomes more and more obvious, such as academies and universities for the professionalization of teachers and for the subjects taught at school (e.g. KuD: art academies). However, in the case of geography didactics the influence was exerted in the opposite direction: geography didactics was established at university *after* the subject was first introduced at school around 1870 (cf. GeoD).

9.3   Early historical forms, establishment and development of school subjects

In the following section, subject-didactic observations on the early historical forms of school subjects (9.3.1) are presented, before their establishment (9.3.2) and their final development up until today (9.3.3) are further considered.

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3   The *Saarbrücken Framework Agreement* concerns the heavily disputed reform of the upper levels of the grammar schools.

9.3.1 Early forms of a school subject

It has already been mentioned at various times that numerous subjects can trace their history back to antiquity. In the following, it will not be possible, however, to give a detailed account of the history of those 17 subjects in this volume, the goal is rather to emphasize significant points by way of examples.

Reference to "septem artes liberales" (seven liberal arts)

The history of music teaching is quite impressive in this context, as already noted earlier: it goes back to Plato and his ideas and was a component of the so-called *septem artes liberales* or "seven liberal arts".

German didactics also looks back on these *septem artes liberales* in its historical development observations and reflections on the early history of German language teaching. However, their content are to be found in different disciplines of the time: "Contents that are part of German lessons today were still treated […] within the framework of separate sub-disciplines such as rhetoric, stylistics, declamation or poetics" (cf. DD, p. 75). In mathematics didactics, too, a reference to the *septem artes liberales* is made in an implicit way by citing geometry and arithmetics. And remarkably, there is also a reference to the *septem artes liberales* in the didactics of technology:

> "From antiquity to the Renaissance, the totality of man-made tools (machines, devices, apparatuses, etc.) and their underlying craftsmanship and artistry, summed up in the word 'technology', was included in the *artes mechanicae* […], i.e. 'practical arts', which were also called *'artes technicae'* […]. Interestingly enough, these were contrasted with the *septem artes liberales*, i.e. 'liberal arts' […]. In antiquity, the *artes mechanicae* were also called *'artes illiberales'* because, unlike the *artes liberales*, they could be practiced not only by 'free men' but also by slaves, i.e., unfree men" (cf. TD, p. 419). Later in history, too, quite different names were coined for the preceding subjects of today's so-called *technology instruction* such as 'work instruction,' 'technology,' 'manual skills instruction,' 'crafts instruction,' 'formative crafts,' 'free crafts,' 'technical crafts,' 'polytechnics,' 'study of work,' and finally 'technology instruction'" (cf. TD, p. 420).

Last but not least: Time and again, the natural science subjects needed to justify their status as part of the school curiculum in the face of the ancient – later also the humanistic – educational ideal, which can be exemplified by the following reflective contribution of physics didactics:

> "The establishment of physics as part of the school canon was precipitated by a long process characterized by the struggle for recognition as a (general) educational subject. For a long time, the study of physics was not considereds as a contribution to the acquisition of knowledge or the training of thinking. In antiquity, the study of topics that we now classify as experimental physics was regarded as an amusing diversion, not as a component of education. […] Until the Christian Middle Ages, classical education gave priority to pure thought over practical action. In the context of Humboldt's educational reform, this supposed discrepancy was newly revisited in the discussion of material versus formal education" (PhyD, pp. 280–281).

This aspect leads directly to the next point.

Complex early historical forms of the natural science subjects

It can be argued with good reason that indeed each of the histories of the teaching subjects discussed in this volume is complex. This could be illustrated by way of example by referring to the didactics of religion as well as to the corresponding discipline of religious education, since their relationship to the antecedent predecessor disciplines *catechetics* and *catechesis* is also quite complex – so much so in fact, that on the Catholic side catechetics still appears in the naming of the corresponding professional association in Germany: it is called '*Arbeitskreis katholische Religionspädagogik und Katechetik*' (AKRK; Work Group of Catholic Religious Education and Catechetics).

Nevertheless, the natural science subjects have a particularly complex history insofar as their respective scientific reference disciplines changed fundamentally in the course of time, on the one hand, and their establishment as a school subject was by no means undisputed or straightforward, on the other hand.

Thus, from the perspective of chemistry didactics, it is pointed out that 'their' reference discipline used to be a different one: it was Medicine, because chemical knowledge was considered part of it, and it was also Alchemy, which faded away in the years between 1780 and 1810, however. Comparable statements are also made by physics didactics:

"The term 'physics' had a different curricular meaning in the 16th to the 18th centuries than it has today. At universities, physics was understood to be within the framework of philosophy (in the literal sense). There was not yet a coherent subject-related canon of topics for it […]. In a mathematized form, as it is taught today at universities and at high schools, topics such as dynamics (laws of motion) and optics (ray paths) were taught in mathematics classes […]. Under 'natural sciences' one subsumed topics of technology, biology and chemistry" (PhyD, p. 290; cf. also BioD).

As to the establishment of scientific approaches for subjects in school, it was similarly complex. From the perspective of physics didactics, for example, the following statement is worth noting:

"From the time of the Reformation and with the beginning of the Enlightenment, the study of objects (*realia*) which surround us, gradually found its way into schools as natural science. At the lower-level schools, in the 18th century, one can speak of a 'modest natural- and social studiesapproach' (*Sachunterricht*) […] in connection with the Prussian *General-Landschulreglement*. At the higher levels of schooling physics did not take place in the form of active discussions, but rather as an acknowledgement of the state of scholastic knowledge or as an appendage of logic." (PhyD, p. 290)

The following statement further illustrates this point from the perspective of biology didactics: "The subject that deals with the world of living things was still not called *biology*

in the 19th century, but rather natural history instruction, in which, however, 'mineralogy in the broader sense' […] was also included." (BioD, p. 23)

Finally, it should be remarked, at least briefly, that teaching *realia* can also be counted among the antecedents of subject teaching and particularly geography teaching, and that other subjects beyond the natural sciences can also trace their antecedents back to other subjects or at least to one subject, as exemplified by the following quotation from the article on economic didactics: "In 1889, national economics was established as a fixed component of history teaching." (WiD, p. 445).

9.3.2   Establishment of school subjects

The heading of "1.3.1 Early Historical Forms" could suggest that a clear distinction can be made between the early history of a subject and its actual establishment in today's sense. In accordance with the preceding considerations "Periods and continuities of early historical forms", however, the following remarks will show that in many cases it is by no means easy to make a clear distinction between the *early* history of a subject and its establishment in the contemporary sense. This is especially true since in the further development of a subject considerable changes can be observed by the respective subject didactics. The problem is aggravated once more by the fact that – as already noted – due to the limited number of pages, many didactic disciplines could only partially reflect on the respective discourse about the history of their school subject in a nuanced way.

Periods of establishment of subjects and their conditional factors

With the awareness of the problem mentioned in the introduction, specific periods of establishment of the subjects could be identified; these are hypothetical, however, although they do show up in tendency in the present didactical reports. At the same time, crucial causal factors for the establishment of the respective subject shall be mentioned in italics. Roughly speaking, the time span between the introduction of compulsory schooling by the state (e.g. Prussia 1763; Austrian Empire 1774; Bavaria 1778) and the *Humboldt-Süvern reforms* (in the years 1810/1812/1816) represents a first period of 'establishment', in which some of the subjects or subject didactics actually began to exist:

– From the perspective of technology didactics, reference is made to *industrialization* in the 18th century, which led to an increasing institutionalization of technology as a school subject (TD) – albeit under quite different names;
– from the perspective of religious didactics, the beginning of religious education is associated with *the Enlightenment*, with the term 'religious education' also originating in the 1770s;

- From the perspective of physics didactics, physics education became established at the beginning of the 19th century, which is a direct consequence of *Humboldt's reforms*[4] in *educational policy*. In addition, at least two further causal factors stand out, namely: the university demonstration experiments by the physicist and later proponent of the enlightenment Georg Christoph Lichtenberg (last quarter of the 18th century), and the different types of schools (elementary schools, grammar schools), which shaped the establishment of subjects in terms of *educational organization*;
- From the perspective of German didactics, the introduction of German lessons in the mother tongue is also presented as an *educational policy* consequence of Humboldt's reforms (new regulations for the final exams (*Abitur*) of 1812).

In this context, it should be noted that there are good reasons why other subjects such as physical education ('gymnastic instruction') and music ('singing', 'aesthetic instruction'), which were also part of Humboldt's reforms, nevertheless tended to recognize the early historical forms of their subject at this point. This shows that the exact time at which a school subject in the modern sense is established depends on several criteria, of which the inclusion of a school subject into a general education curriculum is only one.

Two other subject didactics date the beginning of their respective subjects back to about 1870, the time in which the idea of a "Lesser Germany" ("Kleindeutsche Lösung") became predominant after the Prussian-Austrian War (1866) and the foundation of the German Reich (1871):

- From the perspective of art didactics, the beginning of art instruction in 1870 can be seen, first, as the introduction of drawing as a compulsory subject in elementary schools. The educational policy motives were, in turn, at least in part also based on the failure of the German arts and crafts at the Paris International Exposition (1867) (cf. "1.3 Special Contexts for Individual Subjects").
- From the perspective of geography didactics, the almost simultaneous establishment (1872) of geography as a school subject and as a field of didactics can be traced back to the beginnings of geography as a science as well as to the founding phase of the German Empire and the accompanying interest in national legitimation including the imperialistic thinking.

Another key period in the establishment of school subjects is the turn of the century around 1900 (the importance of this period in terms of subject didactics has already been noted in section 1.2 above):

- From the perspective of English didactics, firstly, the school types of the *Realgymnasium* and the *Oberrealschule*, which were established at the end of the 19th cen-

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4   Wilhelm von Humboldt wanted a humanistic education for all children of all social classes. However, his reform of the upper levels of school and of university reached primarily the upper and the achievement-oriented, educated middle classes.

tury, are largely responsible for the increase of instruction in the modern languages English and French in terms of their curricular standing within the educational organization; secondly, the reform movement as well as the so-called 'Direct Method of Foreign Language Learning' play a decisive role in the subject didactics of Teaching English as a Foreign Language (EngD);

– From the perspective of chemistry didactics, the influences of the methodological courses of Ferdinand Wilbrand (1885) and especially of Rudolf Arendt (1895) play a role that should not be underestimated. Ultimately, the 'Meran Proposals' of 1905 already mentioned, which go back to the Association of German Nature Reseachers and Medical Doctors (GDNÄ) which were extremely effective in terms of educational organization, were decisive for the establishment of an independent chemistry instruction. Due to the "emerging chemical industry in Germany" as an economic influential factor, chemistry instruction was finally even introduced into humanistic education at high schools (ChD);

– From the perspective of music didactics, the beginnings of music instruction are marked – as already noted – by the Kestenberg Reform of educational policy in the 1920s. This is justified by a change in understanding of the content of the subject, namely the extension of singing towards "music" at large, which is also accompanied by "different music didactic orientations" (MuD, p. 262).

The 1970s mark a final period in which the establishment of more recent school subjects can be observed:

– From the perspective of economics didactics, reference is made to the educational policy recommendations of the German Committee for Education and Training of 1964, which were "a central impulse for the establishment of the subject *Arbeitslehre* at two types of school (*Hauptschulen* and *Gesamtschulen*), by which economic and vocational content increasingly found its way into schools of general education." (WiD, p. 445) Nevertheless, the establishment of this subject develops rather slowly and faces many obstacles.

– From a computer science didactics perspective, the beginnings of computer science education date back to the late 1960s, when the elective subject 'computer science' was introduced into secondary education. Important contextual and conditional factors are the establishment of the first computer science courses in 1968, driven by educational policy, as well as the related scientific developments of computer science, which is still extremely dynamic till today "and subject to regular paradigm shifts" (ID, p. 183);

– From the perspective of an integrated didactics of natural, social and environmental studies in pimary school, the new subject designation as '*Sachunterricht*' (SaD) is emphasized as a crucial point, because it highlights terminologically the difference to the traditional orientation called *Heimatkunde* (local history). This shows the relevance of certain guiding principles, subject-specific ideas or the respective self-understanding of a subject for its establishment as a school subject. This change

from *Heimatkunde zu Sachunterricht* was suggested in 1969 by the Elementary School Congress and realized in 1970 by the German Education Council as well as by the *Kultusministerkonferenz* (KMK) – which again shows the importance of educational-organizational as well as political factors at play.

In retrospect, one can say that the influences on subject didactics identified in the first two sections are largely replicated or confirmed in the establishment of the related school subjects.

Problems of the establishment

The often laborious and by no means simple establishment of the school subjects has already been mentioned. A closer look reveals some typical constellations of the problem:

– In the early historical forms of the subjects, this became particularly clear in the opposition between the natural sciences on the one hand and the classical languages (and later the humanistic educational ideal) on the other hand (cf. e.g. PhyD). Here, to a certain extent, there is a competition between different groups of subjects, which can revolve, for example, around the allocation of number of hours for teaching.
– Another set of problems can also be observed within a subject group: This became clear, for example, in the contrast between the classical languages Latin and Greek on the one hand and the modern foreign languages English and French on the other. Moreover, a certain degree of competition cannot be ignored either, especially within the didactics of the natural sciences; this.becomes particularly evident from the perspective of chemistry didactics in the face of the better-established teaching of physics.
– Such conflicts within a group of subjects become even more acute when different subjects (with different approaches and elements) are taught under a common label. This issue could not only be observed from a chemistry didactic, but also from a political didactic perspective, a technology didactic perspective as well as from an economy didactic perspective, where it is stated: "Currently, it is predominantly embedded into combination or integration subjects, since the introduction of a new subject leads to conflicts of distribution against the background of limited time tables." (WiD, p. 446)
– Further motives of educational organization relate to the economic quality of the school system and can again be exemplified by the didactics of chemistry:

> "In Prussia, for example, the Gymnasium was a ten-level institution with two science lessons per week in each grade. However, the enforcement of more visible science instruction failed (as it did before), because of the dominance of the old languages, lack of teaching staff, and inadequate equipment in the schools" (ChD, p. 54).

Finally, certain guiding ideas can also have a negative impact on the establishment of school subjects. This can be exemplified through the case of economy didactics: Here, reference is made, first, to the negative effects of the New Humanism, which continues into the present, and, second, to the false dichotomy between higher-value general education and lower-value special (or merely functional) education (cf. WiD).

Even once a subject has been established, certain problems persist in the eyes of the various subject didactics (cf. e.g. ChD, TD, WiD). In particular the "periods and continuities" outlined in the framework of early historical developments (cf. section 3.1 c) remain in focus. In this sense, attention will be paid in the following section by the respective subject didactics to the further development of school subjects, once they have been established.

9.3.3 Further development of established school subjects

The basic question of this part of the analysis is, whether and how subject didactics monitor developments (including reforms) of their related school subjects. This question can be answered preliminarily as follows: Firstly, by paying attention to the causal factors (e.g. type of school, educational policy, influence of the related scientific discipline) and secondly, by studying the development of guiding ideas within the subjects.

Determining factors for the established subjects

Essentially, similar factors within the established school subjects of today can be observed as have already been mentioned under 1.1.

"Historically significant contexts and personalities" and 1.2. "Educational-political and educational-organizational conditional factors" by the subject didactics. Without repeating certain aspects such as "Nazi period" or "educational policy" in detail, the perspective of German didactics on their subject is quoted as a good example: "Each political turning point, e.g. of 1918, 1933, 1945 and 1989, was each connected with drastic changes in educational policy, which also changed the framework for schools and for German as a mother-tongue in their own way" (DD, p. 76).

In the following, those points are mentioned which stand out particularly with regard to the descriptions of established subjects. With regard to educational policy and organizational conditional factors these are

– first, the importance of the type of school (e.g., PhyD, SaD, ChD, MuD, EngD, TD): as an example from music didactics for the years after 1945 until into the 1960s, the primacy of singing in the elementary school may be mentioned, while in the Gymnasium the (analytical?) work approach inspired by the Kestenberg reform was gradually established (e.g., MuD, p. 263);

– second, the importance of international impulses (e.g. SaD; KuD; EngD; ID; MaD): as a typical example, the English didactic perspective is mentioned here, where an approach is described for the time after 1945 "which essentially followed the principles of the Direct Method, but at the same time opened up to the behaviorist procedures of the audio-lingual method from the USA […] and then to the audio-visual method […]" coming from France afterwards (EngD, 104);

– third, the importance of didactic impulses (SaD, KuD, GeoD, SpoD) as well as of pedagogical-psychological impulses (KuD, SaD): "A profound paradigm shift became apparent in West Germany at the beginning of the 1970s, when *"Länderkunde"* was abandoned based on convincing arguments (e.g., lack of exemplariness and student orientation) geography instruction was given a general geography orientation adequate both to the main reference discipline and to current didactic discourses" (GeoD, p. 134) and

– fourth, the importance of considerations and impulses from the respective academic disciplines (BioD, EngD, ID, KuD, MaD, GeoD):

> "The construction of computers makes up a rather small part of computer science as a subject – with corresponding consequences for the school subject. Rather, computer science – according to the Association of Informatics – deals with 'elementary structures and processes, principles and architectures of systems, interactions in small, medium and global networks, the design, development and implementation of hardware and software up to highly complex application systems and the reflection on their use and effects'" (ID, p. 185).

Although some of the more "scientific" impulses for the school subjects have already emerged in the preceding historical explanations (cf. e.g. the importance of Euclid for the didactics of mathematics or Herodotus for the didactics of history), a closer look into the comparative analysis leads us to the conclusion that their importance for the development of established school subjects can even be more clearly identified and stressed.

Development of guiding ideas

The above-mentioned conditional factors have an effect on the development of school subjects. This development can be observed in particular on the basis of certain guiding ideas embedded within the subjects. The development of these central ideas can take different paths and in certain cases even be accompanied by a change in the designation of school subjects (cf. e.g. ID). Overall, three aspects can be described in this context, which are by no means mutually exclusive:

– Development and change of guiding ideas (cf. e.g. BioD, EngD, KuD, TD, ID, MaD, SpoD). From the perspective of geography didactics, this is described as follows:

> "While in the age of regional or country geography ("Länderkunde") the focus was still on individual countries in their idiographic form (e.g., Switzerland), the interest of ge-

ography teaching has been redirected since the 1970s toward nomothetic, transferable findings (e.g. human use of a high mountain range, effects of ski tourism on the natural landscape etc.)" (GeoD, p. 134–135).

Informatics didactics underwent a similar change in perspective – it exemplifies a subject-oriented paradigm shift:

> "In the mid-1980s, there was a reorientation of informatics instruction, in which the focus shifted: it became now to be less on the computer and more on the user. Influenced by the computer technology that was now also widespread in private households, it seemed necessary to orient lessons towards the use and operation of the software products and thereby to offer practical life orientation" (ID, p. 184; cf. SaD).

– *The presence of diverging and competing guiding ideas* (e.g. MuD, RelD, SpoD): On the one hand, this is illustrated by the perspective of music didactics, where, as a consequence of the Kestenberg reform, a distinction emerged between "education through music" and "education towards music" (MuD, p. 263) as guiding ideas competing, yet similarly valid. A differently 'poled' tension is presented in the didactics of religion:

> "On the one hand, there are calls to tie religious education at school closely to the two churches, which alone could claim authority in religious matters. On the other hand, there are voices that see religious education as a moral resource to educate students to become responsible members of society. Such instruction would have to sever all ecclesiastical ties in order to serve entirely the purposes of the state" (RelD, p. 340–341).

– Finally, *continuity is repeatedly expressed despite all changes* (e.g. BioD, ChD, EngD, TD, ID). The following example from chemistry didactics is impressive, where, referring to Rudolf Arendt (1828–1902), we find the following statement: "Arendt's didactic guidelines can be found almost unchanged in today's chemistry didactics and are rather gaining in importance" (ChD, p. 54). Regardless of a certain development involved, the presentation of biology didactics emphasizes the continuity of two didactic guiding principles ("science orientation on the one hand and the teaching of knowledge regarding public welfare and practical skills on the other"): "Science orientation changed its focus over time from the description of nature to the explanation of nature to the relativization of scientific statements and theories, without, however, completely abandoning one of these approaches in the corresponding reforms. The teaching of knowledge regarding public welfare and practical skills includes aids for coping with everyday life as well as the ability to participate in social discourse about the goals and forms of application of biology" (BioD, p. 39).

For all three aspects of the presented development in school subjects, further evidence could be cited. The perspective of English Didactics in particular is worth mentioning here additionally, as it succeeds to describe the interplay of different conditioning factors and the development of central ideas in a nuanced way (cf. EngD).

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10. Origins and Development of Subject Didactics

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The descriptions of the individual subject didactics show characteristic features and factors influencing their establishment and development. These are addressed in the first section 10.1 "Establishment of subject didactics" by way of overview, and then developed in more detail in section 10.2 "Influential factors". In the comparative view of the contributions of the 17 subject didactics three points are prominent in particular, namely: "Significant historical contexts", "Institutionalization of subject didactics", and "Important founding personalities". This latter point already leads to section 10.3, entitled "Development of subject didactic approaches", in which content-related and conceptual issues are reflected. The plurality of subject-didactic approaches in turn results in considerations in the purview of the philosophy of science, which are further discussed in section 10.4 headlined "The scientific character of subject didactics". Here, the observations of different subject didactics on the scientific theories underlying their discipline come into focus.[1]

10.1 Establishment of subject didactics

In brief summary, the following aspects stand out in the subject-didactic self-reports with regard to the establishment of subject didactics:

– The contributions reveal very different periods of establishment of the subject didactics dealt with in this volume, ranging broadly from Enlightenment (e.g., RelD) to the years of the 1990s (cf. ID).
– The establishment of subject didactics can develop in stages: The beginning of mathematics didactics, for example, is dated to the end of the 19th century, but a significant upswing is only registered for the end of the 1960s (MaD).
– In the reports, different features for characterizing establishment are named: In one case, that of English as a Foreign Language didactics (EngD), a publication in the form of a first systematic conception is referred to, for example (with reference to Mager, 1840/1844; cf. also DD and KuD). Similarly, but in a heightened form, the didactics of physical education (= Sports Didactics, SpoD) mentions a larger

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1   As a reminder: the insights gained in each of the Chapters 9–14 are again summarized and condensed in the perspective of General Subject Didactics (see Chapter 15 below "Résumés in view of General Subject Didactics").

number of publications as a sign of establishment, which systematically deal with physical education around the turn of the century of 1800. In contrast, other subject didactics tend to indicate institutional features, namely the first professorship in the discipline (e.g., 1893: MaD, 1901: ChD, 1930: WiD).

– Individual subject didactics also assess the current degree in the establishment of their discipline differently: from low (e.g. SaD) to high (e.g. PhyD, ChD).

In connection with the establishment of subject didactics various influential factors were mentioned, which are only briefly listed here and will be elaborated upon in the sections following:

– *Institutional factors* (see 3. below) were already evident in the establishment of the first professorships in subject didactics at universities; the starting point for this is often described as teacher training for grammar schools and later the academization of training also for elementary schools. In addition, teachers' associations play an important role as well in the establishment of subject didactics (cf. RelD).

– A crucial role for the development of subject didactics is also attributed to specific *personalities*. Among these, Johann Amos Comenius (1592–1670) stands out in the accounts because he is significant for the history of several subject didactics (among others PhyD; cf. in detail below 2.4).

Finally, it should be noted that some subject didactics occasionally also mention the first naming of their discipline (e.g. 'music didactics': 1851, 'religious education': 1889, 'economics education': 1903); or they reflect on the relationship to 'subject pedagogy' when these exist, as in the case of music, religion and economy education (MuD, RelD, WiD).

10.2 Influential factors in detail

10.2.1 Significant historical contexts

With the Enlightenment and the establishment of professorial posts for subject didactics around the turn of the century, in 1900, we have already identified historical contexts which were also featured as a formative period in Chapter 9. Apart from a few exceptions, such as the references to Comenius in particular, there are relatively few descriptions, however, in response to questions that refer to the time before the Enlightenment. Otherwise comparable historical contexts as in Chapter 9 can be observed. This can be shown, for example, by reference to

– the *Nazi dictatorship* with its racial doctrine and eugenics (BioD), military physics (PhyD) and didactic instrumentalization as well as exploitation in areas such as mother-tongue education or sports (see DD, SpoD),

– the *context of the German Democratic Republic* (incl. reunification), especially with regard to research activities in areas such as polytechnics (TD) or the orientation towards competitive sports (SpoD),
– the *Sputnik shock* and the resulting promotion of science didactics (BioD, PhyD; but also mentioned in KuD),
– the *1970s* as a conceptual golden age (MuD), characterized through social criticisms by the 1968 student movement (DD, PolD), by educational reforms (MuD, GeoD, SaD), by a turn towards scientific approaches (e.g. in MuD, SaD), by the development of information technology (ID) and last, but not least by the integration of colleges of education into universities (as mentioned in PhyD, for example).

Finally, PISA and competence orientation in connection with a newly established disciplinary branch called "Empirical Educational Research" (*Empirische Bildungsforschung*)[2] dominate the discussions since *the beginning of the 21st century*; this is highlighted in this chapter even stronger than under Question 1 (e.g. DD, PhyD, GeschfoD, SpoD, WiD, EngD).

10.2.2 Institutionalization of subject didactics

The institutionalization of subject didactics is an important prerequisite for its establishment. In this context, three essential aspects can be observed in particular: First, the establishment of subject didactics at universities, second, the founding of subject-didactic scientific associations including publication organs, and finally, the founding of particular Institutes for the promotion of specific subject didactics. These points will have to be explained in more detail:

– A crucial factor for the integration of subject didactics at universities is the introduction of teacher training programs (e.g. ChD, PolD, RelD), although a distinction must be made here between teacher training for grammar schools and the academization of teacher training for elementary schools (RelD) as well as the distinction between subject teachers and classroom teachers (ChD) within primary education. Overall, the evolving teacher education programs have led step by step to the establishment of subject didactic professorships at universities (e.g. 1901: ChD; 1893: MaD; 1962: PolD; 1980: SaD). In this context, the integration of Colleges of Education from the 1970s onwards is also stressed, which ultimately led to another increase of subject-didactic posts at universities (ChD, EngD, GeoD, PhyD, SaD).
– A further important institutional aspect is the establishment of subject-didactic associations and, before that, of subject teacher associations. The latter have an important function for the formation of subject didactics, because of the practice orientation and the practical reflection they bring in (RelD, PhyD, DD), among other

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2   For the exact description and positioning of this relatively new discipline participating in the study of education and the social sciences see above.

things. The German Society for the Didactics of Chemistry and Physics (PhyD, ChD) as well as the German Society for Foreign Language Research (EngD) are good examples for those subject-didactic associations. Not only do they organize scientific conferences on a regular basis (e.g. PolD, SaD), but they also founded important journals such as the *Zeitschrift für Fremdsprachenforschung* (ZFF, Journal of Foreign Language Research) (EngD, cf. also GeoD) and other publication organs. The reduction of the difference between grammar school didactics and elementary school didactics may be seen as a corollary of these subject-didactic associations (e.g. ChD). Furthermore, the formulation and official presentation of position papers on subject-didactic concerns and issues, published by the associations as agents themselves, are mentioned here as an activity (e.g. ID).

– Finally, the Institute for Science Education (*Institut für die Pädagogik der Naturwissenschaften*, IPN) in Kiel, which was already established in 1966, plays a special role for the didactics of the natural sciences (BioD, ChD, PhyD, including nowadays the "Didactics of Elementary Science and Environmental Studies" (in German: "*Sachunterrichtsdidaktik*", SaD). The reports emphasize here as advantages the development and adoption of curricula and of helpful conceptual frameworks (BioD, SaD). Another example of a national research institute for a specific subject area is the "Institute for the Didactics of Mathematics" (IDM) in Bielefeld (since 1973) which serves to implement research projects, often in cooperation with international partners, also supporting the promotion of young emerging researchers (MaD).

The self-reports provide an insight into the current state of institutionalization of certain subject didactics: in geography didactics, for example, we learn that 40 subject-didactic professorships exist in Germany altogether (GeoD), whereas for chemistry didactics it is stated that the professorships are primarily located at faculties of chemistry and only occasionally at faculties of education (ChD), a solution which can prove problematic. Such experiences as well as the positive function of subject-didactic associations are underlined in a concluding statement from economy didactics:

> "Moreover, the already unsatisfactory tenure situation in economy education is made even more precarious by sporadic appointments of expert scientists. As a result, there was comparatively little empirical research before 2009. However, this has changed fundamentally in recent years, which can be attributed both to changed priorities of the actors and to the increased promotion of young didactic scientists by the German Society for Economic Education (e.g., establishment of a junior research group, workshop offerings etc.)." (WiD, p. 447).

10.2.3 Influential personalities in subject didactics

As in Section 1 already, it can be observed that the role of important personalities is again emphasized in the reports of the subject didactics, in addition to the institutional embeddedness mentioned as an important influential variable. Interestingly,

the same representative persons named in Section 1 are also featured here, due to their decisive impact not only on school subjects, but also on the historical roots of subject didactics. This can be understood as a further indication of the fact that, from a historical perspective, there are fluid transitions between the history of a school subject and the history of subject didactics itself. In one case, a specific person is particularly highlighted as quite essential, mentioned both in chapter 1 and 2 alike by diverse subject didactics: Johann Amos Comenius (1592–1670; BioD, ChD, KuD, SaD, PhyD). Thus, Comenius cannot only be considered as the 'founding father of didactics' (Meyer 2016, p. 57), but also as the 'founding father of subject didactics'. For example, from a chemistry didactics perspective, it is stated that "J. A. Comenius in particular influenced many generations with his works, in which he dealt with the process of teaching and learning science in a very differentiated way" (ChD, p. 55). And even beyond the natural sciences, the same is emphasized, e.g. in art didactics:

> "With Johann Amos Comenius in the 17th century, pedagogical considerations were already taking place that linked the act of drawing with the development of imagination, the senses, and memory, and at the same time understood it as a preparation for learning how to write." (KuD, p. 208).

In addition to the influence of those personalities already mentioned in Chapter 9, there were more persons with a "founding function" listed in the various subject didactics under the current heading: Among others, Johann Christoph Friedrich GutsMuths (1759–1839) is referred to in sports didactics and Johann Heinrich Gottlieb Heusinger (1797) in technology didactics; the latter is praised as someone "who gave anthropological reasons for the necessity of work-based instruction" (TD, p. 424).

Even beyond the foundational phase, based on the accounts given by the different subject didactics, individuals have played a prominent role in the development of their discipline. Typical representatives of this are Martin Wagenschein (1896–1988) for the didactics of physics (PhyD; cf. also SaD), Gunter Otto (1927–1999) for the didactics of art (KuD), and Karl Ernst Nipkow (1928–2014) for religious education (RelD).

10.3 Development of subject didactic approaches

The insights described so far referred to the establishment of subject didactics in general and its conditional factors. Subject-specific considerations as such did not yet play a prominent role (in conceptual terms). As a rule, however, the influential personalities are associated with very specific approaches in specific subject didactics. It would go beyond the scope of the present chapter to describe these approaches in detail for each subject and it is also not the task of General Subject Didactics to do so – as interesting as the self-reports in this volume may be in this respect. Rather,

the focus is on how the different subject didactics themselves view these respective approaches and in doing so which typical characteristics become obvious through comparison:

– A first typical observation is that the reports repeatedly point out *competing approaches*[3] *within subject didactics*: In physics didactics, for example, we find thoroughly structured curricular approaches as opposed to Wagenschein's genetic-socratic conception (PhyD), in English didactics we can distinguish between educational-theoretical reflections on foreign language learning on the one hand and skill-oriented approaches on the other hand (EngD), and in technology didactics between approaches that strive for a connection between technology and art and concepts based on the idea of the *work school* (TD).

– A second observation relates to changes of subject didactic approaches. For example, in geography didactics there is reference to a paradigm shift in the 1970s (GeoD), in primary school science didactics the concept of "science orientation of the 1970s is replaced by the term *socially determined child orientation*" (SaD, p. 368), and in sport didactics the change takes place from the "curriculum-theoretical model" to the "idea of a pragmatic sport didactics" (SpoD, p. 396).

– Thirdly, one can speak of educational impulses for subject-didactic approaches which bear on several subject didactics. These are usually influenced by approaches originating broadly in didactics or, more generally speaking in the educational sciences. They include, among others, an orientation towards a theory of Bildung (e.g., ChD, EngD, SpoD), on curriculum theory (e.g., BioD, GeschD, PhyD, SpoD), focus on learner orientation (e.g., BioD, GeschD), on science orientation (e.g., SpoD, SaD, TD), or on competence orientation (e.g., EngD, GeschD, PhyD, SpoD, WiD).

– As a fourth point, there are subject-specific impulses that can be of fundamental significance for subject-didactic approaches: The importance of experimentation for science didactics is an example for such an approach (PhyD, ChD), another one would be a certain cultural-praxeological definition or understanding of music for the development of corresponding approaches in music didactics (MuD) or concepts based on historical consciousness for history didactics (GeschD).

– Fifth and finally, there is a wide plurality of approaches in subject didactics (e.g. RelD, MuD, DD). An example of this can be taken from music didactics: "Didacts of music developed a concurrent and growing variety of music-didactic theoretical approaches. Usually based on different background- or meta-theories (e.g. from philosophy, educational science, learning theory, aesthetics, epistemology, etc.), they focus their attention on different premises and postulates in music-didactic theory-building. Examples include: constructivist, anthropological, praxeological,

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3   In this context the term "approach" is preferred because it is more open in meaning than alternatives such as "concepts" or "guiding ideas" (cf. Grümme, Lenhard & Pirner, 2012). Through this choice we can incorporate conceptual aspects which are not necessarily part of established paradigms.

meaning-oriented, communicative, or context-critical approaches as well as concepts such as 'Staging arenas for aesthetic experience', 'Constructive Music Instruction,' 'Music Pedagogy of the Performative Arts,' or the concept of 'Experiencing and Comparing Musical Practices'" (MuD, p. 266).

Two fundamental questions arise with regard to the plurality of subject-didactic approaches and more generally with regard to the five typical characteristics as the described above:

Do all subject didactics really lack continuity in the development and definition of their approaches (cf. RelD)? And is a cohesive systematization of these approaches which is still pending in all the subject didactics (cf. the example of MuD) possible that will stand the test of time?

10.4 Scientific quality of subject didactics

It is precisely this plurality of didactic approaches within one and the same subject didactics (as in MuD) which can raise questions of their systematicity based on a theory of science. It is not surprising, therefore, that the scientific nature of one's own discipline is also addressed in the contributions of the subject didactics, with five aspects in particular being observed in the self-presentations:

– *Scientificity as a problem*: Several subject didactics are young disciplines by comparison (see above) and are reflecting their journey towards becoming a science in their own right (GeoD, SaD, ID). This can lead to extreme results as a case in Lower Saxony illustrates, where a survey on subject didactics (Armbruster, 2006) concluded that, from the perspective of individual representatives of their discipline, it "cannot be considered as a scientific discipline" (SaD, p. 369). "Inconsistent use of basic terms" (MuD, p. 263) as well as the fact that specialized didactics are "essentially driven by experience rather than theory" (EngD, p. 106) and were run by university teachers "who had themselves been practicing teachers" (EngD, p. 106) are seen as crucial issues regarding the academic nature or scientificity. This tendency is aptly expressed in music didactics: "Up to that time (the 1970s) and partly even beyond it, music didactics was seen as an application-oriented sub-discipline of musicology, or even as a norm-guided practical discipline that made use of the findings of other sciences (educational science, musicology, music psychology, etc.), but could not itself claim to be scientific in character" (MuD, p. 263). This leads directly to the next point.

– *Relationship between theory and practice*: In the context of subject didactics, this is a complex, ambivalent issue in that a specific orientation towards practice can call the scientific character of subject didactics into question, while at the same time reflection on practice in the context of teachers' associations was a conditional factor for the establishment of subject didactics (see also 2.3. above). A fundamen-

tal characteristic of subject didactics lies in the fact that "theory formation and practice reflection" are equally understood as "the two cornerstones of their research" (RelD, p. 342) and that "the often considerable discrepancy between theory and practice [...] is recognized and dealt with as one of the tasks for the future" (GeschD, p. 160), involving all subject didactics in general. This relationship between theory and practice presents itself not least as a search for the appropriate formats of subject-didactic research (cf. GFD, 2017).

– *Key aspects of subject didactic research*: Until the 1990s, one focus of subject didactics was seen in the "modeling and testing of teaching materials" (SaD, cf. MaD). In this context, it would have to be examined in detail to what extent the following statement from economy didactics applies equally to other subject didactics as well:

> "The focus on hermeneutic research, theory development, theory-to-practice transfer, teacher education and training, and teaching-learning materials development has developed at the expense of empirical research; this has been reinforced by limited research resources" (WiD, p. 447).

In keeping this analytical judgement in mind, it was observed in the early 1990s that "the lack of empirical research in subject didactics grew into an existential threat to these disciplines" and that "the empirical turn took place first in the didactics of natural sciences and later also in other subject didactics" (BioD, p. 31) (cf. DD, EngD, GeoD, GeschD, MaD, MuD, PhyD, PolD, WiD). Finally, it is worth noting that first of all, international research impulses are emphasized (ChD, PhyD, ID, TD; cf. also GeoD) and secondly, that the promotion of young emerging researchers is presented as an important aspect (EngD, GeoD, MaD, PhyD, WiD), and thirdly that historical work on the development of one's own discipline can be perceived as a research desideratum (SaD).

– *Relevance of academic disciplines*: This relevance has been made clear in light of not only the subject-specific impulses for subject didactic approaches, but also of the fact that the developments within the related academic disciplines have generated new fields in some subject didactics (e.g. biotechnology and ecology in BioD; cf. also ID and DD). In principle, various subject didactics can also be understood as branches of the respective academic discipline (e.g., GeschD, ID, RelD), although the relationship is by no means unproblematic (GeschD, MuD). Therefore an "intermediate position of subject didactics between subject sciences and educational sciences" (GeschD, p. 158) is observed, which leads to the following point.

– *Relevance of educational science*: The development of subject-specific didactic approaches has already pointed to impulses from educational science, which proves the relevance of educational science as a subject didactic reference discipline and will not be repeated in detail here. Similarly, there is mention of educational currents being adopted in subject-didactic approaches (e.g., RelD, GeschD), and of education being characterized as a basic subject-didactic category (e.g., RelD, TD).

In the context of subject didactics, even its blurred borderline to elementary school pedagogy is problematized (SaD).

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11. Goals, Content, and Competences of the School Subject and of Subject-Specific Teaching and Learning

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In the following two sections (Chapter 11 and 12) we will be dealing with the second set of topics originally formulated under B. "Learning within the School Subject" and "Subject-Didactic Research", as related to school subjects. Chapter 11 will particularly deal with goals and the content of a subject area. This might include the following, concrete aspects, agreed upon earlier, before writing, by the authors of the subject-specific reports (in 2017 during a planning meeting in Vienna):

– Global and characteristic goals of the respective school subject as well as their justification,
– the development and substantiation of competence models,
– sources, development, selection and structuring of subject-specific content and
– subject-specific epistemology, methods of gaining insights and knowledge.

As in the first set of historical issues in Chapter 9 and 10, a distinction is made between the school subject itself (Chapter 11) on the one hand and subject-matter didactics related to it on the other hand (Chapter 12). The impulses for both chapters are closely connected, however, with numerous aspects of the subject pointing to the respective subject didactics and vice-versa. Again, we had to set a space limit of 10–12 pages for the elaboration of these two topics altogether for reasons of volume of the publication. This limitation in space allowed for a rough general overview again, without being able to present the wider subject-specific discourse in any more nuanced way. This constraint always has to be kept in mind when studying the self-reports of the 17 subject didactics and the findings presented here — by definition they can only be selective and limited in scope and depth.

The guiding questions for this section, as listed in Chapter 8 above, have proven to be fruitful in view of the responses given by the subject-didactic representatives. The following analysis deals with their texts provided, broken down separately according to the two sub-topics *goals* and *content*, and a special addition on *competencies*. Methodological aspects are the only ones not specifically addressed in our analysis, since the findings on this issue were less substantial at the time, compared to the other topical areas dealt with here. Generally speaking, it is interesting to note that the findings on *subject content* and *subject competencies* emerge most strongly and clearly as the dominant issues in the mind of all subject-didactic disciplines. Both aspects were already the focus of the subject reports and the analysis in Volume

1 of General Subject Didactics, then limited to five reports only (cf. Bayrhuber et al., 2017). By contrast, the new categories *goals/objectives* and *methodology* had only emerged as equally important during that analysis. Accordingly, in the earlier study of 2017 they had not been included explicitly in the outline of questions, so that the statements about these categories could only be considered limited in terms of their validity (Rothgangel, 2017, p. 142). Comparisons, therefore, with the previous analysis of 2017 were only useful in relation to the two categories "subject content" and "subject competencies", but not in view of the newer categories of "goals/objectives" or "methodology". With this limitation in mind, we will start looking comparatively at the subject-based objectives, as identified and discussed in the 17 different subject reports of 2019 (Rothgangel et al., 2021).

11.1   Subject-oriented goals

A revival concerning the discussion of objectives can be observed in the context of the so-called "competence orientation" from the turn of the century onwards. This was due to the influence of the international comparative studies of PISA (*Programme for International Student Assessment*) as explicitly mentioned in PhyD, but also in BioD, MaD; DD). These studies involve the identification, naming and measurement of basic subject-specific goals in connection with more global aims per subject or learning area. In the didactics of natural sciences (BioD, ChD, PhyD), for example, this objective is called 'basic scientific education', or alternatively 'scientific literacy'. As will be shown, this terminology already indicates the complexity and controversy in the formulation of subject-specific objectives. Reference to the notion of *literacy* on the one hand and to the more common concept in Germany of education as *Bildung* on the other hand sets the frame for this analysis, of which only a few basic features can be elaborated upon here. In this process particular attention should be paid to the terms and wordings used to express more general as much as subject-specific goals.

11.1.1   Conceptual aspects

This segment is not concerned with definitions, but rather with observations on the use of language in the subject reports. Not surprisingly, there is a tendency to express subject-specific objectives using the term "competence" and, to a lesser extent, that of "literacy". In the introductory statement, scientific literacy was already mentioned with regard to the didactics of natural sciences (BioD, ChD, PhyD). The term 'literacy' is also used in English didactics, mainly in the plural ('foreign language multi-literacies', EngD, p. 109) and in mathematics didactics ('mathematical literacy', MaD, p. 237). In general, the fact that the term "literacy" is not mentioned explicitly in other reports, does not mean that it is not known or used there (in German didactics e.g. we find formulations like "reading literacy" or "literary literacy", DD, p. 87, and in

ID "computer literacy"); rather, the absence of this notion otherwise may be due to the necessary brevity of the presentations. Although the present analysis cannot clarify the relationship between literacy and competence in a systematic way, the close connection between the two concepts becomes obvious: for example, when scientific literacy is subdivided into four areas of competence (subject knowledge, acquisition of knowledge, communication, evaluation) in the didactics of the natural sciences. The equivalent use of the concept of competence (in the singular and in the plural) can be observed in other subjects as well in the context of discussing their goals, for example, when there is talk about religious competence (RelD), communicative competence (EngD) or the "deepening of linguistic, literary and media competences" (DD, p. 79).

In addition, linguistically speaking, the notion of competence ac be combined with other nouns so to form compounds such as "political assessment competence" (PolD) or "receptive competence" (KuD), "orientation competence in space" (GeoD; cf. RelD) or "action competence" (GeoD; cf. SpoD, PolD) – and thus it enables focus on specific objectives or aspects in goal setting. This flexibility in concept formulation allows for different alternatives, as a matter of fact for a wide range of naming sub-dimensions, rather than the German notion of *Bildung*, which is the equivalent to Education in English. However, *Bildung* also appears in compound forms, such as in *Selbst*bildung (BioD) or *Persönlichkeits-* und *Welt*bildung ("*Personality and Global Education*", SaD), in other words: in a more general framework of goal definitions on a personal level. But this happens much less so in a subject-related context, except for example in a term like "*Grund*bildung" (e.g. in BioD, ChD, PhyD, WiD), meaning basic subject-specific education in the natural sciences or "scientific literacy". On the other hand, within the dominant German discourse on competence definition and competence measurement, the term "*Bildungsstandard*" (educational standard) is the one most often and prominently used in the reports and spelled out in a subject-specific manner.

Overall, the frequency with which the term "*Bildung*" is referred to in the context of subject-specific objectives is remarkable, especially in view of the earlier discussion about competence for more than 15 years, as was already shown in the introduction related to 'basic education in the natural sciences'. Other examples for the use of the notion of *Bildung* (in the sense of a collective, summarizing word for a whole area of subject-specific education) are "economic *Bildung*" (WiD), "informatory *Bildung*" (ID), foreign language *Bildung* (EngD) or "linguistic, literary and medial *Bildung*" (in DD). Closely connected with the notion of *Bildung* is the one of "emancipation" (German: *Mündigkeit*) and "participation" (German: *Teilhabe*), as can be seen in the following quote: "Economic education (*Bildung*) shall empower people to a sound judgment, to self-determination and to responsible co-construction" (WiD, p. 447). In a similar way, there is also mention of technical emancipation (TD) and political emancipation (PolD) as educational goals.

Furthermore, the concept of "*Handlung*" (action, activity, ability to act) can also be found in the passages on subject-specific objectives, for example in art didactics (visual-productive activity, KuD) and sports didactics (ability to act physically, *Handlungsfähigkeit*, SpoD), but also in political science (ability to act politically, *Handlungsfähigkeit*, PolD), in English as a foreign language (ability to perform speech acts and to interact, EngD) and in geography didactics (ability to act competently in space, GeoD). It is worth noting that in sports didactics the guiding idea of *ability to act* is referred to as the "pragmatic sister of the concept of Bildung", "since the results of instructional and educational processes within physical education show up in the *actions* of the students in the (extra-curricular) world of sports and movement" (SpoD, p. 401).

Based on these different terminological varieties it is possible to reconstruct – with due caution – a certain basic pattern which is repetitively used for the reflections on the subject-specific goals: a certain adjective relating to the subject-specific quality of the expression (e.g. natural scientific, mathematical, economic, technical, digital, religious or political), is linked with one of the appropriate nouns, either literacy, competence, *Bildung*, self-responsibility (*Mündigkeit*), social responsibility or ability to act. And all of these resulting noun phrases imply an embedding in a certain subject relationship or in subject specificity, while pointing at general capabilities at the same time.

Of course, it is necessary to formulate some exceptions or introduce further differentiations at certain points: for one thing, in an interdisciplinary subject area such as "*Sachunterricht*"[1], for example, the link to a certain content or goal cannot be expressed using narrowly defined technical adjectives, but rather through the use of a broader noun phrase designating the object of study and education (e.g. nature, environment, surrounding conditions etc.; SaD).

Establishing the link to a specific subject and to a specific goal area (within that subject) can be achieved either through using an adjective or adding a noun, but both are not mutually exclusive, is be evidenced by an example taken from art didactics concerning terms such as "artistic" or "imagery": "Central goals of art education are the development and support of artistic-productive action as well as the ability to perceive, analyze and critically understand historical and contemporary imagery" (KuD, p. 214). A second example is found in history didactics where basic objectives are formulated in recourse to the notion of learning (e.g. "learning to think historically", GeschD). Otherwise, in the majority of subject didactics, the use of notions such as "learning goal" or "educational goal" play much less of a role than terms like *Bildung* or competence (but cf. SpoD as an exception). As a final example, we can point to the fact that a complex subject-specific objective or an area of objectives

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1   See the description of this interdisciplinary subject area above. In Germany, it exists only on the primary school level.

as "scientific literacy" (German: *naturwissenschaftliche Grundbildung*) is normally operationalized and spelled out further into detailed sub-components. This leads us to the next point already.

11.1.2 Complexity of the discourse about goals or objectives

We can already see that the discourse on subject-specific goals is quite complex and not free of controversy in many different respects. This multifaceted situation is exemplified below and broken down into six different points from a) to f), with particular reference to scientific literacy:

a) A first facet of the complexity is a differentiation of the guiding objective. This can be exemplified by the chemistry didactic presentation of the OECD definition of *scientific literacy* from 1999, in which basic science education is defined as "the ability

– to apply scientific knowledge,
– to recognize issues of a scientific nature and
– to draw conclusions from supporting documents,

in order to understand and arrive at decisions relating to the natural world and the actions of human beings in it / on it, leading to changes" (ChD, p. 58).

In this way, several dimensions of the overall objective are highlighted in an illustrative way, which already anticipate the later four scientific competence areas, as outlined by the Ministers of Education in Germany (KMK) in formulating basic (and testable) educational standards.[2] Beyond the didactics of the natural sciences, we also find other differentiations of global target definitions, but they often follow their own 'logics' or systematic forms of thinking. For example, in the didactics of economics, the following distinctions can be found, which are similar, but nevertheless different from the one above:

> "The global goal of economic education can be seen in the promotion of an individual's ability to orient him- or herself, to make judgements and decisions, to take action in and to partake in the design of life situations determined by economic factors in the face of ever accelerating changes in the global economic setting. Economy education should enable people to be self-determinant, responsible and mature co-creators of the world they inhabit" (WiD, p. 447).

Here the focus lies on situations determined by economic factors and on operators (such as "to orient oneself") which bear on these situations. Meanwhile all of this may be considered part and parcel of the term "Bildung" as an overriding concept

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2 In German the acronym KMK stands for *Kultusministerskonferenz*: It is the joint body of Educational Ministers from all the 16 *Länder* in Germany who regularly consult among each other, who suggest certain steps or measures, but who have no binding power for the individual states; see also above.

(including "mature judgement", "self-determination", "responsible cooperation and participation"). So as a generalization we can state that the notion of *Bildung* is alluded to in different reports and applied to a number of different types and levels within the discourse on subject-based goal definitions. It comprises not only self-cultivation, but also subject competencies and transferable epistemic capabilities.

b) In the explanations of the subject-specific objectives, a basic tension between a functional and a person-oriented concept of education can be perceived time and again (e.g. BioD, ChD, EngD, MaD, PhyD), where the functional aspect is often expressed in terms of literacy or competence. The perspective of physics didactics is cited here as a representative example for other subject didactics as well; it again refers to the OECD definition of "scientific literacy" and is discussed in the literature in detail.

This perspective "follows the basic idea of functional education of a 'responsible citizen': 'All students (should) understand the importance of science and technology for their everyday lives.' […] Fischler et al. (2018) juxtapose this 'pragmatic' or even 'utilitarian' understanding of education with the classical understanding of education as *Bildung* – as 'development of the individual and his or her relationship to the world' […]. Fischler et al. (2018) see the core of science education not in the 'acquisition of (scientific) content knowledge and skills'. Instead, it is about 'contact and confrontation' with the objects of knowledge of the natural sciences. This confrontation reveals the meaning of scientific content and the sense of their appropriation to the individual. Learners have to experience and reflect the resistance of scientific facts against understanding in their process of appropriation. […] The Anglo-Saxon concept of scientific literacy and that of scientific '*Bildung*' in the German understanding represent different views of the goals of physics education. Nevertheless, it is difficult to construct a strong contrast between them" (PhyD, p. 296).[3]

c) Furthermore, technology didactics can be used as an example to show how different approaches go hand in hand with different objectives: Thus, the guiding objective of science-oriented concepts in technology education is stated as "the orientation of children and adolescents in a technological world." (TD, p. 426); in contrast, the guiding goal of socially-oriented concepts in technology education can be described as the "individual emancipation of people in the active use of technology in all life situations" (TD, p. 426).

> "The multi-perspective model of technology didactics is, to a certain extent, a synthesis of the approaches oriented towards the subject-specific, academic sciences and those oriented towards society, from which essential aspects have been taken up and elaborated upon

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3   We keep in mind at this point that Bildung apparently also includes "education towards responsible citizenship", as claimed and discussed in PhyD, p. 296, for example.

didactically. The main goal of the didactic considerations is to enable the students to act in situations shaped by technology in a way that is consistent with basic human values and grounded in critical reflection" (TD, pp. 426–427).

d) Against the background of the first three points, it is not surprising that, in chronological terms, characteristic changes in defining subject-specific objectives have occurred and can be observed. This is exemplified by the didactics of chemistry:

> "In the course of history, the goals of chemistry education have undergone various changes in terms of priorities. Phases of strongly application-oriented objectives have been replaced by the definition of systematic learning opportunities, geared towards the acquisition of basic subject knowledge, and vice versa. Also a distinction has been made between the acquisition of knowledge and that of competence as primary objectives, shifting from one to the other" (ChD, p. 57).

Similarly, it can be observed from an English didactics perspective that "media didactics and literature didactics have gone through their respective phases of development and goal setting" (EngD, p. 109). It is also worth noting that there are "major controversies" (EngD, p. 109) regarding the objectives in English didactics, where "intercultural communicative competences" compete with "discourse competence" as a wider, more comprehensive and challenging framework.

e) The complexity of the internal debate on goals per subject increases further when different types of school and of school levels are considered. This can be exemplified by the didactics of physics, where it is stated with regard to the upper grades: "For the upper secondary school level, the question of the goals of physics instruction arises in a different manner. The overarching goals of the upper secondary school are advanced forms of general education, scientific propaedeutics and the ability to study […]. The contribution of physics education to a deepened understanding of general education lies […] in the subject-specific specialization with a simultaneous awareness of the peculiarities of a physical world view, i.e. the nature of the natural sciences […]. Schecker et al. […] identified four target areas of physics education in an expert study for the Ministers of Education and Cultural Affairs of Germany (KMK) on the advancement of physics education in the upper grades:

– Physics as the basis of the modern worldview (advanced conceptual understanding, e.g. of space and time, particles and waves),
– Physics and technology as shaping factors of socio-cultural developments (understanding of the importance of physical knowledge e.g. for communication, traffic, energy supply),
– Physics as a paradigmatic natural science (understanding the specifics of physical methods: modeling, measuring, mathematizing),
– Physics as a field of study and career (knowledge for entry into tertiary education, concepts, laws, deductions, experimental procedures)" (PhyD, p. 297).

f) In view of this enormous complexity, there is a considerable concern about a systematization of goals in many subject didactics, as was the case for music education at the end of the 1970s, which generated different 'types of goals' such as *ideal, material, medial and real* goals (MuD, pp. 267–268). All of these need to be clarified in much more detail, an unfinished task till this very day. In this sense, a long-term research perspective opens up as a desideratum for General Subject Didactics, namely to undertake a further precise systematization of all the multi-layered subject didactic discourses on subject-specific goal definitions.

11.2 Subject-specific content: Sources, selection, development

The three aspects 'sources', 'selection' and 'development' of teaching content have already been dealt with in an earlier analysis of the subject-matter contributions, namely in Volume 1 of our publication series "General Subject Didactics" with regard to subject-matter content (Bayrhuber et al., 2017). At the time, these observations were based on five subject-didactic reports only. Due to the 12 additional reports, which were included in the second, more comprehensive study (published in Volume 2 of "General Subject Didactics", Rothgangel et al., 2021), each of the dimensions above could now be further refined or specified, based on a much larger data base, as presented in the following sections.

11.2.1 Sources of subject content

The analysis of the five school subjects included in the first study of 2017 (Bayrhuber et al., 2017) already revealed four sources of defining subject-matter content for teaching:

– Academic disciplines,
– *Praxis/Practices*[4]
– Societal demands and
– Anthropological categories.

The present analysis comprising the 17 subject didactics confirms these four types of sources in general, but these can now be substantiated and characterized in more detail. Accordingly, the naming of these four source categories should be slightly modified and read as follows:

– Academic subject-matter disciplines
– Socio-cultural practices within the subject area

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4 *Praxis vs. Practice(s)*: Whether the singular or the plural form is appropriate, depends on whether one refers to the phenomenon of acting as such, in a collective manner, as opposed to single practices. In the latter case the plural is normally the appropriate form.

– Societal context, life-world and cultural aspects related to the subject
– Anthropological aspects related to the subject.

Let us look at each one of these four sources more closely.

a) Academic subject-matter disciplines

Although practically all subject didactics cite the respective subject-matter disciplines as a source for their subject content, the comparison reveals differences in the importance of these disciplines. For example, there are subject-specific self-reports in which the academic disciplines are identified as the primary source of subject content, where, as a rule, the application to and the benefits for societal requirements are kept in mind (e.g. BioD, MaD) – entirely in the spirit of competence orientation (see below in Chapter 12). In contrast, other self-reports emphasize other sources more prominently in addition to the academic disciplines, such as certain socio-cultural practices existing (e.g. DD, MuD, KuD, RelD, SpoD). This alone already results in a different significance of the academic disciplines as a source of subject content. The example of music didactics goes as far as to attribute a subordinate role to the subject-matter sciences, in comparison to the social practices, as mentioned later (MuD, see point b) below).

Furthermore, the scientific reference is concretized in different ways within the school subjects, although this can be controversial in some cases, as a matter of fact it can lead to conflicting approaches in this respect within one and the same individual subject didactics. For example, in physics didactics this applies to the four key concepts of *energy*, *interaction*, *matter* and *system* (PhyD). These are controversial since an overload in content knowledge, excessive demands on the students' understanding as well as motivational problems are put forward against them. Instead contextualized approaches are favored in its place. Also, in chemistry and biology didactics the overriding importance, if not dominance of academic disciplines as reference systems become obvious (e.g. *substances and particles, structure-property relationships, chemical reactions and energy* in chemistry didactics – *system, structural-functional relationship, development as well as other key concepts considered as system properties of bio-systems* in biology didactics). In particular, these basic concepts describe and structure the state of subject-specific knowledge in a general way.

Comparable phenomena can even be observed in other subject areas concerning key concepts to be known as part of subject competence. For example, one of the approaches in political didactics tries to offer a mental orientation for understanding complex political systems on the basis of fundamental concepts, taken from the discipline of political science. Just in legal politics, for example, these include no less than 161 sub-concepts (PolD). In another approach to political didactics, 'dimensions of the political world' are used as a framework for defining political education and for teaching and learning its substance (PolD). And in economy didactics as well

there are many challenging categories and basic thought patterns imported from the respective academic disciplines as content to be taught in school (WiD, cf. also RelD).

Overall, a variety of different relationships between scientific disciplines and key concepts for school teaching can be observed: 1) Physics education, for example, covers only knowledge gained up until the first half of the 20th century at the most, according to the subject-didactic report (PhyD). Accordingly, it is emphasized that disciplinary research of today is quite distant to school and to school content (mentally and socially speaking). 2) In contrast, computer science didactics reflects the challenge that disciplinary methods, certain subject areas and specific tools are relatively short-lived (ID). 3) On the other hand, music and art didactics illustrate that by no means do all sub-areas of the academic discipline play the same constitutive role in the respective school subjects; rather, other factors such as socio-cultural *praxis* determine the closeness to and relationship with the respective disciplinary area (MuD, KuD). Similarly, in the didactics of technology, an instrumental understanding of technology can result in dealing with "construction, equipment, and machines" (TD, p. 426), derived directly as subject areas for teaching (although the actual adaptation processes still follow later). In the didactics of history, finally, a narrative-constructivist understanding of history can result in the teaching of history not being defined by specific (academic) content considerations, but rather by relevant 'practical' topics, coming from "the surrounding historical culture of society" itself (GeschD).

b) *Praxis/Practices within a subject area*

Academic disciplines reflect, analyze, and interpret a certain subject area and establish theories based on that. Against this background, it can be observed that certain subject didactics deviate from that and assign the actual social practices within their respective subject areas an epistemological status of their own, compared to academic theories. Music didactics, as already mentioned, provides an outstanding example of this: in it, the five areas of cultural praxis (production, reproduction, reception, transposition, and reflection) represent the constitutive sources for the content of music teaching and learning, according to which subject-specific, disciplinary references are ultimately aligned (MuD). However, the role of these *praxes* vis-à-vis their scientific counterparts is weighted differently in terms of their relative importance within individual subject areas. In school subjects such as biology, German as a mother tongue, foreign language education/English, art, religion and sports it can be observed that socio-cultural practices do serve as a source for choosing and defining subject-specific teaching content to some extent, but to a lesser degree. Here are some more details:

– German didactics refers to "all forms of medial reception and production possibilities of pragmatic and poetic language use" (DD, p. 80);

– English didactics presents the foreign language itself as a learning "object as well as a medium for the acquisition of linguistic and target-cultural content" (EngD, p. 113);
– Art didactics draws upon a canon of visual art, architecture, and design from pre-history through early history to the present day, while visual phenomena of (the) everyday culture of today such as fashion design or advertising are considered equally as sources for subject content. Overall, there are several learning areas named, based on artistic processes: chromatic, graphic, plastic, spatial, scenic and media design (KuD, p. 219);
– Religious education emphasizes religious acts as well as symbols as sources of defining and choosing subject content (RelD), which in turn illustrates its affinity to art didactics as well as to music didactics;
– Biology didactics addresses everyday practices such as nutrition, sleeping, sexual behavior, hygiene, learning or waste disposal (BioD);
– Sports didactics, finally, considers movement in its various dimensions (anthropological, lifeworld, physical) as essential (SpoD).

The latter marks already the transition, as it were, towards the following two sources of selecting subject content, namely the social or lifeworld context and the anthropological dimensions or references.

c) Subject-related social, cultural and life-world context

Social, cultural and life-world contexts can be a source for defining subject content in a variety of ways. This applies, for example, to contextualized learning in physics didactics, where the STS approach (science, technology, society) decidedly uses societal and technological problems as a starting point in teaching (PhyD). This, in turn, is not at all uncontroversial within the field of physics didactics and represents only one option among others. There is also a plurality of different other approaches related to other school subjects: for example, in technology didactics, some of these avenues or approaches are specifically society-oriented and generate their teaching content from the fields of consumption, production and the environment (TD), while others strive for a synthesis of scientific and society-oriented approaches. The teaching of "*Sachunterricht*" (natural, social and environmental issues integrated, taught in primary school) follows a similar approach in which the life-world dimension is juxtaposed with the eight academically-defined dimensions relating to the widely defined subject area (cf. SaD).

Further references to social and life-world contexts can be found in religious education studies / research and in geography didactics, where contemporary societal problems and challenges can constitute an explicit teaching topic (RelD, GeoD). But these can equally be found in biology didactics, for example, when one deals with the participation of students in a public / societal discourse about goals and applica-

tions of bio-scientific research. Or in economics didactics, for example, where life situations shaped by economic situations could likewise become a source for [identifying] subject content (WiD). Cultural contexts also serve as a source for content in many subject didactics, such as literature or rather literary practice and literary reception within the didactics of German as a mother-tongue (DD). The same is true for architecture and advertising in art didactics (KuD), for many aspects of intercultural reality in English didactics (EngD), or for the historical cultural artefacts / events surrounding us in history didactics (GeschD).

Thus, social, cultural and life-world contexts can indeed be constitutive for the creation of subject content. Nevertheless, there is a certain danger of reducing the educational goals and the educative dimensions of a subject if these contexts represent the only frame of reference for teaching and learning within this subject (as SpoD rightly points out).

d) Subject-related anthropological aspects

Anthropological references form a final source for providing subject content. In religious education research and in German didactics, for example, questions of identity of the learners are an object of study and reflection and a subject of instruction (RelD; DD). In sports didactics, the body and the body experience are vividly discussed as concepts (SpoD). Biology didactics considers humans as part of nature and aims to promote an individual self-understanding of the learners themselves as natural beings, whereas in foreign language didactics the development of a self-critical cultural identity and of intercultural competence plays an important role. Anthropological references are also present in other subject didactics, where they often serve to legitimize (a certain area of) subject content (e.g. in the case of KuD) or where they represent an essential element in choosing a certain content (MaD, ID, EngD, WiD, GeoD).

11.2.2 Selection and structuring of subject-specific teaching content

As already indicated, there are not only different reference systems and contexts, from teaching content is derived and chosen, but also a number of different sources and considerations which are referred to in order to structure specific items (to be distinguished from one another) and to sequence them into teaching units.[5]

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5 It might be an interesting analytical observation that the topic of transformation from disciplines (cf. Hudson et al., 2023) or transposition in a double sense (cf. Schneuwly, this volume) is hardly considered in the reports.

a) Sources and their types of interaction as principles for selection and structuring

Not only do the anthropological aspects just mentioned above indicate a smooth transition between sources and the selection processes of subject content, it is also fair to say that all of the four sources of subject content identified can represent determining factors for selecting and structuring content or subject-matter to be taught:

– Firstly, there are subject didactics as a whole such as biology didactics (BioD) or subject-didactic approaches within various subject didactics (e.g. PhyD, PolD, TD), in which the respective academic discipline has a predominant position both in choosing and in structuring the content of a subject. In biology didactics, for example, this leads to the basic concepts of "system, structure and function: the relationship between them and development", all of which serve to integrate and build up biological knowledge (BioD). In a similar sense, in chemistry didactics, the content structure of subject-specific knowledge can also be designed with the help of a spiral curriculum, based on the central academic concepts, as named above (cf. point 11.2.1.a, ChD, above).
– Secondly, as already mentioned, music didactics is an example of a subject didactic discipline in which the five aforementioned practices (production, reproduction, reception, transposition and reflection) are foundational for the selection and structuring of subject-specific content in music education (MuD, cf. similarly in KuD, DD).
– Thirdly, certain approaches can be observed in a number of other subject didactics in which subject-related contextual aspects play a fundamental role for the selection and structuring of teaching content: The STS approach (science, technology, society) in physics didactics is an example, in the sense that social and technological problems of today determine the choice of physics content (PhyD). This lifeworld orientation is also of great importance in the "Didactics of Nature Studies, of Social and Environmental Studies" (see footnote in Chapter 8 above) in primary school and can be considered as one of its distinguishing features (SaD, p. 372).
– Fourthly, subject-related anthropological aspects play an important role in the selection of content within various approaches of subject didactics. One example is English didactics, in which the level of linguistic difficulty and the "learner orientation" (EngD, p. 114) are reference points for the selection and grading of material.

Moreover, several approaches are presented in subject didactics which select and structure subject content by relating two or more of these sources to each other. In this context, the following variants of mediating an academic discipline and a subject-specific context can be observed:

– First, a variant in which the academic perspective serves as the starting point (Muckenfuss, 1995; PhyD);
– Secondly, a variant in which the starting point is taken reversely from technical and social problems (STS approach, PhyD);

– Thirdly, a variant of equal rank in which, for example, dimensions oriented towards the lifeworld and towards subject-specific perspectives are related to each other by means of a didactic network (SaD).

Strictly speaking, these three variants of mediation can be applied in the same way to the relationship between academic disciplines and practices as well as between academic disciplines and anthropological references. Without giving evidence of all six theoretical variants here, at least one example should be presented: The mediation of anthropological categories and academic disciplines (as well as socio-cultural practices) is carried out in a certain approach of religious education, in such a way that dimensions of the anthropological category "religiosity" serve as a starting point for the selection of subject content (RelD, p. 345).

This model of relating different sources of subject content to each other would become even more complex, if not just two, but three or all four sources were taken into account for the selection and structuring of subject content simultaneously. Generally speaking, reference to three or four of these sources can indeed be observed in individual subject didactics (e.g. EngD, GeoD, ID, KuD, RelD, SpoD, TD), but there is no overall model offered in which the four sources mentioned are combined with one another or related to each other for selection and structuring of teaching content, e.g. on the basis of certain variants of mediation.

b) Didactic aspects and models for selecting and structuring content

In addition to the situation just mentioned, other approaches can be found in the self-presentations of subject didactics, which also serve the selection and structuring of subject content. In particular, a more or less explicit reception from general didactics or from the educational sciences as a whole can be observed, for example, when the following points are mentioned:

– Models taken explicitly from general didactics (ID, TD),
– The principle of exemplarity, according to *Wagenschein* (ID, p. 194–195),
– The principle of elementarization (GeschD),
– Selection based on educational goals (PolD, WiD) or on guiding principles (*Leitideen*) (BioD),
– Selection based on key questions (What, Why, What for, How, With What and For Whom) (ID).

In some subject didactics, other specific models of content selection are presented, from which only two examples will be given here:

In mathematics didactics, the model of Hans Werner Heymann is referred to, in which general education serves as a guiding criterion and the following seven concrete aspects are considered as central for evaluation: "preparation for life", "foundation of cultural consistency", "world orientation", "guidance for critical use of reason", "responsibility", "understanding and cooperation" and "strengthening of the student's

ego" (MaD, p 241–242). Against this background, it is emphasized for good reasons "that mathematics in school quite deliberately goes beyond the subject content (in the narrow sense). In principle, this is also true for other subjects, yet mathematics is not arbitrarily replaceable here: it offers specific possibilities, since independent aspects of the student's ego and cooperative processes can be addressed and since it is generally easier than in other disciplines to find incontrovertible statements" (MaD, p. 242).

With reference to developmental psychological considerations of Jerome Bruner, Andreas Schwill (1993) has developed an approach of "fundamental ideas of computer science" within informatics didactics (ID, p. 186). He formulated certain "criteria for the identification of stable subject areas", "which can also serve as categories for the selection of suitable learning content, independent of subject-specific *fashions*". These criteria are:

– Horizontal criterion (Subject content is relevant in many sub-disciplines of the academic field, here: computer science),
– Vertical criterion (Subject content is accessible at different cognitive levels),
– Time criterion (Subject content is relevant for the academic discipline of computer science over a longer period of time),
– Meaning criterion (Subject content can be accessed through experience of the target group in their everyday world) and
– Goal criterion (Subject content develops a reference to current research questions of the discipline, here: computer science).

Fundamental ideas of computer science that meet the above criteria are, for example, 'algorithmization', 'language' and 'structured decomposition'. These abstract concepts (master ideas) represent central pillars of computer science modeling, which in turn can be divided into subcategories. 'Algorithmization', for example, can be subdivided into 'design paradigms,'

Regardless of the fact that the first example was developed, so to speak, by the intersection of general didactics and mathematics didactics and the second example was primarily developed within computer science didactics itself, both can have a stimulating effect on other subject didactics as well. It should also be noted that in other subject didactics even further specific models of content selection are presented, which could not be outlined in the present analysis for reasons of scope. In any case, the descriptions so far ultimately result in interesting possibilities for an interdisciplinary dialogue among subject didactics as well as with general didactics, which could focus on content selection as a central (subject-)didactic task.

11.2.3 Development of subject-specific content over time

In the various texts of the subject didactics there is also mention of the fact that a development of subject content has taken place over the course of time: In chem-

istry didactics, for example, a largely constant content area is acknowledged with regard to the material world, but also changes at the same time, since new topics such as fertilizers, nano-chemistry and processes of modern electrochemical energy production came up and have been added to the curriculum (ChD). Similarly, in biology didactics, the content dimension has been widened as well, due to changes in technical terminology (such as the term "gene") or to the introduction of procedures for ethical assessment in the 1980s (BioD). In mother-tongue education (German as a first language) a constant widening of content can be observed as well, due to the expansion of the concepts of *text* and of *digital media* (DD). Finally, the development in sports didactics is remarkable, since a multi-faceted process of change can be observed here: from traditional sports to fashionable types of sports and on to new fields of movement and physical activity. And there does not seem to be an end of this development with a potential loss of a coherent focus on the level of content (SpoD).

It should be emphasized at this point that this listing does not claim to be exhaustive. Rather, the examples given indicate various options that can contribute to the development of subject-specific content, whether it is development

– of the academic discipline (e.g. processes of modern electrochemical energy production, ChD),
– of the content areas (e.g. opening up the traditional sports canon to new activities and influences, SpoD),
– of the societal contexts (e.g. digital media, as in DD), or finally
– of the subject didactics themselves, e.g. through context-oriented approaches, the inclusion of new areas (ethical assessment as in BioD) or critical evaluation of certain developments, (the latter one leading to keep a coherent focus on the content level, despite opening to new types of body movement and activities; SpoD).

11.3   Competence orientation: Reform waves, modeling, critique

After the turn of the millennium, competence orientation has developed into a dominant trend in the discourse within subject didactics as much as in education in general, at least in Germany. In view of this, it must always be born in mind that both the subject reports as well as their analysis are limited to certain *basic features*, by necessity so. These emerge in the analysis of the texts especially with regard to (3.3.1) competence orientation as a wave of reform, with regard to (3.3.2) the conditioning factors and (3.3.3) to the 'construction logic' of competence models and finally with regard to (3.3.4) the criticism of competence orientation.

11.3.1   Competence orientation as a sign of necessary reforms

The international comparative study of PISA at the turn of the millennium is seen as a decisive trigger for competence orientation within education (e.g. BioD, MaD,

PhyD, SpoD). Figuratively speaking, the so-called PISA shock could be described as an earthquake that led to a powerful competence-oriented reform wave. The extent of this reform can be seen in the descriptions of the subject texts by a number of facts, namely that

– international relationships do not exist only because of the PISA study; instead an international scientific discourse on competence orientation can be observed in quite a few subjects (e.g. GeschD, ID, MaD, PhyD); and in certain subjects even a European frame of reference has been established (cf. EngD, KuD),
– in terms of educational policy, reference is made in several texts to various resolutions of the Standing Committee of the Ministers of Education and Cultural Affairs in Germany (*Kultusministerkonferenz*, KMK; cf. KMK 2003: DD, MaD; KMK 2004: BioD, ChD, EngD, MaD, PhyD; KMK 2005: ChD, PhyD; KMK 2012: DD, EngD; MaD) and even to unsuccessful initiatives concerning the KMK (GeoD, PolD)),
– competency models have been adopted in part by subject-didactic associations (e.g. GeoD, ID, PolD, WiD); a coordinated model has been developed for science education in general (BioD, ChD, PhyD), and a dialogue between subject didactics can also be observed in other respects (e.g. GeoD, ID, PolD),
– these reforms within the subject didactics led to a basic theoretical discourse (see also 3.3.2) and to empirical studies regarding various sub-competencies (e.g. BioD, DD, MuD, PhyD, PolD, SpoD),
– a competence-oriented reorganization of the teaching practice was pursued, in which above all the curricula were re-designed to become competence-oriented (ChD, GeoD, ID, KuD, MaD, PhyD, SpoD),
– a dialogue was often conducted on a broad basis (cf. MaD, p. 255: "between representatives of the individual disciplines, of politics, of science and scientific associations").
– Last but not least, a lively and even controversial discourse on competence can be observed in various subject didactics as well as among teachers (see 3.3.3).

Thus the development of competency models is an essential requirement within competency orientation. These are the focus of attention in the passages following.

11.3.2 Constitutive factors for modeling competence [6]

A closer look at the self-reports of the 17 subject didactics reveals a number of factors that can influence and shape the formulation of competency models:

a) conceptual influences,
b) formal structuring principles,

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6 In earlier sections we have already dealt with the notion of competence in theoretical terms (see Chapter 2 as well as section 11.1 in this volume).

c) domain-specific conditional factors, and finally

d) conditional factors of educational policy and educational organization.

a) Conceptual influences

In some subject texts, certain influences are named explicitly which exercise an important orienting function for the construction and design of competency models in these subjects. One can distinguish two types of influences:

– *Impulses coming from empirical educational research*, consisting in particular of the PISA framework (cf. BioD, ChD, DD, MaD, PhyD), of Weinert's understanding of competence (cf. ID, MaD, TD) and that of the expert study by Klieme et al. (2003; English version: Klieme et al., 2004) (cf. MaD, PolD, SpoD, WiD). These have become decisive for numerous subject didactics.

– *Impulses from the discourses in the various subject didactics themselves*: In the didactics of natural sciences, in the didactics of mother-tongue education (German) and in mathematics didactics, there is a certain overlap with the PISA framework in that the definitions of scientific literacy, of reading literacy, and of mathematical literacy (as used in the PISA approach) also apply here as one point of reference. These definitions have an important significance and a guiding function for the modeling of competence in these subjects (BioD, ChD, PhyD, MaD; DD). In the didactics of religion (both Protestant and Catholic), the competency model for religious education, developed in Germany by Ulrich Hemel as early as 1988 (RelD), plays an important role for the didactic modeling of competence till today, alongside with the impulses from empirical educational research (see above). Similarly, economics didactics reveals a subject-specific aspect that is probably also significant for other subject didactics: subject-internal goals and content can again represent an important basis for the formulation of educational standards (WiD). These orienting impulses from empirical educational research as well as from the subject-internal discourse of a specific subject already contain certain formal structuring principles or content-related conditional factors. For reasons of systemacity, these will be presented separately in the following two sections.

b) Formal principles of structuring

The formal principles of structuring mentioned below are largely derived from empirical educational research. Without claiming to be exhaustive, the presentations of the subject reports reveal the following structuring principles, which obviously cannot all be found together in any one subject alone:

– *Domains of competence, partial competencies and educational standards*: Domains of competence are a basic structuring principle that can be found in practically all subject reports. As a rule, three to six competence areas are named (e.g. three:

PolD-GPJE 2004, WiD-Retzmann; four: BioD, ChD, PhyD, PolD-Detjen et al.; five: DD, EngD, ID, TD, WiD-DegÖB; six: GeoD, MaD). Within the natural sciences, for example, *four* areas of competence are listed, namely: 'knowledge', 'acquisition of knowledge', 'communication' and 'evaluation'.[7] These are further specified in the respective individual science didactics, so that the competence area "subject knowledge" reads as follows in the didactics of physics: "Knowing physical phenomena, terms, principles, facts, laws and assigning them to basic concepts" (PhyD, p. 298). Partial competencies emerge from larger competence areas, e.g. basic concepts from the competence area 'subject knowledge' (e.g. BioD, ChD, PhyD). Partial competencies, like competence areas themselves, can be the basis for educational standards (e.g. ChD, RelD). In chemistry didactics, one of these standards reads as follows: "Explain the diversity of substances on the basis of different combinations and arrangements of particles" (ChD, p. 58).

– *Competence levels and types of requirement*: This relates to further principles of structuring competence in a formal way; the naming of specific levels can only be observed in a few subject-didactic competence models: they can range from a sub-minimal standard to the highest standard in a five-level model of physics didactics, for example (cf. PhyD). These are to be distinguished from requirements related to the reproduction ("application of unchanged knowledge under familiar conditions", BioD, p. 35), to the reorganization ("application of slightly changed knowledge under the same conditions" BioD, p. 35), and to transfer ("application of knowledge within a new context", BioD).

– *Content- and process-related competences*: This is a common distinction in the data presented (e.g. PhyD, RelD, KuD, GeschD, SaD). For example, in the didactics of physics, the competence area or domain 'subject-specific knowledge' can be defined as a content-related competence, whereas the three other competence areas of knowledge acquisition, communication and evaluation can be understood as process-related competences (PhyD).

– Competences for s*tructuring features related to creating and to linking perspectives:* these are found only in the didactics of natural, social and environmental studies in primary school, determined by its intrinsic interdisciplinarity (SaD). This above distinction is applied to "subject areas" as well as to "ways of thinking, working and acting" (SaD, p. 371). Independent of its singularity, this distinction is highlighted here because it might be an option for other subject didactics wanting to express interdisciplinary aspects of their subject within their competence models.

– *Models of competence structure and competence development*: These features are only mentioned in one particular place within the subject-based reports, namely ChD. With all due caution, this may be an indication that in almost all of the other

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7   It should be noted, however, that the understanding of the different competence areas can differ within the three didactics of the natural sciences. Only in the didactics of biology a fourth competence area called "evaluation" is found, understood as "assessment in ethical terms".

subjects there are decidedly fewer *developmental competence models* offered than *structural* competence models with their definitions of competence areas, of individual competencies, and of educational standards.[8] It seems to be no coincidence that developmental modeling is specifically mentioned in the presentation of one of the natural science didactics (Chemistry Didactics); in many other didactics a much more controversial discussion can be reported, even with regard to structural competence models (e.g. PolD, RelD, SpoD, WiD). This shows that developmental models have hardly been generated till this very day within individual subject didactics; even in cooperation with educational psychology this was not successful so far.

c) *Subject-specific conditional factors*

An essential feature of Weinert's understanding of competence is that competences are *domain- or subject-specific*. The structuring principles just mentioned above under b) are of a formal nature and apart from certain reminiscences (esp. "subject knowledge", "basic concepts", "content-related competencies"), the specificity of the domain has not yet been highlighted to a great extent. The basic question at this point therefore is how domain- or subject-specific aspects are expressed in the different competence models. In this context, the subject descriptions show that domain- or subject-specificity in competence models is largely defined by those four specifying factors that have already been identified as sources of content selection, namely: 1) academic disciplines, 2) praxis/praxes within the subject area, 3) subject-related societal, lifeworld, and cultural contexts, and 4) subject-related anthropological aspects. Amazingly, these four aspects are the same as the ones mentioned above in the context of content selection – a finding which was not necessarily to be expected, which was not self-evident and could not be taken for granted at all.

It is true that the competence models differ in terms of whether and how subject-specific or practice-specific conditional factors predominate, for example (cf. e.g. BioD and KuD). Nevertheless, in general the focus on these four sources (as listed above) operate as major domain- or subject-specific conditioning factors in the competence models in general. This is also the case in science didactics, where these sources shape and express the domain-specificity of the competence areas:

– *Academic Disciplines*: The subject-specific academic reference is explicitly expressed by the competence area "subject knowledge" (German: *Fachwissen*) (BioD, ChD, GeoD, PhyD, PolD). In other subjects, references to the academic disciplines can be observed through the fact that connections are established between "declarative conceptual knowledge about elementary subject areas and subject concepts" (SaD, cf. DD, EngD, ID, RelD, WiD) and the respective reference disciplines, or

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8   For empirical research on subject-didactic competences see Section 4 below.

links are made to "central mathematical ideas" (MaD, p. 243) and to "competencies for content-, theory- and method-related categorization" (GeschD, p. 164).

– *Praxis within the subject area*: In the didactics of the natural sciences, praxis comes into play especially in the competence area "knowledge acquisition", for example, when it comes to conducting chemical experiments (ChD, p. 58). Everyday practices such as eating are also addressed from a professional subject-specific point of view (BioD). Practices are of prominent importance in art didactics, where the "production of pictures, objects, spaces or staging" are named as four areas of competence, "which describe the creational process" (KuD, p. 216). These are of comparable importance in music and sports didactics (MuD, SpoD), but also in technology didactics, where competence areas refer to the construction, production and use of technical products (TD). In other subjects, the reference to *praxes* or practices is often mentioned in the context of process-related competencies, for example: process terms like "designing" / "designing ability" or "acting" / "ability to act" are used (e.g. EngD, GeoD, PolD, RelD, SaD, WiD, SpoD, ID). Of course, further references to specific practices can be found in the subject-related reports, e.g. with the naming of competence areas such as "writing" (DD) or the introduction of operators such as "using" or "applying" (e.g. TD, ID).

– *Subject-related contexts (societal, life-world and cultural)*: The competence area "assessment" (BioD, ChD, GeoD, PhyD) refers to the societal context in a domain-specific way. In biology didactics, for example, it deals with socially controversial topics of "applied biology such as biotechnology or reproductive technology" (BioD, p. 38). A comprehensive contextual reference system is established in the competence model of the *Association for Natural and Social Studies in Primary School* (GDSU), among other things, by means of the guiding question "What should children have learned at the end of primary school about their natural, cultural, social, and technically designed environment – and why?" (SaD, p. 373). In the didactics of religion, the contextual reference is established by referring to "other religions and worldviews up to religious, cultural and social contexts in a global perspective" (RelD, p. 347; cf. also the competence area "Intercultural communicative competence" in EngD, p. 109). And in the dominant model of economy didactics, "the competencies are primarily derived from economically shaped life situations to be mastered" (WiD, p. 450). Comparably, technology didactics is about "mastering technically shaped life situations" (TD, p. 430) and computer science didactics about preparing for "a life in a digitally shaped world", according to their self-perception (ID, p. 194; cf. DD, p. 84: "Dealing with other media"). The competence named "Modeling Mathematics" (MaD, p. 243) is not only about the application of mathematics in everyday life, but rather includes "first of all the mathematization of reality, of real situations" (MaD, p. 44). Of course, the contextual reference also plays a crucial role in the didactics of geography; this is illustrated, among other things, by naming one of the competence areas "spatial orientation", which leads us directly to the next point.

– *Subject-related anthropological aspects*: In the competence area "communication" (BioD, ChD, PhyD) as part of science education, the anthropological relevance is expressed, among other things, by the fact that it is a matter of translating technical language, specific to biology, chemistry or physics into the everyday language of students or of society and vice versa, which means that "chemistry teaching and learning can also be regarded as a platform for *language* education" (ChD, p. 59). In this respect, the issues of language use and mediation through language are foundational to all subject didactics and are often indicated in competency models with terms such as "communicate" or "communication" (GeoD, ID, MaD, KuD, RelD, SaD,TD). In mother-tongue education (German didactics) these linguistic dimensions play a particular role within the competence area of "speaking and listening" (DD, p. 81) as well as in English didactics within the area named "functional communicative competence" (EngD, p. 111). Anthropological references are also central to subjects that deal with certain fundamental dimensions of human existence, such as dealing with the biology of mankind in biology (BioD), with "singing" as well as "listening and describing" in music education (MuD, p. 271), with "perceiving and expressing one's own faith and experiences […]" in the didactics of religion (RelD, p. 347) and finally with the constitutive references to "body" and "movement" in the didactics of sports (SpoD, p. 392).

Without discussing in more detail the anthropological references at this point, it should be obvious that the formulation of areas of competence, of individual competencies and of educational standards always establish an anthropological connection through the various operators applied. It could be examined in greater depth in which respect the use of operators differ between the various subject didactics and which dimensions of the human existence are dealt with in subject-specific terms.

d) Conditional factors of educational policy and of organizational issues

In the analysis of the historically oriented Sections 1 and 2, the importance of conditional factors in educational policy and educational organization was already repeatedly emphasized. It is all the more true for a competence orientation as a comprehensive reform system in which very different actors and sub-systems are involved. This is vividly illustrated by the following quote: "The implementation of educational standards in concrete curricula was accompanied by challenges and difficulties. In particular, the redesign of the curricula required a reduction of the material in many instances, also in order to be able to make additions elsewhere. This broad negotiation process took place between the representatives of the individual subject didactics, policy-makers, academic disciplines and professional associations in often painstakingly detailed work" (MaD, p. 245).

When comparing the subject reports, another specific point becomes clear: On the one hand, there are subject didactics that can quite easily make reference to

publications of the KMK in which the competence areas or educational standards of a specific subject are documented, as authorized by the respective administration (KMK 2003: DD, MaD; KMK 2004: BioD, ChD, EngD, MaD, PhyD; KMK 2005: ChD, PhyD; KMK 2012: DD, EngD; MaD). On the other hand, there are other subjects and subject didactics which did not find the attention at the level of the state (based KMK priority decisions) – in spite of formal applications and preliminary ground work already done by the respective subject-didactic groups (e.g. PolD, GeoD). This difference in the status of subject didactics is one of the main observations on the surface in the analysis of the subject reports. It is to be expected that the comparison of subjects on the basis of more in-depth studies concerning their contemporary history would probably lead to further revealing results.

11.3.3 Concerning the 'construction logic' of competence models

A comparison of the competence models between the subjects shows that, on the one hand, the existence of a competency model is predominant for some subject didactics in the German context, with biology, chemistry and physics didactics even agreeing on a common basic model with four competency areas (BioD, ChD, PhyD; cf. also GeoD). On the other hand, there are subject didactics in which alternative models with different construction principles coexist (e.g. PolD). In some cases these are constructed in a decidedly more complex way than the natural sciences' competence model (SaD). Observations like these raise the question of the 'construction logic' of competency models.

At this point, without claiming to be exhaustive, three selective observations about the construction logic of competency models are made, which result from the representations of the subject texts.

a) One- or multi-dimensional models

The four competency areas of the natural sciences' didactics in the KMK publications (subject knowledge, knowledge acquisition, communication, and evaluation) can be understood as components of a one-dimensional model in that all of them can be located on a vertical coordinate axis (BioD, ChD, PhyD). The advantage of this conceptualization is that such models can be more easily operationalized and empirically tested. Nevertheless, the OECD competence model for the sciences already shows that 'assessing' cannot only be understood as a separate competence area, but that it is also embedded in all the other competence areas.

A two-dimensional model, which can be formed by process-oriented aspects (e.g., perceiving, interpreting, communicating, judging, designing) on the one hand and content-related aspects on the other hand, can be found in the didactics of religion, computer science, and technology (RelD, ID, TD). An even more complex multi-dimensional model can be observed in the teaching of "natural and social studies

integrated" on the primary and secondary school level (SaD, cf. GeoD). Here, two bi-dimensional structural features are distinguished: First, "declarative conceptual knowledge" versus "procedural action knowledge", second, "perspective-constituting and perspective-linking subject areas" versus "perspective-related and cross-perspective ways of thinking, working and acting" (SaD, p. 374).

b) Origins of competence domains and dimensions

In the didactics of natural sciences, the four competence areas can be traced back to the development of the OECD definition of 'scientific literacy' (cf. BioD, ChD, PhyD). In the didactics of religion, process-related competencies (e.g. "perceiving religious phenomena" RelD, p. 346) are conditioned by the anthropological category "religiosity" and the model of "religious competence" developed from it, as it was first established by Ulrich Hemel (1988) and then taken up in a modified form by the model of the Catholic German Bishops' Conference (DBK) as well as by the Protestant model of the Evangelical Church of Germany (EKD) (cf. RelD). It is noteworthy, however, that both competence models differ strongly/remarkably with regard to their subject areas: The DBK model is based more on a theological discourse, whereas the EKD model is based more on religious challenges that arise, for example, with regard to one's own faith as well as to other religions and other worldviews (RelD). Both are by no means mutually exclusive, because theological references can be linked to challenging religious situations and religious challenging situations are to be reflected theologically. Nevertheless, this difference is distinctive in that it also influences the competence logic of other subject didactics and leads to different competence models accordingly. For example, in the didactics of economics, two competency models, which are based on distinct life situations, are distinguished from a competency model that is "oriented towards a scientific system" (WiD, p. 451).

Overall, quite a few subject didactic models are characterized by a combination of process and subject-related aspects in order to develop areas of competence or individual competencies (e.g. TD, ID). While the above examples primarily implement the subject-related reference via the academic disciplines or subject-related life situations, there are also examples that establish this reference via subject-related practices: The first example in this context is the construction logic observed in technology didactics: "On the one hand, elements of the life cycle phases of technical products (design, manufacture, use), on the other hand, further important skill areas (understand, communicate, evaluate) are structuring [the model]." (TD, p. 430) A second example can be found in art didactics, where four areas of competence are defined for producing and another four areas for "receiving pictures, objects, spaces or stagings" (KuD, p. 216).

We have to keep in mind at this point that the reference to subject matter (or domain-specificity) in the sense of the differentiation grid described at the beginning of this section can be established by 1) academic subject-matter disciplines, 2) practices

in the subject-matter area as well as 3) subject-related contexts. If we consider additionally that process-related aspects (e.g., perceiving, interpreting, judging, acting) represent alternative 4): anthropological references, then quite a remarkable finding emerges at the end: Ultimately, a cross-section of subject reports that operate more or less with a matrix of process-related and subject-matter related aspects, reveals four different construction logics: the four categories listed could already be identified as essential points in the sources for selecting subject content (see section 3.2.1) as well as in the domain-specific conditioning factors of competence models (see 3.3.2).

c) Ways of designing educational standards

Again, various possibilities can be found in the subject-specific texts with regard to the process of designing educational standards. Two design approaches can be illustrated, again using the DBK and EKD competence models as examples (cf. RelD): The EKD model generates a total of eight competencies from the five process-related competences on the one hand and the four subject areas characterized by challenging situations on the other hand, from which several educational standards are derived in each case. In the DBK model, however, "the content areas are operationalized directly on the basis of four to five educational standards in each case, and these are further specified by more or less extensive lists of content-related reference points" (RelD, p. 348).

One basic question with regard to the various aspects mentioned in section a) to c) is the extent to which the different construction logics of competence models are conditioned by (the) subject-matter, by the respective discourse culture of the scientific community, or by the necessary compromises that often characterize such models (EngD). In any case, a thorough discussion of the construction logic of competence models, followed by a subsequent empirical review, and, if necessary, a revision of the competence models and of the educational standards derived from them, is desirable and in fact necessary for a tenable, professional basis of 'competency orientation'. However, we can see that in none of the presented subject didactics an empirical review of the overall model has been achieved (cf. ChD), let alone a revision based on empirical data. This leads us to the last point.

11.3.4 Critique of the competence orientation

It has already been indicated that the 'competence discussion' in Germany has been lively and controversial. The following quotation may give a first comprehensive insight into some points of criticism (cf. GeoD):

> "Alongside a fundamental critique of a competence orientation as such, which originates from the realm of critical educational and cultural theory and is primarily ignited by the concepts of 'standardization' and 'measurability' […], there are also critical voices on the part of school practitioners. In analogy to the criticism in other school subjects, these

voices are concerned, among other things, about the significance of the content and express their consternation that the actual ore of subject-matter itself could get lost, that the number and the level of requirements in educational standards are too high, and that a teaching-to-the-test mentality could find its way into the schools" (GeoD, p. 138).

This quote reveals at least two different dimensions of criticism (deficits in educational theory, practical problems), which can also be found in other subject texts and supplemented by further arguments. In this context, as has been repeatedly emphasized in the course of this analysis, we have to point out a certain limitations concerning the theoretical-educational dimension, which the authors would like to illustrate or exemplify with reference to one's own subject: In the didactics of religion, for example, there was a broad and nuanced educational-theoretical critique of the competence orientation and actually still is. However, this was not presented in the subject-didactic reports on religious education due to the limited page numbers agreed upon. Instead, only the concluding consensus was recorded ("In the meantime, however, there seems to be a widespread consensus that certain areas of religious education can be standardized without thereby capturing the entirety of religious education", RelD, p. 348). This finding is certainly valid for many subject didactics, without this being explicitly stated in the individual subject reports. From this perspective, the following descriptions cannot be expected to be complete or even detailed enough, nor can the subject didactics dealt with in each case be cited as (hard) evidence for any points. However, in the spirit of qualitative research, a number of basic types of criticism can be identified and distinguished relatively clearly.

a) Deficits in educational theory

This first critical dimension can already be found above with regard to the didactics of geography and religion (GeoD, RelD). Competence orientation is faced with the criticism that it operates under the dictum of the "standardized pupil" (DD LF4, p. 88) or a "purposefulness of the human being" (utility aspect; TD, p. 431) and that the focus is not on "general education, but on the interests of economy […]" (TD, p. 431). In this sense, a sports didactic perspective also states: "The focus of criticism is […] the transfer of economic thinking to educational policy and pedagogy, in which students are only to be schooled as effectively as possible; this is viewed with concern for the pedagogical claims of physical education" (SpoD, p. 206).

b) Subject-specific differences

Other points of criticism can be summarized as follows: a general competence orientation does not do justice to certain subject-specific or domain-specific aspects. Such a critical didactic perspective in music education is symptomatic for this context: any competence model, so the argument, "faces the basic proviso that it reduces the specific qualities of aesthetic experience and design to what can be quantified and

grasped in verbal language and thus misses the specifically aesthetic nature of the subject matter" (MuD, p. 270; cf. also DD on understanding literary texts). This has also been stated from an art didactic perspective in a similar way:

> "The professional identification with the reference field of 'free art' and its experimental, innovative and provocative implications on the one hand, and the starting point of 'free children's art' on the other hand, which requires 'free expression' and 'unfolding', support the scepticism about formulating of educational standards. At the same time, visual-aesthetic experiential processes are difficult to press into fixed performance standards that are tested in comparative tests." (KuD, p. 218).

And again in sports didactics it is claimed that the future of competence research will basically depend on the success of integrating theoretically derived as well as empirically testable competence models into a holistic view of human action competence within the areas of movement, play and sports altogether (SpoD, p. 406).

c) Deficits in competence theory

The points of criticism, however, are not only based on educational theory or subject-specific features, but can also be nourished – to a certain extent due to a competence-theoretical 'logic' – by the state of critical discussions in the subject itself. Accordingly a serious deficit in terms of the definition of what we understand by 'level' of competence is pointed out by GeoD. On the other hand, it is noted that certain existing competence models do not meet the demanding criteria of the Klieme et al. (2003) expert study (e.g. in WiD, MuD) or that competence areas are too difficult to delimit from one another or from partial competencies, and conversely, that they are even sometimes wrongly assigned (WiD).

Other controversial issues – at least for the time being – are the question whether the ability to evaluate or judge (something) is domain-specific or not and thus a general capacity nourished by subject-specific learning, but generalizable beyond that, at least in principle, or whether pure declarative 'knowledge' can be considered as a competence dimension at all (PolD), as opposed to an application and use of knowledge. Finally, a certain danger is pointed out in several reports, namely that "cognitive target dimensions dominate too much" (PhyD, p. 298). And this is not in accordance with Weinert's comprehensive definition of competence, on which most of the basic competence research in Germany is based or was based originally, at least (Weinert, 2001).

d) Empirical deficits

Strictly speaking, empirical desiderata could also be attributed to the previous point, because empirical testability is a basic requirement for educational standards. In this context, it is less surprising, therefore, that insufficient empirical data for educational

standards are found in areas such as the didactics of music and religion (MuD, RelD). On the other hand, despite considerable efforts in terms of empirical research, even in physics and chemistry didactics, for example, deficits are also noted because empirical testing has only been conducted on parts of the competence structure so far and hardly on developmental models of competence in those areas, let alone on the model as a whole (ChD).

e) Issues of practice

Finally, practical problems are also articulated in many different respects. They basically show that the implementation of competence orientation entails its own challenges. The following points can be highlighted in brief:

– The educational standards are too demanding (GeoD, cf. PhyD).
– A mentality of "*teaching-to-the-test*" can be dangerous (GeoD, p. 138).
– There is a reduced orientation towards lesson design (PhyD, cf. ChD).
– Competence orientation brings little change in the everyday practice of teaching physics (PhyD).
– There is a lack of relationship between competence-oriented curricula and the scientific discussion underlying it (SpoD).
– There is a general concern regarding insufficient teaching of actual subject-matter knowledge on the part of subject teachers (mentioned in PhyD).
– The implementation of educational standards is seen as problematic in general (PhyD, SpoD), without giving detailed reasons.

f) Positive aspects

The problematic issues, as listed above, should not hide the fact that competence orientation is also assessed positively in many respects and in many didactic disciplines; there are even reports such as the one from biology didactics, in which practically no negative criticism appears (BioD).

In mathematics didactics, a clearly positive change in subject teaching and learning as a result of competence orientation is perceived as well, e.g. with regard to more application in task formulations; insofar, the reform is judged as overall successful (MaD).

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12. Outlines and Perspectives of Subject-Didactic Research and Development

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The comprehensive topic of subject-didactic research and its development over time deals with the following aspects, among other things:

– types or formats of subject didactic research (empirical, historical, theoretical, comparative, …),
– model-based research – or theory-based development of topics, of teaching concepts and of learning opportunities,
– state of the art in (empirical) competence research, subject-specific criticisms thereof and of competence orientation in general,
– relationship with other disciplines as reference systems and to subject-based practices.

It is noticeable that two of the four aspects mentioned here are also touched upon in the context of other issues, namely in Chapter 11 above or in Chapter 14 below: for example, some subject-specific critique of competence orientation has already been addressed to some extent in the section 11.3.4, whereas the ties to other reference disciplines are primarily dealt with in the subject reports in Chapter 14, mainly in connection with the interdisciplinarity of subject-didactic research. Nevertheless, some aspects of this large field of reflection will also be picked up and discussed at the end of this chapter under 12.5 "Academic Reference Disciplines". This is because scientific-theoretical determinants come into focus here, whereas in Chapter 14 the dialogue among the different subject didactics is foregrounded and described.

Overall, the analysis of the individual subject-didactic reports shows an enormous increase and a positive development of subject-didactic research over time, which is described in more detail under 12.1 "Development of Subject-Didactic Research". Furthermore, after some characteristic features influencing subject-didactic research have become apparent, these will be discussed in 12.2 under the heading "Conditional Factors of Subject-Didactic Research". Content-wise, the various aspects of competence research (12.3 "Development, research areas and methods") will dominate the following section of the analysis, whereas in 12.4 "Formats of subject-didactic research" different research approaches will be presented and distinguished accordingly.

12.1 Development of subject-didactic research

Although the historical development of subject didactics was one of the central topics in Chapter 10, newer, more recent developments in subject-didactic research up until today are echoed in the present chapter. Apart from a few exceptions (cf. KuD), these developments go back to the 1970s and are still unfolding. In this context, time and again a positive evaluation of the progress of subject-didactic research is expressed in general terms in all of the self-reports. In some disciplines, however, this development is characterized as somewhat "hesitant" (MuD, p. 271) or as only "slowly increasing" (KuD, p. 223). But the overall tendency expressed in the different subject-specific texts is one of a fundamental pride about the increase of research activities, in terms of quantity as well as quality. It is stated in mathematics didactics, for example: "[Research] has thereby undergone substantial changes, especially in Germany, over the last forty years" (MaD, p. 246).

This positive acknowledgement of subject-didactic research is confirmed throughout the different content areas, with some reservations, as indicated above. At the same time what is reported about are only general lines of development, with certain examples presented, which give by no means a complete picture of the true evolution of subject-didactic research in recent years (cf. MaD).

12.1.1 From experience-based concepts to empirical research

It is characteristic for the development of subject didactics that in numerous subject reports there is mention of an increased focus on *empirical* research over time (e.g. TD, SaD). In this context, a trend away from experience-based recommendations and material provisions for teaching subject-matter towards well-founded conceptualizations and data-based, empirical insights can be noted in comparison to the 1970s and before.

> "While in the 1970s numerous concepts were still based on experience so that Haubrich […] rightly complained about an 'overproduction of theoretical concepts', a methodological change from a primarily 'theoretical' to an empirical-analytical research orientation took place very early in geography didactics" (GeoD, p. 144; cf. also SaD, ID).

The positive consequences of this development are described in another subject-didactic report, namely in biology didactics, as follows:

> "As a major output of biology didactic research, university teacher education can now draw on empirically validated bodies of knowledge about cognitive and affective aspects of teaching and learning biological relationships that did not exist 20 years ago" (BioD, pp. 39–40; cf. also SaD).

Along the same lines, it is acknowledged in SaD that empirical research is "highly significant for the further development of the subject" and its teaching quality (SaD, p. 381).

12.1.2 Increase in empirical research expertise

Beyond this general turn towards empirical research, a "continuous differentiation of issues and research methods" (SaD) as well as a clear increase in quantitative and qualitative empirical studies can be noted (cf. SaD, GeschD). In many cases, this increase in subject-didactic research expertise is also attributed, among other things, to the "cooperation with empirical educational researchers" (GeschD, p. 167; namely educational scientists and colleagues from educational psychology). This is well documented, for example, by the fact that more and more data-based publications such as the "Research Handbook on Empirical Writing Didactics" (DD, p. 86) are appearing on the market. In addition, it is noteworthy, however, that in some disciplines (social-scientific) *quantitative* approaches initially dominated, before a strengthening of *qualitative research methods* developed later (this is the case in geography didactics, for example). In other subject-didactic disciplines (such as sports didactics) the opposite happened: while "qualitative approaches dominated in the past" (SpoD, p. 407), these are now becoming increasingly quantitative. At the same time larger research projects appear which can be characterized by a triangulation of methods and a mixed-methods approach (so mentioned in GeoD, cf. EngD, ID, SpoD). This leads directly to the next point.

12.1.3 Trends towards more complex studies and larger research projects

Alongside with the growing empirical research expertise, including third-party funding, some interdisciplinary cooperation and even an internationalization of subject-didactic research, some larger and more complex research projects are now being carried out. In this context, the research project 'Evaluation of Standards in the Sciences for Lower Secondary Education; BioD, ChD and PhyD' (*Evaluation der Standards in den Naturwissenschaften für die Sekundarstufe I*) can be cited as a representative example for similar, numerous other projects (cf. also 12.2.1 below). Accordingly, it is also acknowledged in sports didactics that in several projects "different data sources (coming from teachers, learners, observers etc.) and different data collection methods (questionnaires, observations, test procedures, videography)" are being used simultaneously (SpoD, p. 408). This situation can be contrasted explicitly to earlier times when (according to TD, p. 195) "broad empirical studies hardly took place in this phase of subject-didactic research".

12.1.4 Topics and issues in subject-didactic research

Against the background of what was laid out in Chapter 11, it is not surprising that research on subject-specific *competence* in its various forms and expressions represents a fundamental trend during the last two decades. It covers a relatively significant part of subject-didactic research; it is strongly supported by educational policies and

third-party funding and it often takes place in the form of interdisciplinary research projects. Other trends in subject-didactic research can also be identified, based on the results of our comparative analysis (with certain reservations, however): Certainly *research on teacher professionalization* is one of those topics which is prominently mentioned in the subject reports as being on an up-rise move and most important (e.g. GeschD, PhyD, SaD and other subject didactics). In this context, reference to an interdisciplinary project entitled COACTIV (cf. Baumert & Kunter, 2011; Kunter et al., 2013) and some other important German follow-up studies is often being made: COACTIV is an acronym for "**Co**gnitive **Activ**ation in the Classroom: The Orchestration of Learning Opportunities for the Enhancement of Insightful Learning in Mathematics".

This project can be largely understood as a comparative branch of competence research, because it focuses on the identification and description of *teacher competences* in quite a number of subjects, with a general teacher training perspective in mind.

In addition to such overriding, cross-curricular topics in subject-didactic research, other more subject-internal research tendencies are also noticeable, with two examples to be mentioned here: In the didactics of German as a mother-tongue, repeated reference is made to *canon research*: "This investigates which literary works, authors, and epochs have received special attention in the past and whether or not and according to which criteria a school literary canon can be designed for the present and the future" (DD, p. 85). And within the didactics of religion an increasing use of *comparative methods* is applied in order to "work out the specifics of denominational education" for internal and international comparison (RelD, p. 351).

12.1.5 Subject-didactic research perspectives

Independent of the general advancement in subject-didactic research, as indicated above, one can also identify perceptions of apparent desiderata or of one-sidedness in subject-didactic research and attempts to overcome them. Two fundamental issues could be named and emphasized here. First, the balance between theoretical and empirical research (cf. GeoD, GeschD): for example, the lack of systematic subject-didactic research from both perspectives is criticized in art didactics (KuD); conversely, the danger of "blind empiricism" is pointed out in sports didactics (SpoD). Secondly, the gap between theoretical and empirical research on the one hand and their practical relevance and applicability on the other hand: for example, in foreign language didactics (EngD) the chances for overcoming this gap through design-based research approaches and programs are underlined and partly demonstrated; similarly, in chemistry didactics the potential of a relatively new trend named *learning progression* is pointed out (an approach originating in the US, aiming at planning subject-specific instruction, learning and competence development over a longer period of time, in a cumulative way; ChD; cf. PhyD). Ultimately, the whole problem is

one of balancing theory-building, empirical research and the pragmatics (or practice) of daily teaching, as aptly stated in history didactics: "Empirical studies, especially quantitative ones, require precise theorizing. And then the testing ground of both theory and empiricism is pragmatics" (GeschD, p. 167).

12.2 Conditioning factors of subject-didactic research: Funding, professional associations, internationalization

As in the history of subject didactics (cf. chapter 10), specific conditioning factors for subject-didactic research also surface here and offer themselves as possible explanations. In both cases these factors differ in characteristic ways, however: While in the historical context forms of institutionalization and the influence of formative personalities could be identified as conditional for the development of subject didactics, now other factors such as third-party funding, activities of professional associations and trends in internationalization can be named as causes for the development of subject-didactic research in recent times. Let us look at each one of these factors separately.

12.2.1 Funding

It can be assumed that third-party funding probably marks a turning point between subject-didactic research before and after the beginning of the millennium. This hypothesis would have to be investigated more closely and tested more strictly in the form of a separate study oriented towards analyzing the structure of recent, contemporary developments. However, the various subject reports themselves identify third-party funding in support of certain research topics and educational issues as a very influential variable. In the mid-1990s, scholars in science didactics founded an interest group called *Arbeitsgemeinschaft Didaktik der Naturwissenschaften* (ADINA, Working Group on Science Didactics). They initiated and promoted deliberately an empirical turn in subject didactics, starting with science-didactic projects funded by the prestigious German Research Foundation (cf. BioD). Ever since, the number of challenging third-party supported projects and the funding volume for subject didactics in general seem to have increased immensely over the last 25 years. In cooperation with a national research and development center in education called IQB[1] large scale projects such as "Evalution of Standards for Sciences Education" (for BioD, ChD and PhyD) or "VERA"[2] (Comparative Studies in Grade 3 and 8 for DD, EngD, MaD)

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1   IQB = *Institut zur Qualitätsentwicklung im Bildungswesen* (a national Institute for Quality Development in Education), founded in 2004.
2   VERA = The name is an acronym for "*VERgleichsArbeiten*" (comparative studies, nationwide) in grade 3 and 8 of the German school system nationwide, as a more refined addition to the regular PISA testing.

play a special role here, but also projects under the priority programs of the German Research Council (DFG) for competence research (e.g. LUK = *Literarische Urteilskompetenz*; "Literary Evaluation Competence" for DD) as well as projects funded by the Federal Ministry of Education and Research (BMBF) within its program initiative 'Quality Offensive in Teacher Education' (mentioned e.g. in BioD, EngD, SpoD). And even 'smaller' projects such as the "JeKi program" in music didactics[3] (MuD), also funded by the BMBF, are mentioned as cases of the same type.

In this context, it would be necessary to examine in more detail how subject-specific didactic research is not only made *possible* by third-party funding, but also *influenced* or even *directed* by it as a result of third-party funding (at least up to a certain point). This is particularly true with regard to the funding of certain types of research:

– interdisciplinary research (DD),
– development of methodological expertise (GeschD),
– subject-related competence research in physics didactics (PhyD),
– research of young, emergent scholars in science (BioD; FUNKEN program[4], ChD),
– ambitious larger research projects (e.g. research on educational standards in cooperation with national institutions = the so-called ESNaS project, ChD, p. 64), which could not have be managed without the help of external budgeting.

In all of these areas mentioned, empirical educational research in its institutionalized form is a valuable project partner for subject didactics, and it is not uncommon for externally funded projects to be carried out in cooperation with other subject didactics, sometimes with several of them at the same time (e.g. FaBiT[5], cf. EngD).

Nevertheless, the support of subject-didactic research based on the research strategies of national agencies such as the German Research Foundation (DFG) or the Federal Ministry for Education and Research (BMBF), cannot only be seen positively, all the opposite, it is also met with criticism in several research communities, some of which is quite harsh: The reproaches go as far as assuming that doing competence research on such a large scale is done mainly because one wants to feed "on the troughs of the German Research Foundation and other third-party funding sources" (DD, p. 88). Indeed, the question arises to what extent the link between third-party

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3 JeKi = *Jedem Kind ein Instrument* (An instrument for every child), a program in music pedagogy at primary schools in certain parts of Germany (mainly North-Rhine Westphalia). This program has been extended meanwhile to "Instruments, Dancing, Singing for Every Child" (*Jedem Kind Instrumente, Tanzen, Singen*, JeKits).

4 The FUNKEN program, hosted at the University of Dortmund, links several didactic research projects into a program of advising and training young researchers on their way towards developing expertise and common standards in subject-specific research, also fostering cooperation among subjects and geared towards practical applications in the classroom.

5 FaBit = "Fachbezogene Bildungsprozesse in Transformation (*FaBiT*)", a research initiative at the University of Bremen, comparing subject-based educational goals, teaching and learning processes in comparison of several subject didactics.

funding and actual research projects has decisively shaped and influenced subject-didactic research agendas over the last 15 years – a point that can probably better be analyzed and evaluated more clearly with some distance in time and involvement.

12.2.2 Activities of subject-didactic associations

In the descriptions of the subject reports, it becomes evident that professional subject-didactic associations can perform an important function in the promotion of research (cf. BioD, MuD, SaD, SpoD). A direct link to the preceding point (concerning funding) can be seen in the report of biology didactics: "In order to increase the number of applications for nationally (DFG-)funded research projects, the sub-section 'Didactics of Biology' (FDdB) within the Association for Biology as a whole (VBIO)[6] has already supported two groups of junior researchers through junior academies." Here, not only the importance of third-party funding becomes apparent, but also the targeted promotion of emergent young scientists through an association's initiative and activity.

This supporting effect of subject-didactic professional associations can also extend to other areas such as consultation for publishing, e.g. publishing articles successfully in peer-reviewed journals or in relevant book series (EngD, SaD, SpoD) or summarizing the state of the art in subject-didactic research from time to time so to identify important desiderata worth studying by younger researchers (EngD, SpoD).

12.2.3 International dimensions

In various respects, a certain international orientation of disciplinary didactic research can be perceived, which contributes to a broadening of perspectives and serves the exchange and transfer of scientific knowledge in subject didactics (examples would be the "Rational Number Project" in MaD or the "Learning Progressions" Project in ChD and PhyD; cf. also Schweitzer & Schreiner, 2021; Schweitzer, 2022, for Religious Education; Vollmer, 2022, for transfer of research in subject didactics in general). In some subject didactics it is acknowledged that the reception of the international discourse has only gained momentum in the last decades (e.g. MuD) and that there are still many deficiencies in terms of presenting oneself internationally (EngD). Notwithstanding these perceptions, the majority of subject reports indicate that international exchange does take place to a certain extent, in different areas and on different levels. For example, there are

a) International professional didactic associations such as ERIDOB (BioD),
b) International professional conferences, e.g., from ACM, IEEE, and IFIP (ID),

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6 VBIO = *Verband der Biologen*, an Association of Biologists, with a separate section for scientifically working biology didacticians.

c)   International publication channels, whether peer-reviewed conference proceedings (e.g., ID), subject-based publication series (e.g. MuD) or English-speaking journals, covering one or more content areas or even basic issues of all subject didactics (e.g. RISTAL = Research in Subject-Matter Teaching and Learning, edited by the German Association for *Fachdidaktik,* GFD*),*

d)   International research projects in which specific subject didactics from Germany are involved (e.g. the project DAPHME in MuD),

e)   International Policy Statements such as the "International Declaration on Research in Geography Education" (IGU CGE, 2015) (GeoD, p. 145).

As in the previous section on the influence of third-party funding on research agendas in subject didactics, a similar critical question arises here, which should be investigated in the context of a separate study: namely, to what extent do international dimensions of subject-didactic research influence national research activities and a national discourse on topics or vice versa? And do international comparative studies such as TIMSS (Trends in International Mathematics and Science Study, since 1995) or PISA (Programme for International Student Assessment, since 2000)[7] lead to new insights and research agendas on the national level? Finally, is there an increase of awareness among German scholars for the need and importance of an international exchange about subject didactics or about equivalent approaches in other countries and educational settings?

12.3   Competence research: Development, methods, areas and topics of research

Competence research has already been described in chapter 11 to some extent as a comprehensive research area which has shaped crucially subject-didactic research in the last 15–20 years. This point ties in well with the preceding paragraphs, because competence research has not only been prompted by international comparative studies, but has also been promoted by third-party funding and supported massively by professional associations and their activities. It is not possible to provide a comprehensive picture of competence research in Germany in historical and theoretical terms at this point. Rather, only a few aspects can be addressed that stand out as remarkable, either in terms of differences or of similarities in the comparative analysis of the subject reports.

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7   PISA, see above. The PISA studies refer mainly to individual subjects and the related subject didactics: mathematics, the sciences and language comprehension in the mother-tongue.

12.3.1 Development of competence research

Some important causes for the dominant competence orientation (above all the so-called 'PISA shock', documenting medium achievement ranking for Germany) as well as some cornerstones of its implementation (e.g. expert study by Klieme et al., 2003); introduction of national education standards, establishment of a national Institute for Quality Development in Education (IQB), third-party funding potentials) have already been addressed and need not be repeated here.

As with earlier comparative studies (Rothgangel, 2017, p. 141), the present data set of subject descriptions equally shows two different ways of dealing with competence orientation.

On the one hand, in certain subject areas such as science didactics (BioD, ChD, PhyD; cf. also GeoD, ID) it can be observed that subject-specific competency models were immediately developed (ChD) competence items and levels were formulated and educational standards were tested and reviewed (BioD, CHD, PhyD) in cooperation with the IQB (see projects such as ESNaS, above). Also, the discourse on disciplinary as well as interdisciplinary subject-based teaching and learning were promoted through applying for third-party funding demanding explicit reasoning (DD). Thus, "the networking of geography didacticians in German-speaking countries received a considerable boost through the joint preparation of the DFG package proposal GEOKOM [...], within the framework of which competency models on central geographic competencies were to be developed and empirically tested" (GeoD, p. 144; cf. also ID).

On the other hand, there are subjects such as the didactics of music and religion (MuD, RelD; but cf. also DD, EngD), in which quite controversial discussions took place as to whether a reception and implementation of competence orientation should take place at all for educational-theoretical reasons. As a result, fewer competence models were established (at the beginning), and relatively little empirical research was conducted to test them. In this sense, the following statement from the perspective of religious education is vindicated: "This research [...] is not yet as far developed as, for example, the one in the mathematical-scientific domains" (RelD, p. 352).

Perhaps both types of reactions towards competence orientation can be seen as relative, as they emerge: on the one hand, certain criticisms of competence orientation are also being voiced in science didactics (e. g. problems of teaching staff: in PhyD; difficulties to estimate the demands of the future: ChD). On the other hand, first competence projects are now being realized e.g. in art and music didactics: these are concrete studies on the structural model of competence developed by the research group 'European Network of Visual Literacy' (KuD) and empirically validated level descriptions for the model of practical music competences (MuD).

12.3.2 Research methods and areas

The representations of the subject-specific didactics in which competency research is reported and discussed in more detail, reveal a number of research areas typical of competency orientation:

a) the modeling of competence structures, focusing on specific areas such as subject knowledge (ChD), knowledge acquisition, ethical evaluation, and communication (BioD), writing and reading competency as well as literary comprehension competency (in DD) or listening comprehension and reading comprehension (in EngD). Beyond that, other areas for modeling competence like "reasoning and judging, motivation, political attitudes, teacher enthusiasm, and many more" (PolD, p. 328) can be observed;

b) the grading of competence demands and performances (PhyD) as well as the determination of competence levels (MuD);

c) the diagnostics of competencies in general (PhyD, WiD).

At the same time it can be conceded that developmental models of competence based on longitudinal studies are still insufficiently available (ChD).

Methodologically speaking, "elaborated psychometric procedures" (PhyD, p. 304) are used and, specifically, various test instruments for competence measurement have been developed (e.g., ChD, DD, GeschD, ID, WiD), while in other areas like economics didactics alternative diagnostic instruments "such as those based on economic teaching experiments […] or business games" have been adopted additionally. Occasionally, some "video studies on progressions in subject teaching" (ChD, p. 64) were conducted. An illustrative example for the elaborate methodology of such didactic research comes from computer science didactics and will be quoted at length:

> "Normative approaches to modeling competencies in computer science were used for the development of a structural model of competence […]. After these interim results, obtained more by hermeneutic methods, the competence categories previously derived from normative positing were empirically examined, differentiated, supplemented and modified in the research project with the help of a procedure oriented towards demand-analytical methods (so-called *critical incident* technique), which was based on expert interviews. In this way, a more differentiated model of structural competence […] was obtained. On the basis of this model, a measurement instrument for competence measurement (Item Response concept, Rasch scaling) was developed in a multi-stage quantitative empirical procedure with more extensive data collection (N > 500). This was later also used to measure competence acquisition within other computer science projects […]. In the test development, 'scenario-based test items' were primarily developed, along the lines of 'situational judgement tests' […] which are based on complex action-oriented as well as representative tasks of the teaching domain" (ID, P. 196).

12.4   Formats of subject-didactic research

The discussion about formats of subject-didactic research is an important topic, also within the Association for *Fachdidaktik* (Gesellschaft für Fachdidaktik, GFD) and has already been the focus of several GFD meetings and smaller conferences as well as of publications (Bayrhuber et al., 2012; GFD, 2015). Nevertheless, the comments in the present subject reports also show that a consensus has by no means been reached on this topic yet – a topic which is both fundamental and complex in the self-understanding of subject didactics. In principle, there are two basic tendencies: On the one hand, formats are more or less equated with certain methodological approaches; on the other hand, formats are understood as more than 'just' methods (cf. GFD, 2015; Krüger, Parchmann & Schecker, 2014). Against this background – inspired by the distinction in English didactics between research approaches and research areas (EngD) – the subject reports will be compared with regard to their representations of research methodological approaches first (12.4.1) as well as to the subject areas studied and analyzed second (12.4.2). Only then will the formats of didactic research in the narrower sense (as a combination of at least two dimensions) be discussed (12.4.3).

12.4.1 Methodological research approaches

Typologies of subject-didactic research methods

In various subject texts, an overview is given of what the basic types of subject-didactic research methods are, normally mentioning three (e.g. DD, GeschD) to five (e.g. EngD, RelD) different methodological approaches, also referred to as "fields" (GeschD) or "formats" (DD). In German didactics, historical, systematic and empirical research approaches are distinguished (DD), whereas in technology didactics, a distinction is made initially only between theoretical and empirical research. However, in this case the theoretical research is further sub-divided into historical, systematic and comparative research (TD), so that in comparison to German didactics three dimensions coincide (empirical, historical, systematic) and only the comparative approach is added as a fourth type. In history didactics, a distinction is made between theory, empiricism and pragmatics including the connections between these different approaches. Thereby, with the keyword 'pragmatics', a new fifth dimension is coming up/, which is described in other subject-didactic areas as "pragmatically oriented [...] developmental research" (SaD, p. 379), as "action research" aiming at practice change (EngD, p. 115), or in the didactics of religious education as "action-oriented" (RelD, p. 350). Ultimately, regardless of the differences in detail, two typologies of subject-didactic research methods can be found in English didactics as well as in religion didactics, which are relatively similar and largely include the aforementioned approaches of other subject didactics. Thus, in the didactics of religion,

a distinction is made between the following basic methodological types, often also equated with research formats in other texts:

– historical
– empirical,
– systematic,
– comparative and
– action-oriented (RelD).

Comparable research approaches listed in English didactics are

– historical,
– empirical,
– theoretical,
– comparative and
– Action research, aimed at changing practice (EngD).

These five methodological approaches – again in some readings also called *research formats* – are elaborated somewhat more in the following sections.

Historical approaches

Although historical research approaches are mentioned in various subject didactics (DD, PhyD, SaD, KuD, GeoD, TD, RelD, MuD, KuD), it is relatively often noted that they are only of secondary importance (cf. e.g. PhyD, KuD, EngD) or there exists only a "manageable number" of them (MuD, p. 273).

An special exception to this, apart from German didactics (DD), is the didactics of religion; it even has a working group if its own for historical religious education, which meets annually and publishes regularly (RelD; https://www.uni-frankfurt.de/71593642/Arbeitskreis). But otherwise, the subject-specific reports in general contain hardly any reference to specific methods or research approaches in terms of the history of ideas or institutions – especially not in comparison to the empirical approaches mentioned immediately below (cf. however, MuD, which is referring to the study of historical sources *and* to the use of discourse-analytical approaches alike).

Empirical approaches

After the preceding remarks under 12.4.1 on "Development and progression of subject-didactic research" *empirical* methods are mentioned in all of the subject didactics, as was to be expected. Given the detailed explanations in the different subject reports, we will only select three basic points here for presentation:

First, the importance of both quantitative and qualitative approaches becomes evident in many respects, also the use of a mixed-methods approach is increasingly being advocated and underlined (GeoD, EngD, ID, SpoD). Secondly, specific

methodological procedures are mentioned as part of both quantitative and qualitative research methods (quantitative: e.g., item response theory and Rasch scaling; qualitative: e.g., guided interviews and grounded theory). Thirdly, specific empirical research patterns are mentioned in connection with specific research functions such as:

– Intervention studies (GeoD, GeschD, MuD, PolD, RelD),
– Effectiveness studies (DD, GeoD, GeschD, ID, SaD, SpoD, TD),
– Evaluation research (ChD, EngD, GeoD, SaD, SpoD, PhyD, TD, WiD),
– Implementation research (ChD, GeoD, SpoD, TD).

It should be borne in mind that there can be fluid transitions between these approaches and functions, as is the case, for example, for categories such as *developmental* research. Since the latter is not necessarily carried out empirically (cf. GeschD), it will be presented below together with design-based research under the heading "Practice-based approaches".

Comparative approaches

Comparative approaches are mentioned in various subject reports (EngD, RelD, ID, TD, PolD, KuD, MuD, WiD), but overall this research pattern stays relatively unmarked. From the perspective of economics didactics, reference is made to comparative curriculum analysis (WiD), in English didactics comparative studies between languages and individual language didactics are emphasized (EngD), while in music didactics a "few comparative studies of music instruction in other countries" are alluded to (MuD, p. 273; cf. also RelD).

Theoretical approaches

This group of approaches is characterized by a certain breadth of conceptualization, where the qualifying adjective 'systematic' is also often used alternatively to 'theoretical'. In part, the preference for either the term 'systematic' or 'theoretical' may be related to different traditions within the academic disciplines; thus we speak of theoretical physics on the one hand, for example, and yet of systematic theology on the other hand. It has already been mentioned that in technology didactics historical, systematic and comparative approaches are subsumed under the superordinate term theoretical approaches (TD). Also in physics didactics, work on basic goals and on self-understanding, on the history of physics as well as on developmental formats are qualified as theoretical – with the additional indication that these have become rare (PhyD). Contrary to this broad understanding of 'theory', however, it should be noted, that historical work – just like empirical studies – is always related to theoretical reflections; on the other hand, it crosses the borderlines of theoretical research, when

dealing with historical sources. And there are numerous comparative studies that are primarily or exclusively empirical and not theoretical in the narrow sense at all.

If one directs the attention to explicitly 'systematic' approaches, topics such as the systematic clarification and further development of concepts and theories come into view, "with which tasks, questions, and perspectives of an *integrated natural & social science education in primary school* (German: *Sachunterricht*) and its didactics are communicated" (SaD, p. 379; cf. MuD, PolD, RelD). Basically, this is a matter of "self-assurance" (RelD, p. 351) or of an "ordering system" (TD, p. 432).

Occasionally it sounds as if such approaches were dominant earlier and that one can therefore speak of an "overproduction of theoretical concepts" (as in GeoD, p. 144). In contrast in the current situation a need of systemic or theoretical research has been noted in other subject-didactic areas (e.g. in KuD).

Through closer examination, distinctions can be made within systematic or theoretical research respectively, comparable or similar to those known in empirical research between quantitative and qualitative approaches. One first distinction refers to the *object* of theoretical or systematic reflection: This can relate to the development and justification of subject-didactic concepts or to larger conceptions [all the way] up to scientific theories on the one hand (RelD, MuD, PolD, ID, WiD, KuD); or it can relate to a theory-based modeling of learning opportunities and respective offers in the classroom, on the other hand (GeoD, KuD, TD, GeschD, MuD). A second distinction is made in linguistic terms within the subject reports in that the concept of theory has two different cognitive-linguistic counterparts: on the one hand, theory is contrasted with empiricism (e.g. TD, WiD, GeoD), on the other hand, theory is dealt with as opposed to practice (e.g. ChD, WiD). The latter is already a transition towards the practice-related approaches.

Practical approaches

With the increasing specialization of methodological approaches – be they historical, empirical, comparative or theoretical – a certain distance to the practice of subject teaching and learning can arise. This can happen, although the goal of subject-didactic research ultimately is the analysis and improvement of practice. This mismatch can be described as a "theory-practice gap" (BioD, p. 41), appearing occasionally as such in the subject reports (e.g. ChD, EngD, PolD). In order to overcome this gap, developmental research is discussed (ChD, PhyD, SaD, TD, RelD) or the so-called *design-based research* respectively (ChD, DD, EngD, KuD, MaD, MuD, PhyD, PolD) in which theory and practice are equally constitutive. In this context, reference to *Learning Progressions*, an approach originating from the United States, is made within the didactics of physics and that of chemistry (PhyD, ChD).

12.4.2 Content areas of subject-didactic research

Typologies of content areas of subject-didactic research

In the different subject-specific reports there are certain typologies of content areas for subject-didactic research offered – similar to those of research methodological approaches listed earlier, but now definitely more heterogeneous in nature. Two typologies focus specifically on the thematic frame of reference for subject-didactic research. Thus, in geography didactics (GeoD, p. 144), we find the following distinction:

– Perennial topics (e.g. "topographical" knowledge, handling of maps and spatial perception; learning outside school ("in the field", so to speak) as well as basic reflections on the meaning and orientation of geographic education) and
– Shifting topics ("often in correspondence with ongoing social, disciplinary, and educational developments").

Another distinction made in economics didactics might be noteworthy and of relevance for other subject didactics as well: Here, one distinguishes between *objects* of economic didactic research, some of which treat "economic education in its entirety" (WiD, p. 451; e.g. development of economic didactic category systems with reference to Klafki's didactics of education theory), while others refer to specific subject areas of economic education (e.g. civic education, financial education, vocational education, entrepreneurship education).

Two completely different systems of content definition can be found in sports didactics. The first variant "is based on well-established quality models of empirical educational research and focuses on the quality of structures, processes and results" (SpoD, p. 407). The second variety systematizes the state of research on a meta-level by distinguishing the following types of subject-didactic research in sports (SpoD, p. 407):

– research in teaching and learning (*Unterrichtsforschung*),
– research on learners (*SchülerInnenforschung*),
– research on teachers of physical education (*SportlehrerInnenforschung*),
– research on the development of sports in school (*Schulsportentwicklungsforschung*).

The latter distinction can be connected to subject areas of didactic research, which are also mentioned in other subject reports. Therefore, it is not surprising that four of the seven categories resulting from the comparative analysis of the 17 subject texts altogether, largely correspond to the subject areas of didactic research in sports. The seven subject areas of didactic research identified throughout the data corpus are the following ones:

– Subject-matter research: selection and legitimation of subject-specific content (*Inhaltsforschung: Auswahl und Legitimation fachlicher Inhalte*),

- Developmental research: practice-oriented analysis of subject-specific teaching and learning (*Entwicklungsforschung: praxisorientierte Analysen zum fachlichen Lehren und Lernen*),
- Teaching and learning research: Basic analyses of subject-specific teaching and learning (*Lehr- und Lernforschung: grundlagenorientierte Analysen zum fachlichen Lehren und Lernen*),
- Research on learners: from everyday concepts to subject-specific competencies (*SchülerInnenforschung: von fachlichen Alltagsvorstellungen bis zu fachlichen Kompetenzen*),
- Research on teachers: from subject-didactic knowledge of teachers to research on teacher training and professionalization (*LehrerInnenforschung: vom fachdidaktischen Lehrerwissen bis zur Lehrerbildungsforschung*),
- Research on contextual conditions relevant for subject-specific teaching (*Forschung zu fachlich relevanten Rahmenbedingungen*),
- Research on the history and on theory-building in subject didactics (*Forschung zur Geschichte und Theorie der Fachdidaktik*).

The following sections will outline these seven content areas of subject-didactic research in more detail, based on characterizations and explanations provided in the subject reports themselves.

Subject-matter research: Selection and legitimation of subject-specific content

In all of the subject-didactic reports, specific content issues and content areas of subject-didactic research are mentioned: As already stated, in geography didactics a distinction is made between perennial and shifting topics (see above, GeoD), and in economics didactics specific sub-areas of economic education such as "civic education" or "financial education" were cited (WiD). In that sense, also in other subjects (e.g. in biology didactics) specific research *topics* such as "environmental education" or "health education" can be identified (BioD).

These specific topics of subject-didactic research could also be part of subject-didactic developmental research or general teaching and learning research. However, a fundamental task of subject-didactic research in this matter is *to focus on the subject-matter itself*, namely to select (cf. SaD, MaD) and to legitimize (cf. Section 3) the content to be taught in one specific subject – be it academic content, content derived from subject-specific practices, from subject-related social contexts or subject-related anthropological references. The issue of legitimizing specific content issues can extend to questioning or justifying the whole teaching subject itself (cf. RelD, WiD, SpoD).

In this context, various possible criteria for the selection and legitimation of subject content come into focus: Determining references can be the specific contribution of a subject to education in general (*Allgemeinbildung*; cf. WiD, ID, MaD) or the

recourse to specific educational goals and "curricular questions" (MaD, p. 246). Theoretical discussions of normative questions concerning goals and curricula, which are addressed in several subject reports (cf. PhyD, SaD, MaD, PolD, TD), belong to this realm.

The decisive point of reference, however, for the selection of subject content and the design of curricula are ultimately the students themselves, with their developmental-psychological prerequisites or the "relevance of the content for their everyday life" (MaD, p. 247). At this point, there is a smooth transition to the concept of Didactic Reconstruction, in which subject-matter clarifications / subject-specific content clarifications as well as the registering of learner perspectives contribute equally to what is called didactic structuring. Accordingly, it is not surprising that in the didactics of "integrated natural & social science education for primary school" (*Sachunterricht*) there is explicit talk of "the selection, legitimation, and didactic reconstruction of learning objects" (SaD, p. 379).

Developmental research: Practice-oriented analyses of subject-specific teaching and learning

With regard to didactic reconstruction, developmental research comes into view as a focus of subject-didactic research. Developmental research is mentioned in numerous subject-didactic reports (ChD, EngD, GeoD, KuD, MaD, MuD, PhyD, PolD, RelD, SaD, SpoD, WiD) and displays a wide scope of realizations. The range of variation reaches "from thematically narrower developments with selective evaluations to comprehensive projects of didactic reconstruction of a subject area [...]. Projects with several cycles of development, testing, and evaluation follow the model of design-based research" (PhyD, p. 303). In the subject reports, numerous areas and topics come into focus, which are studied within the framework of developmental research. This can be exemplified by research topics in physics didactics since the 1970s:

> "Project learning and integrated science education, testing based on learning goals, students' conceptualizations and learning difficulties, subject-matter structures and patterns of progression in physics education, girls in physics education, digital and other media, modeling and measurement of competencies" (PhyD, p. 304).

Developmental research in subject didactics does not only show transitions into the preceding content dimensions of research, but also into basic "teaching and learning research" (cf. RelD, SpoD), which is described further down in point d). The main difference between the three is the decidedly practical orientation of developmental research (e.g. PolD, MaD). A concrete example of this can be found in English didactics:

> "In this process, university researchers, together with teachers in the field, not only develop the questions of a research project, but also cooperate closely with each other in data collection and data analysis, with the goal of initiating and undergoing an iterative process

of developing, testing, and adapting appropriate instructional sequences for a particular group of learners" (EngD, p. 115–116).

Teaching and learning research: Analyses of fundamental issues in subject-specific teaching and learning

Fundamental subject-didactic research on subject-related teaching and learning processes covers a broad spectrum of research topics and issues. Some examples include:

– In German didactics, "conditions for success in spoken interaction [...], spelling competence [...] and principles and methods of writing environments conducive to learning" (DD, p. 87) are studied,
– in physics didactics, "the framework conditions, methods and contents of physics teaching [...] are investigated with video-based studies" (PhyD, p. 304),
– in the didactics of religion, reference is made to various studies ranging "from the qualitative reconstruction of teaching processes" to "intervention studies in pre-post design" (RelD, p. 351),
– in technology didactics, "correlations between the degree of self-control of the learning path and learning performance in technical problem situations" (TD, p. 433) are analyzed and
– in economics didactics, "student conceptions and their conceptual change over time are studied intensely" (WiD, p. 454).

Typically both the increase and the broad spectrum of subject-didactic teaching and learning research are reflected and characterized in the presentation of art didactics, for example. Here, a gradually increasing research activity is observed, which takes place in connection with empirical educational research, and the following research questions are raised against the background of the "results of various qualitative and quantitative empirical studies on quality in art instruction: How can design tasks be set in a meaningful way, how can cognitive impulses and aesthetic experiences be initiated through art reception, how can teaching phases be analyzed video-graphically and the functions of social forms be made accessible? How can sequences of practice and feedback qualities be investigated or reflection phases be explored in art lessons, how can the characteristics of a creativity-promoting lesson plan and teaching be identified (including openness, trusting atmosphere, stimulating environment), and finally, how can the class management be structured so to balance the quality of an art lesson?" (KuD, p. 223).

In sum, an essential focus of fundamental teaching and learning research can be seen in the fact that a "detailed recording of interactions" in the classroom is strived for and takes place (EngD, p. 115) and that the interplay of specific components of subject teaching in connection with learning processes is analyzed.

Research on learners: From everyday concepts towards subject-specific competencies

Subject-didactic research on students is often placed into the context of basic teaching and learning research (e.g. PhyD, GeoD). Nevertheless, two pragmatic reasons suggest the alternative concept of establishing research on learners as a subject area of its own: First, this type of research cannot only be conducted within the framework of teaching and learning research, but it is also relevant in the context of subject-didactic content research as well as developmental research. Secondly, it can be taken from the subject reports themselves that student research, like teacher research, is often mentioned explicitly as a separate field (e.g. SaD, EngD) which is crucial in this context.

An essential point within the research on learners is the analysis of students' learning prerequisites. Numerous studies are available on this topic, especially in the didactics of the natural sciences. There are many typical research topics which can be listed on the basis of biology didactics, but they also appear in many other subject didactics:

– *"Students' conceptions"* (BioD, p. 40; vgl. auch PhyD, ChD, SaD, PolD, RelD, GeoD, SpoD),
– *"Students' interest and motivation"* (BioD, p. 40; vgl. auch PhyD, PolD, GeoD, SpoD),
– *"Students' values, attitudes and decision-making"* (BioD, p. 40; vgl. auch PolD, RelD, GeoD, SpoD).

Furthermore, subject-relevant practices of students as preconditions of their learning deserve special attention, e.g., in dealing with students' abilities in technical problem-solving (TD), their musical (re)production (MuD, p. 275), their ways of dealing with children's drawings (KuD), or their visual-aesthetic behavior in general (KuD).

Another important aspect of student research is the assessment of subject-specific learning outcomes or competencies, such as in large-scale surveys such as TIMSS or PISA and in comparative studies on different age levels such as VERA (PhyD, DD, EngD)[8]. If, however, preceding learning processes are also taken into account and related to test results – e.g., through a pre-post design or conceptual change research – then these studies are to be better placed into the category of basic subject-didactic teaching and learning research (see above).

Finally, studies on gender (e.g., BioD, WiD, SpoD) or inclusion (e.g., GeschD, SpoD) could also be assigned to this research area, although such topics may also be located in other subject areas of subject-didactic research, depending on the concrete orientation of the respective research projects.

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8 TIMSS = Trends in International Mathematics and Science Study; PISA = Programme for International Student Assessment; VERA = VERgleichsArbeiten (Comparing Achievements nationally in Grade 3 and 8).

Professionalization research: From teachers' subject-didactic knowledge to teacher education research

In various subject didactics, the current importance of studying teacher professionalization is highlighted (DD, KuD, PolD, SaD, SpoD). In political didactics, for example, it is even assumed that "professional competence has already been successfully researched in the three dimensions of 'professional knowledge', 'motivation' and 'beliefs'" so that "subject-didactic and academic-scientific knowledge could be represented and distinguished in a multidimensional way" (PolD, p. 328).

The variety of research topics in this research area can be exemplified by the didactic explanations in economics education: "Essential for successful economic teaching-learning processes are the teachers, so it is their professional competence [...], their attitudes towards the domain [...], their knowledge of the (economically shaped) life situations of their students [...] and their ideas about lesson design [...] which are researched. In addition, questions of teacher education are taken into consideration, concerning the design of practical phases [...], research-based learning [...] or the relevance of previous professional experience, for example" (WiD, pp. 454–455; cf. also SpoD).

In this sense, "questions of teacher training and education" (EngD, p. 115) are also emphasized in English didactics as a somewhat underrepresented subject area of its own in subject-didactic research (cf. also MuD, TD, ID).

Research on subject-relevant framework conditions

The importance of societal and educational policy frameworks for teaching school subjects and for subject didactics has already become clear at various points. It therefore comes as no surprise that subject-relevant framework conditions also form a topic area in subject-didactic research. Three aspects in particular stand out in the subject-specific reports: First, reference is made to curriculum and textbook analyses (RelD, GeoD, WiD, SpoD), and to the "theory- and knowledge-based development of curricula" (MaD, p. 247; cf. ChD, WiD). Second, the in-school and out-of-school contexts of teaching certain subjects are explored in various ways, such as:

– The "effects of all-day schooling and the shortening of learning time in the context of reduced schooling (e.g. from nine years to eight years in the German Gymnasium (G8/G9)" (SpoD, p. 408),
– "Challenges in the transition from school into the teacher training system" (WiD, p. 452),
– Acquisition of "economic education in informal contexts outside school" (WiD, p. 454),
– Cooperation models "between music schools and public education" (MuD, p. 272),
– "Other geographic learning sites (such as universities, museums, and special *teaching trails*)" (GeoD, p. 144),

– "Historical learning in places outside of school" (GeschD, p. 168).

As a third aspect, social and cultural events and developments which are relevant for the school subject, come into view (e.g. in BioD). Another example of this is the historical-didactic research on "dealing with history in historical culture" (GeschD, p. 168).

Research on history and theory of subject didactics

Finally, it can be observed in the subject reports that the respective subject didactics themselves can become the object of subject-didactic research, in which its respective foundations are considered historically, conceptually or in terms of scientific theory-building (e.g. BioD, DD, RelD, PhyD, PolD, EngD, WiD, MuD). Thus, from a historical point of view, there is research on the

– History of the subject-matter (e.g., the "History of Technology and its Didactic Significance," TD, p. 432; cf. PhyD) or certain partial aspects of the subject area (e.g., research on the ideologization of children's and youth literature in the Third Reich, DD),
– History of the school subject (RelD, GeoD) or of certain sub-areas of it (e.g. objectives, PhyD),
– History of subject didactics (e.g., source studies in music education in order to "reveal the/some 'blank spots' in the history of subject didactics – e.g., in relation to the youth music movement" (MuD, pp. 273).

It is true that a theory of a specific subject didactics or notions such as "scientific theory" or "theory of science" are rarely mentioned in the subject reports (but cf. KuD, RelD, WiD). Nevertheless, they are dealt with in substance in various places, such as when a theoretical music pedagogy (MuD) or a systematic technology pedagogy (TD) are talked about and demanded. This is also at play when the systematic clarification and further development of theories and of concepts is laid out for in the didactics of an 'integrated nature & science education in primary school' (*Sachunterricht*), asking "with which tasks, questions and perspectives of subject-matter instruction and its didactics are communicated" (SaD, p. 379). The same applies also when the respective conceptual discourse in other subject didactics is taken into consideration (MuD, PolD, RelD, WiD, ID): it is exactly the variety and differences of subject-didactic concepts and conceptualizations which suggest fundamental reflections on the theory of science and the status of subject didactics. From the perspective of religious education, the disciplinary and interdisciplinary context also comes into view within this context:

> "In view of the plurality of concepts in the didactics of religion, scientific theoretical considerations of religious education are indispensable, which serve the self-assurance and help determine the place in the context of theology as well as basically in the interdisciplinary context as a whole" (RelD, p. 351; cf. WiD).

This typology of research areas within subject-didactic research does not claim to provide a complete list of all possible or existing objects or topics of didactic research. At the same time, it should have become clear in the preceding paragraphs that the boundaries between these areas are sometimes fluid and that in some cases other distinctions or classifications could be made. Nevertheless, the basic aim of this typology was to work out some fundamental and important types of objects and areas in subject-didactic research and thus to perform a heuristic function for subject-didactic research as a whole, given the heterogeneous explanations in the subject reports themselves.

12.4.3 Formats of subject-didactic research

We can now come back to the issue of "formats" in subject-didactic research – against the background of the preceding remarks on research methodological approaches (4.4.1) as well as on the areas and topics of subject-didactic research (4.4.2). We will now focus on those subject reports that refer to "formats" of subject-didactic research and that explicitly transcend a purely methodological understanding (empirical, historical, etc.) of it.

The models offered by the didactics of physics, chemistry and geography (ChD, GeoD, PhyD) are similar, but they still differ in detail. From the perspective of physics didactics, the following "three major research areas" (PhyD, p. 303) were identified in response to the question about the formats of subject-didactic research:

– "teaching-related developmental research",
– "basic research on teaching and learning", and
– "theoretical research" (PhyD, p. 303).

Without going into further details of these three points, which have already been discussed above under 12.4.1, the chemistry didactic perspective should be added next, in which another "three central orientations" (ChD, p. 63) are mentioned in response to the same question about the formats of subject-didactic research:

– "a subject-related, often experimentally-conceptually oriented developmental research",
– "empirical teaching-learning research", and
– "approaches to evaluation research"(ChD, p. 63).

While the first two points more or less correspond to each other, there is a striking difference in the latter point vis-à-vis physics didactics: in chemistry didactics, all three orientations are characterised as empirical.

In the perspective of geography didactics it is pointed out with good reason that there is no uniform classification at hand, but only heterogeneous systematics available, so that the following distinctions are possible for a classification:

- "Researching the foundations of geographical teaching and learning",
- "Development of concepts" and
- "Evaluation of concepts" (GeoD, p. 142).

It is noted in this context that the "implied linearity not only sketches an ideal-typical research framework, but [...] also emphasizes the necessity and circularity of theory and empiricism in their mutual relationship" (GeoD, p. 142). The comparison with the two preceding models also shows that in contrast to chemistry didactics – but in a similar way as physics didactics – the theoretical perspective is included, while evaluation research is specifically emphasized, as was the case in chemistry didactics, unlike in physics didactics.

Another model that seems to deviate more strongly at first glance from the three drafts offered so far (by the didactics of physics, chemistry and geography), comes from the didactics of religion (RelD). In this model, it is first stated by way of introduction that the understanding of *formats* of subject-didactic research, differentiated according to research methods only (historical, empirical, systematic, comparative, action-orienting) constitutes a far-reaching consensus in religious education. "However, this logic obscures the fact that relevant projects in the didactics of religion usually involve several of the aforementioned methods. For example, empirical projects are based on a systematic reflection of their object of study and not infrequently lead to practical didactic reflections" (RelD, p. 350).

This has to be seen against the background of a GFD working paper, according to which a format is defined by "the totality of all content-related, methodological and research-organizational aspects [...] that can be described in the planning, implementation, evaluation and utilization of the results of a subject-didactic research project" (GFD, 2016, p. 2). Accordingly, "characteristic questions of religious-didactic research are chosen as the anchor point of the following description [sc. chosen], because in these the totality of a research project is reflected in a condensed form" (RelD, p. 350). On the basis of this understanding, without claiming to be complete, the following five research fields of religious-didactic research are derived:

- "Legitimisation of religious education and self-assurance of its nature and history",
- "Development of religious-didactic concepts and reflection of religion didactics under science-theoretical perspectives",
- "Analysis of religious pre-conditions on the part of teachers and learner plus analysis of conditioning factors for religious education (e.g. curriculum and text book analysis)",
- "Analysis of teaching and learning processes in religious education" as well as
- "Didactic reconstruction of teaching objects" (RelD, p. 350).

On closer examination, this model shows remarkable similarities with the above three draft models from the didactics of physics, chemistry and geography: The first

aspect ("the legitimation of religious education…") and the second one ("the development of religion-didactic concepts …)" have clear affinities to theoretical research (PhyD, GeoD). The two following aspects of this new proposal again show clear affinities to basic teaching and learning research, as mentioned in PhyD, ChD, and GeoD. The last point, finally, centered on "didactic re-construction" coincides with developmental research in the earlier drafts (PhyD, ChD, GeoD).

On the whole, it is evident that the subject-didactic presentations on this particular point are strongly determined by subject-specific, methodological references and that the understanding of formats of subject-didactic research, as expressed in the GFD position paper, is considered as authoritative or binding only in exceptional cases.

12.5   Reference disciplines

As has been shown in the preceding paragraphs, the question of research formats emerges as one of the main issues of this section on "Perspectives of subject-didactic research and development". Which ones are identified and used by the different subject didactics and to what extent are they specific for didactic research? In contrast to the predominantly methodological debate on research formats as outlined above, another dimension of great influence for subject-didactic research decisions appears to be that of *reference disciplines*, the relationship to other sciences and practices. This issue, however, is by no means explicitly addressed in all subject reports at this point, which may have to do with the fact that this issue is also focused upon later in Chapter 14, namely when dealing with "Networking in subject-didactic research". In that context the question of interdisciplinary references is brought to the fore specifically on the basis of dialogues between subject didactics and different sciences, leading to similar results with regard to reference disciplines as here.

12.5.1.   The importance of subject-specific *praxis*

With regard to 'subject-specific practices' as an area of reference for subject-didactic research, there is hardly any explicit mention of it in the data. While in physics didactics it is at least noted that "references to subject-specific practices in social or private contexts" (PhyD, p. 305) are not significant for the discipline, in religion didactics a different view becomes apparent, which depends on circumstances of the time and on certain positions about religious education: After religious practices had played an important role in the context of religious education for centuries, they receded from the 1960s onwards. However, in the context of a 'symbolic didactics' (from the 1980s onwards) and even more so in the context of a Performative Religious Education (from 2000 onwards), the reference to religious practices has increasingly regained importance – even if this is a controversial topic in religious educational discourse

itself (RelD). In biology didactics, subject-related practices play an important role as well, especially in the context of human biology and ecology, but these are not referred to by the term 'practices'. Rather, one speaks of activities or actions, for example, health-conscious or environmentally compatible actions (BioD).

12.5.2 Reference disciplines of individual subject didactics

If one looks at the subject reports with regard to the reference sciences mentioned, the following quotation from the didactics of physics offers an excellent starting point:

> "The subject areas of physics, general didactics and the psychology of learning, as well as the didactics of the other STEM subjects in school, are of particular importance. In addition there are references to technology, history of physics, philosophy of science, and other disciplines such as ethics or linguistics" (PhyD, p. 305).

At the beginning, those four reference disciplines are mentioned (scientific discipline, general didactics, educational psychology, and other STEM didactics), which are of special importance to the didactics of physics. Additionally, further possible reference sciences are introduced (from technology to linguistics), but they are handled in less detail. Overall, the comparative analysis of all the different subject reports leads us to the conclusion that the first four reference sciences mentioned in physics also apply to other subject didactics, they can be regarded as constitutive for subject didactics in general, with certain conceptual extensions or generalizations at one point or other:

– Academic Disciplines: Special features in the relationship to the academic sciences as reference disciplines are addressed in various subject didactics (e.g. BioD, MaD, PhyD, RelD, SpoD) and will be discussed specifically in the section under 5.5.3 further down.
– Educational Sciences: Rather than "General Didactics" (as phrased in PhyD), it would be more comprehensive to speak of "Educational Sciences" (in German: *Erziehungs- und Bildungswissenschaft*). This designation deserves preference in view of the entirety of the subject reports. Apart from two explicit references to Wolfgang Klafki and his didactics of educational theory (*Bildunstheoretische Didaktik*; ID, WiD), there are practically no specific references to the term General Didactics in the other subject reports. Rather, it is either educational sciences as a whole (e.g., SaD, RelD) or educational science in the singular (e.g., MuD) which are addressed as reference disciplines, or certain theories of specialized education (German: *Sonderpädagogik*), in the context of inclusive teaching and learning (EngD, GeschD) especially.
– Empirical Educational Research: Instead of "Psychology of Learning" (PhyD; cf. also SaD, PolD), the reflections in many other subject reports suggest the use of a more general term, namely "Empirical Educational Research" (e.g. KuD, p. 223; SpoD). This takes into account and even includes educational psychology (GeoD)

as well as the subject-specific, didactic applications of research methods established in the empirical social sciences.

– Other subject didactics: Beyond the STEM didactics (PhyD; cf. GeoD with reference to science didactics in general), other specific subject didactics are mentioned as reference disciplines (e.g. ChD; EngD, both relating to (other) language didactics). Or other subject didactics are mentioned as reference disciplines in more general terms (EngD, GeschD, PolD, SpoD). The overall analysis of the subject reports concerning the impulse in Chapter 10 on the one hand and the impulses in Chapter 12 and 14 on the other hand, leads to the insight that related subject didactics have become important reference disciplines for one's own didactic field – in contrast to earlier times (cf. Chapter 10).

The four most important reference disciplines for subject didactics, as just outlined, will reemerge in Chapter 14. They represent an important modification or differentiation of previous findings in which subject didactics were primarily or exclusively located between two poles, in an area between academic disciplines and educational sciences (cf. Abraham & Rothgangel, 2017).[9] Meanwhile other subject didactics have become of equal importance as points of reference. Furthermore, similar to the above quotation from physics didactics, additional reference disciplines resonate from time to time, including neuroscience in English didactics (EngD) and human as well as social sciences in religion didactics (RelD; cf. also TD and ID with specific reference to systems theory). More concrete and complementary observations on the reference disciplines of subject didactics are also to be found in Chapter 14 below.

12.5.3. Relationship to the academic subject-matter disciplines

Regarding the relationship between subject didactics and their respective academic or scientific disciplines, three observations can be summarized on the basis of the subject reports.

First, this relationship is not only to be seen in terms of scientific theory, but must also be considered in terms of higher education policy, in that subject didactics are often institutionally embedded into faculties of subject-matter sciences (and not in connection with educational sciences). This can pose the risk of defining didactics as the application science, or, as physics didactics put it, "as being misused for a direct

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9 At times the argument is used that the subject didactics are part and parcel of the education sciences or of the Empirical Educational Sciences respectively and that these latter ones can thus not function as reference disciplines. This narrow view of reference disciplines is not convincing at all – on the contrary, it can be observed that a number of subject didactics (e.g. GeschD, ID, RelD) also consider themselves as part of the academic disciplines (e.g. representatives of Religious Didactics can be members of the Scientific Society of Theology). So one would have to operate with a larger or more extended concept of 'reference discipline': even if subject didactics are partly integrated into the Empirical Educational Sciences or into certain academic disciplines, the relationship between them can be qualified as one of reference disciplines.

transfer of scientific research into the public sphere, into school (PhyD, p. 305). Furthermore, subsuming didactics under scientific umbrella organizations of respective academic subject-matter disciplines can also be problematic, because that can easily blur or even neglect the specific expertise developed in subject didactics" (cf. PhyD).

Second, this relationship to the subject-specific academic sciences is complex in various respects:

– In certain subjects, such as mathematics, a clear difference is drawn between subject didactics and the academic discipline. Thus, in mathematics didactics "very different working methods and cognitive methods are used [...]. What they probably have in common is that they are in clear contrast to the working methods and the methods of knowledge generation in the science of mathematics" (MaD, p. 246).

– The difference between subject didactics and academic subject-matter science can be pronounced and understood in different ways, depending on the respective individual subject didactics. Even the major or primary scientific field of reference can differ for one and the same subject didactics in different countries, as can be shown by international comparison: In Germany, for example, religious education is usually understood as a part of (practical) theology, whereas in other countries such as England 'religious studies' takes the place of theology.

– If one looks even more closely at the respective discipline, they are divided into sub-disciplines. Accordingly, it is necessary to consider and justify which sub-disciplines are of particular relevance for a specific didactics, e.g. for the didactics of music. Thus, from the perspective of music didactics, music psychology plays a special role (because of basic relevant research and thematic proximity), but also musical sociology, music therapy, and music medicine are of importance (because of their explanatory power), and in addition, "educational science, gender studies, cultural science, and philosophy" are also listed (MuD, p. 275; cf. also SpoD).

– Finally, the specific problem of a whole system of reference disciplines in the didactics of "integrated nature & science education in primary school" (*Sachunterricht*) should be mentioned. Here, some representatives of this subject advocate and underline epistemology as an academic field of reference rather than the traditional 'subject-matter content structures' as reference disciplines (SaD).

Third, the question of a fundamental definition and modeling of the relationship between subject didactics and subject-matter sciences arises: For example, the relationship between religion didactics and the related subject-matter science is currently described as a model of convergence or of dialogue. At the same time, it must be conceded that the didactics of religion often unilaterally benefits from theological-scientific findings and that this dialogue is rather one-sided (RelD). Furthermore, a look at the history of the didactics of religion shows that in the past there existed (already) the two extremes in the determination of the relationship between subject-matter science and subject didactics: On the one hand, in the form of an autarky

model (only the academic disciplines are authoritative, the educational sciences have a significance in methodological terms at best), on the other hand, in the form of an exodus model (the educational sciences are authoritative, theological content has a serving role and thus only subordinate significance).

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13. Linking Content Across Subjects

Generalizing Subject-Specific Competences

Martin Rothgangel and Helmut Johannes Vollmer

The issues dealt with in this section pose fundamental challenges and decisions on the part of any individual school subject and subject didactics. They basically require reflections about one's own status and limitations as well as about the relationships to other neighboring subjects or disciplines, about linking interests, topics, approaches and research projects across borders. They are also about joining resources, opening up to possibilities of coordination and to cooperation between different school subjects and their didactics. All of this is not yet very common in the everyday reality of school life and organization, so the challenges are not easy to imagine and sometimes difficult to realize or even overwhelming. However, from the point of view of geography didactics, such an opening of perspectives and the widening of scope with the consequence of linking school subjects and fostering cooperation between them seems to be absolutely necessary; as a matter of fact, it proves essential and imperative for reaching the educational goals, according to them:

> "[This] is based, among other things, on the fact that selected knowledge and skills from other subjects (e.g., mathematical, physical, historical, and/or linguistic) are prerequisites for understanding geographic phenomena and processes (e.g., for calculating distance or a relative scale; in turn, geographic knowledge and skills (e.g., spatial orientation and map competence) are prerequisites for selected learning processes in other subjects" (GeoD, p. 146).

This section will first focus on factors that, according to the subject reports, determine cross-disciplinary issues (13.1 "Contexts of cross-disciplinarity"). From the perspective of various subject didactics, crossing subject boundaries (DD, cf. also TD, SpoD, among others) repeatedly emerges as ambivalent, so it is dealt with both in terms of positive and critical aspects. The positive aspects are treated in section 13.2 ("Potentials of cross-disciplinary links"), whereas the critical aspects are dealt with under section 13.3 ("Challenges and problems of cross-disciplinary work").

13.1. Cross-disciplinary contexts[1]

In the subject-didactic reports three main points emerge which involve cross-disciplinary dimensions: First, beyond all subject specialization: the life-world context as such; secondly, the educational policy context, and thirdly, the subject-specific context itself, insofar as distance or proximity to other subjects and relationships between different subjects are concerned.

13.1.1 Life-world context

In various reports of the subject didactics a certain tension is expressed between the specific segments of reality – reflected and dealt with by the individual school subjects – and a complex, unified lifeworld, which exists outside and independently from the subject-specific segmentations in perception and topicalization. Thus, the importance of an interplay between different subject approaches for coping with this holistic reality is mentioned by some didactics, for example by SaD or TD; others point out "that complex life-world facts can only be processed through the interaction of specialized subject competencies" (PhyD, p. 306).

The specific point made in the last quotation is that "this expert knowledge can develop better within the subject, in the context of a structured teaching approach rather than through 'interdisciplinary' teaching and learning" (ibid.). In contrast to this expert approach, it would also be possible, of course, to refer back to the problems themselves as "epoch-typical key problems of mankind" (SaD, p. 381; cf. also ChD, ID) and thus to a cross-curricular content definition, alluding to the corresponding pedagogical conception of Wolfgang Klafki (1991; cf. English translations in 1995, 2000).

With regard to students, it has also been highlighted that a comprehensive acquisition of competencies "does not stop at subject boundaries" (WiD, p. 455) and that "the learners' ways of acquisition are usually not compatible with the subject-specific, systematic classification schemes" (ChD, p. 66). This applies, for example, to the concept of sustainable development, according to which economic performance should be reconciled with social stability and the preservation of natural resources for future generations. Dealing with such life-world contexts requires cooperation at least among the didactics of biology, geography, politics and economy (as pointed out by BioD).

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1 In the following, the term 'cross-disciplinary' will be used as a super-ordinate concept; expressions like 'transcending the borderlines of a subject', 'linking subjects', 'focusing on similar or the same themes/topics' [*themenzentriert*], 'complementing subject-specific approaches or integrating different ones' (ChD, p. 65) can all be understood as forms of differentiation underneath that umbrella term.

13.1.2 The context of educational policy

The possibilities and implementation of interdisciplinary approaches are strongly determined by the respective shape of the subjects and by the curricular regulations, which in turn depend crucially on the context of educational policies. History didactics, for example, can demonstrate that educational policy decisions can also create a positive context of interdisciplinary discovery for subject didactic research, because history is increasingly taught in connection with other subjects ("history and political education in Austria; integration of the social sciences in Switzerland and also in some German Lander"; GeschD, p. 169). Some first pilot studies in this direction are already under way (GeschD, p. 170).

At the same time, subject-didactic reflections can make political decisions by educational policy frameworks appear in a less favorable light. For example, from the perspective of music didactics, the following has been noted: "Seen from a subject-political point of view, it can be observed that interdisciplinary work is partly instrumentalized by educational policy in order to conceal the existing shortage of subject teachers" (MuD, see above, p. 278). Similarly, subject didactic research can generate positive suggestions for educational policy:

> "Here it is the joint task of mathematics didactics and other subject-specific didactics to identify the basic knowledge necessary for the natural science or the economic science subjects and, if necessary, to pass on resulting curricular requirements to politics" (MaD, p. 252).

Yet the educational policies in a federal system like that of Germany (with 16 different jurisdictions) can differ greatly in the way they formulate curricula and address cross-disciplinary issues, as the following quotation from chemistry didactics demonstrates:

> "All of the curricula within the different states (of Germany) contain demands for a stronger horizontal and vertical integration of the teaching content for the natural sciences. In some Lander, there are even concrete guidelines for a limited integration of instruction in the natural sciences for individual types of schools. In most cases, however, the curricula of the individual states limit themselves to merely giving some recommendations and making suggestions for potential cross-curricular connections with other subjects, without encouraging any concrete steps of integrating science teaching" (ChD, p. 65; cf. also PhyD).

In this context, international perspectives can sharpen the subject-didactic view of one's own subject area. This becomes obvious in the following remarks by chemistry didactics: "For some time now, the didactic disciplines have been concerned with the potential of integrated science teaching. In the past, however, the suggestions made by them have led only to very limited steps of concrete implementation in curricula of the German *Länder* and thus in actual teaching, whereas in other European countries science teaching is generally offered in an integrated way at the middle school level" (ChD, p. 65). This is confirmed by physics didactics, which argues in a similar way:

"An integrated subject named 'science' was and is highly controversial in Germany – in contrast to other countries" (PhyD, p. 305). And this is true in spite of the fact that there are good models and plans for its realization.

13.1.3 Subject-to-subject contexts

In the various didactic reports that we refer to in this section, cross-curricular links are mainly considered in terms of relations to other subjects which have a special affinity to one's own subject area and are thus related ones. Such relationships between subjects can either be built on equal status of both or they can be determined by *one* particular subject having the lead, being initiative or performing a leading and 'giving' role, whereas the other one(s) are more defined by a receiving/'recipient' function. In other words, within a cooperative partnership, some school subjects can be stronger in supplying or in receiving benefits (e.g. ideas, design, impulses, materials etc.). The interdependencies among the 17 subjects studied cannot be described here in detail. However, the didactics of economics can be cited as an example for showing affinities which subjects might have to one another: "Since economic phenomena and problems are (almost) omnipresent, it is not surprising that there are links to many other academic disciplines and school subjects, for example to geography (e.g., globalization), technology (e.g., energy transition), politics (e.g., taxation), history (e.g., industrial revolution), religion/ethics (e.g., material inequality), or mathematics (e.g., in the analysis of marginal utility)" (WiD, p. 455). Furthermore, informatics could be added to this list, especially with reference to digitalization. In fact, from the same perspective of economic education, even more interdisciplinary references could be named. It is easy to imagine from this example alone how the 17 subject-didactic fields included in our study would result in an exceptionally multilayered cross-sectional relationship network, if all of them were to be taken into account in the same differentiated way.

At this point, four observations shall be outlined that illustrate in an exemplary way possible relationships between subjects:

First, there is a particularly close relationship among the three natural science subjects (as already mentioned above). This is documented, for example, through the fact that the explanations given in physics and chemistry lessons focus essentially on their understanding of belonging to an integrated conceptual space about natural sciences, however they are structured internally through the two school subjects (ChD, PhD). By contrast, biology teaching considers also relationships and links indeed to numerous other subjects beyond the natural sciences themselves (BioD).

Second: there are subjects such as German as a mother-tongue (the dominant language of instruction in Germany) or mathematics, which are considered to be of fundamental importance for the learning in all other subject areas and for learning in general. With regard to German as mother-tongue education, for example, one can understand the following statement: "The generalization potential of the sub-

ject-specific competencies in acquiring German is generally high. […] However, the teaching and learning of German cannot replace the acquisition of specific, subject-related language repertoires (as in history, physics, or mathematics, etc.), but it can form a basis for it all." (DD, p. 89) A comparable claim can also be found in other subjects: For computer science, its justification as a subject lies, among other things, in "the increasing 'informatization' of all subject areas and of all school subjects" (ID, p. 198).

Third observation: The interdisciplinary relationship between subjects can also be problematized insofar as one either sees the risk of being degraded to an auxiliary discipline (e.g. MaD, SpoD), or one admits that the relevance and potentials of other subjects for one's own work and goals (in one's own subject area) are insufficiently developed or were not sufficiently considered yet(DD).

Finally, in terms of a fourth observation: occasionally, there are certain models or designs offered for categorizing the relationship between subjects. For example, in mathematics didactics a distinction is made between 1) subjects with necessary connections to mathematics (natural science subjects, economics), 2) subjects with complementary connections (e.g., geography, sports), and 3) subjects with connections to mathematics that do not necessarily have to be apparent (e.g., art, music) (MaD). The discussions about those categorizations or distinctions are ongoing, however.

13.2 Potentials of cross-disciplinary connections

As already emphasized in the introduction to this section, it becomes apparent that from the perspective of subject didactics, interdisciplinary links are experienced with ambivalence. In the paragraphs ahead, we will focus on the positive potentials of interdisciplinary work in teaching and learning, highlighting five different aspects.

13.2.1 General potentials

In the contribution of economics didactics there are a few examples given for general potentials resulting from cross-curricular work such as:

– Avoiding educational redundancies,
– Using synergies,
– Facilitating a holistic understanding of phenomena and problems as well as a comprehensive acquisition of competencies "that do not stop at subject boundaries" (WiD, p. 455).

The exceptionality of these points and their characterization as "general potentials" will be made clear in contrast to the next point.

13.2.2 Special subject potentials

Next to *general* potentials there are certain *subject-based* potentials of cross-disci-plinary value, such as language as an object of study, which arise within a subject (e.g. learning German as a mother-tongue), but which are equally important and relevant for all other subjects, reflecting language and language use in their (specific) domain. Such subject potentials have already been mentioned earlier (cf. 5.1.3), when next to the specific status of mother-tongue education also the role of mathematics and computer science for other subjects was discussed and justified on the basis of their structural importance for learning in general. To remind us: Informatics, for example, argued with "the increasing 'computerization' of all disciplinary areas and of all school subjects" (ID, p. 198).

Similar potentials for interdisciplinary work can be identified in other subject areas as well, for example, in history and geography didactics: From the perspective of history didactics, various 'hyphenated histories' (among others "gender history, environmental history, migration history" etc.; GeschD, p. 168) are referred to. It is claimed that other subjects could benefit from the historical dimension, because the past can become a "distant mirror" for the present and thus give an orientation for the future (ibid.). Comparable arguments are put forward in geography didactics, where the category of a "spatial reality of all beings" (GeoD, p. 145) is presented as a specific potential for cross-curricular linkages.

In a certain way, a special potential for interdisciplinary thinking and working can also be identified in the case of the Didactics of the integrated teaching of nat-ural & social studies in primary school (Sachunterricht, SaD), because this subject is integrative and multi-perspective in itself, thus lending itself for trans-disciplinary reflections and potential transfer operations.

13.2.3 Potentials for deepening knowledge and flexibility in use

The potential of deepening knowledge and using it more flexibly, which is made pos-sible by interdisciplinary linkages, already became apparent in an earlier analysis of the five subjects Biology, German, English, Music and Religion (cf. Rothgangel, 2017, pp. 137–146). At this point, we will only add an illustrative example from art didactics:

> "An examination of a specific content from different subject perspectives can lead to a deepening of knowledge and to a flexibilization of such knowledge. The ability to develop multilayered symbolic systems productively as well as receptively, and in doing so to plan, to order, to revise, and to generate meaning together or to justify aesthetic judgments – these are abilities that are practiced in art classes and which are also needed in other subjects" (KuD, p. 225).

This example shows that the "special subject potentials" on the one hand and the "deepening and flexibilization potentials" on the other hand are not mutually exclu-sive, they go hand in hand, but that they are located on different levels: The category

of "special subject potentials" primarily focuses on a specific *transfer potential* inherent in the content or structure of a subject, so that it can be linked across the curriculum, while the categories of "deepening and flexibilizing" or that of "generalizing knowledge" focus on the processes and actual functions of interdisciplinary activities or interactions.

13.2.4 Potentials for generalization

This last point has already been highlighted in another paper (Rothgangel, 2017c), where the development of religious dialogue skills, for example, were interpreted as a contribution to or qualification for dialogue skills in general). A similar, impressive example comes from mathematics education:

> "Thus, problem-solving skills – in the sense of dealing with a task, the starting point and goal of which are clearly defined, but the path between them must be developed through heuristic procedures and, in some cases, through creative work – are highly valued in our complex world and may be one reason why many mathematics graduates work in the fields of management and consulting, for example" (MaD, p. 253).

Similarly, in geography didactics, 'systemic reasoning' is claimed to be one of the outcomes of geography education, but at the same time it is a mental capacity to be used for general purposes, beyond the subject-specific situation in which it was acquired (first). And in physics didactics it is the "methodological competencies and attitudes taught in a subject-related manner" (PhyD, p. 306), which are assumed to have a generalizing effect and potential; indeed, they could be seen and they *are* seen as a "contribution of physics to formal education" (ibid.). This last reference leads directly to the next point.

13.2.5 Potentials for "Bildung"

As in the example from physics didactics just presented, references to formal versus material education (or "Bildung") are repeatedly made in other subject reports as well, more precisely in relation to *personal* education on the one hand and to *basic, general or functional* education on the other hand, but also to some other specific educational areas (like *attitudes*).

The perspective of personal empowerment and "Bildung" is addressed explicitly in the following passage:

> "By declaring the development of general (foreign language) discourse skills to be a primary goal, the teaching of English pursues a personal formative dimension simultaneously: the reason being that this basic competence can be used and generalized for all kinds of communicative purposes, in other subjects as well as in life as a whole" (EngD, p. 120).

Another example of the same kind can be found in sports didactics, where there is direct reference to personality development through sports; in this way the mutual

diffusion of functional and personal "Bildung" in subject-specific education is made transparent:

> "The goals, which extend beyond the subject itself, thus include performance achievement and social behavior, the promotion of health, as well as personality development and value education. For example, playing in a team requires strategic action as well as communication skills and the ability to work together as a group. And the development of a gymnastics performance also aims at self-directed planning and implementation as well as requiring imagination and creativity" (SpoD, p. 410).

This *personal and functional dimension* of education in combination with subject-based learning is also implicitly addressed in other texts. In the above example of physics didactics, the aspect of 'formal' education through learning physics was already pointed out, and due to the resulting "attitudes" (also mentioned in the quote) there is also a clear reference to the dimension of personal development as well (PhyD). The same holds true for music didactics, where the effects of subject-specific musical education on the personal level are reflected (MuD, cf. KuD). In a similar way, German mother-tongue didactics distinguishes between linguistic, literary and medial competences resulting from linguistic, literary and medial forms of education (DD). All of these have generative qualities, once acquired up to a certain point they can be used in other contexts, since they are transferable. Finally, in religious didactics self-education and identity issues are addressed in combination with subject-based learning by stating: "Rather, the non-disposable and non-operationalizable aspects contained in the concept of education are essential for the subject of religion and characterize a central cross-sectional dimension of religious education" (RelD, p. 355).

More of the potential of subject-specific teaching and learning becomes apparent with regard to issues of *basic or general* "Bildung" (implied):

– For the "integration of natural & social studies in primary school" (German: *Sachunterricht*) it is claimed that this subject is, in addition to mother-tongue education and to mathematics, a core component of the elementary school and that it "contributes to basic education" [in the sense of '*Allgemeinbildung*'] (SaD, p. 382).
– Similarly, with regard to political education, it is claimed that political knowledge is "part of an interdisciplinary basic education" (PolD, p. 330).
– And in the same document we find the following insight: "The possibilities of participating in society and in one's own profession depend on economic, historical, geographical, and political competencies" (ibid.; cf. also WiD).
– Furthermore, the acronym MINT for "Mathematics-Informatics-Natural Science and Technology" (TD, p. 434) is said to signal a common frame of reference for the teaching of technology and its "connecting points to general education" [*Anschlusspunkte zur Allgemeinbildung ...*] (ibid.).
– Finally, the teaching of computer science is claimed to promote the students' sense of empowerment and their 'responsibility' [*Mündigkeit*] as a goal of general educa-

tion, insofar as it enables "an understanding of the underlying concepts regarding computers" (ID, p. 198) against the background of an increasing digitalization of life.

In all of these contributions *various educational implications, attitudes and areas of a more functional Bildung* are identified which students develop and in which they are supported, exactly through the teaching of a certain content or certain skills and capacities in certain subjects. The following data are again taken from the different subject reports:

– In geography didactics, its contribution to education for sustainable development is underlined (GeoD; cf. also BioD). In the didactics of an "Integrated natural & social science education in primary school" (*Sachunterricht*) a number of educational dimensions are explicitly referred to, namely "…those complex educational issues that are listed in the "Framework of Perspectives for Subject Matter Education" as topics. They are linked to goals in the context of subject-matter teaching and learning, such as mobility, sustainability, health prevention of sickness or disease, and media. These could be supplemented by other areas such as intercultural education or peace education" (SaD, p. 383).
– In biology didactics, it is pointed out that basic education in biology lays the groundwork for health-conscious and environmentally acceptable behavior, based on individual and social responsibility.
– In art didactics, it is stated with regard to aesthetic education "that the personal as well as the social acquisition of competencies is inseparably connected with the subject-related educational potentials" (KuD, p. 224);
– In the didactics of religion, finally, the relationship between different educational or *Bildung*-dimensions becomes a topic in itself, when reference is made to the "differences between a religious and a scientific mode of encountering the world" (RelD, p. 354) and when the educational potential of such an ability to distinguish between those two is emphasized (RelD, p. 563).

A closer look at all of these examples shows that there is indeed a diverse educational potential inherent in the subjects taught which could only be hinted at. On the other hand, it also reveals that this section on educational potentials of subject-based teaching and learning requires further basic and substantial research in the future, since the different educational areas and implications mentioned are by no means viewed and understood in a uniform manner by the different subject didactics themselves. Also the educational terms used for each dimension postulated and for each case investigated plus the respective underlying theoretical assumptions) would need to be further clarified and in the end be linked to each other in a cohesive way – a typical task for a Theory of Subject-Matter Didactics or General Subject Didactics in the future.

13.3   Challenges and problems of cross-curricular connections

It has already been pointed out that cross-disciplinary links and interdisciplinary approaches don't always meet with positive assessments. The following examples illustrate some of the issues without claiming to be exhaustive.

13.3.1   Danger of instrumentalization

Repeatedly, the danger of 'instrumentalization' of certain subjects is mentioned as a negative side-effect of interdisciplinary work (e.g. KuD, MuD, MaD, SpoD). On the one hand, one can be suspicious against educational policy "to conceal the existing shortage of subject teachers" by putting subjects together (MuD, p. 278). On the other hand, a common form of instrumentalization lies exactly in the fact that a school subject is expected to serve (external) purposes other than its own. The range of what constitutes instrumentalization is quite broad and spans from such extreme examples as school sports during the time of National Socialism (SpoD) being used as a platform for ideological control or the teaching of "sociobiology" to justify racism to more benign expressions such as the implicit expectation that art classes should be used to prepare the decoration for a school festival (KuD).

13.3.2   Differences continuing between subject-specific approaches

In the subject-didactic reports the concern is repeatedly expressed that interdisciplinary work does not do enough justice to the differences of the specific subject approaches themselves (e.g. SpoD, MuD, PhyD). This attitude can be overdeveloped as a danger, but it can also be underdeveloped as a lack of willingness to cooperate. The following example, again from the "Integrated teaching of natural and social sciences in primary school" (*Sachunterricht*) is illustrative in this matter: "The question arises as to how the networking and the integration of these different aspects can be solved without them standing next to each other in an additive manner and without them being 'dealt with' one after the other. Thus, Dagmar Richter asks critically, using the subject area of *water* as an example: 'What do two approaches actually have in common when a body of water as an ecosystem becomes the subject of instruction, on the one hand, and when, on the other hand, the water use of this body of water in the Middle Ages is shown in a historical perspective'?" (SaD, p. 381).

In this context, other negative experiences and findings as well as challenges of teaching beyond one's own subject or in cooperation with others are often emphasized:

> "The treatment of geographic content in so-called integrative subjects and in subject clusters (*Integrationsfächer* such as in the teaching area of 'Gesellschaftslehre' in Lower Saxony or of the subject compound 'Geographie-Wirtschaft-Gemeinschaftskunde' in Baden-Württemberg, another one of the German Länder) are critically evaluated by ge-

ography didactics despite the advantages offered by multi-perspective forms of teaching. This is based, among other things, on negative experiences with the integration of subject areas in the United States, in Japan and in Great Britain (cf. Haubrich, 1997). But also in Germany, it is critically seen if the *natural* science part of a subject (like in geography) is ignored or neglected when assigned to an integrated *social* studies cluster. This also involves the current structure of teacher training and the associated subject-related professional identity-building" (GeoD, p. 146).

Comparable arguments are found in political didactics when talking about the integration of (diverse) subject approaches:

"However, the subject-specific approaches still remain different. It is known from a Swiss study that history teachers 'cannot provide instruction in civic education that departs from the level of everyday life' (Ziegler, 2018, p. 42; Waldis, 2016). The major school achievement studies in other subjects equally show negative findings for the level of students' performance if taught by teachers from a different school subject (Stanat et al., 2016, p. 498). As empirical evidence proves, the only effective way is to have the subject-matter taught by trained subject-matter teachers" (PolD, p. 330).

13.3.3 Research desiderata

Despite some isolated empirical findings, the subject reports express a general research desideratum in this respect. It is noticeable that even in optimistic statements about the positive effects of interdisciplinary work, it is either pointed out that there are still major empirical deficits and a need for further research (e.g. EngD, SaD, PolD, GeschD), or that empirical studies conducted so far do not confirm the assumptions about transfer and integrity in the learning of students to the degree hoped for (MuD, SpoD).

The critical reflection on the relationship between the subjects of English (as foreign language) and of German (as a mother-tongue) and their respective didactics can be cited here as an example:

"The structured development of oral and written communication skills and the examination of communication models are [also] a concern shared by both subjects. However, it remains to be seen whether transfer really takes place between them and whether this is specifically encouraged by teachers. Thus, there is a great need for more research in the future." (EngD, p. 118)

And as far as hopes for transfer achievements in music didactics are concerned, the following observations are rather sobering:

"The question of the potential of music as a subject to generalize subject-specific competencies and mental structures points beyond the musical-subject-specific to effects of musical learning and musical education in other areas of human behavior and personality. The investigation of such 'transfer effects' with the hope of empirical evidence of their effectiveness experienced a peak around the turn of the millennium [...] It has been argued that music promotes intelligence, social behavior, emotional stability, but also spatial imagination and other extra-musical skills. However, such transfer hypotheses, which are based

on a functional idea of 'Bildung', hardly or only partially stand up to empirical scrutiny" (MuD, p. 279; cf. also SpoD).

Irrespective of whether the research efforts for substantial cross-curricular studies so far are insufficient or whether conflicting research findings exist, there is a great need and a potential for future empirical research in this field of subject-based teaching and learning across the curriculum. It would examine the success or failure of interdisciplinary linkages between school subjects and their educational goals in a nuanced way and lay open the specific factors influencing them.

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14. Networking Research in Subject-Didactics

Building Cross-Curricular Forms of Cooperation in Subject-Matter Didactics

Martin Rothgangel and Helmut Johannes Vollmer

The central issue depicted in this chapter in a multi-layered way is the relevance of interdisciplinary dialogue and cooperation on the research level, not only among subject didactics themselves, but also with other partners chosen by the individual subject didactics. While Chapter 12 had asked about the *potential* reference disciplines of the respective subject didactics in a more abstract, scientific-theoretical sense, the current section now focuses on those concrete *cooperations which already exist in reality or which are in the planning stage*. It follows the ongoing dialogue between disciplines in the attempt to identify (possible) networks of researchers who operate cross-sectionally or express joint interest in a cooperative manner through other types of activity. Subsequently, in a second part, some of the conditional factors and motives for interdisciplinary activities and for searching the dialogue among subject didactics are unfolded.

14.1 Inter-disciplinary dialogue partners of the various subject didactics

14.1.1 Overview of dialogue partners

The analysis of the subject-didactic reports reveals specific dialogue partners, as already elucidated earlier in chapter 12 above. Particular emphasis is placed on the following four dialogue partners, with which subject didactics cooperate in reality:

– Academic subject-matter disciplines (e.g. in BioD, DD, GeoD, ID, PhyD, PolD, SpoD),
– Other subject didactics (e.g. in BioD, ChD, DD, EngD, GeoD, ID, KuD, MaD, MuD, PhyD, PolD, SpoD, WiD),
– Empirical Educational Sciences in particular (e.g. in BioD, ChD, DD, EngD, GeoD, MaD, PhyD, PolD, SpoD), and
– Educational Science in general (e.g. in BioD, ChD, EngD, GeoD, MaD, SaD, SpoD).

Other dialogue partners are also mentioned in some cases, such as ethics (in BioD), media studies (in ID) and neuroscience (in EngD); and still more examples can be

found below under 14.2.5. The fact that some disciplines are *not* mentioned in the data set does not necessarily mean that they do not play a role as reference disciplines for subject didactics. The analysis produces already a multi-layered picture and a differentiated description of subject didactic and their dialogue partners, which does not correspond any more to a simple traditional positioning of subject didactics between academic disciplines on the one hand and general didactics or the educational sciences on the other hand, as it was portrayed earlier in this book (cf. Abraham & Rothgangel, 2017; English translation Abraham & Rothgangel, this volume; see Chapter 3).

It is quite remarkable in this respect that the 17 contributions from the participating subject didactics differ very much in their choices; on the other hand, general didactics is not even mentioned once as a dialogue partner at any point – a finding that already became apparent in Chapter 12. Again, one should not conclude from this fact, however, that the interdisciplinary dialogue with general didactics does not take place at all or that it is not meaningful. Rather, when speaking of the educational sciences in general (as is the case e.g., in BioD, ChD, EngD, GeoD, MaD, SaD), an implicit reference also to general didactics is likely to be included, in particular when teacher education is the topicalized (as in EngD).

It nevertheless remains surprising that general didactics is not explicitly mentioned and not even considered once as a dialogue partner. This is in line, however, with observations already made earlier (on a smaller data base, though) about the relationship between subject didactics and general didactics (cf. Rothgangel, 2017b). It also corresponds with results already presented in Chapter 12: General didactics is hardly mentioned as cooperation partner for subject didactics. This used to be different in earlier times and can be explained in some detail (cf. Vollmer 2021a+b).

14.1.2 Academic disciplines as dialogue partners

The subject reports also reflect the links and the exchange taking place with the respective academic disciplines involved (German term: *Fachwissenschaften*). This happens with varying degrees of intensity – a point already alluded to in chapter 12 when analyzing the potential subject-didactic reference sciences, without inclusion of interdisciplinary perspectives at the time. In physics didactics, for example, it is said that this relationship is in the process of reducing, with the following reasons given why this dialogue is less intense than before:

> "Cooperation with academic scientists from physics is less pronounced in didactic research, due to the long-standing shift of focus towards empirical teaching and learning research. On the other hand, at some universities there is a lack of understanding among physicists for the independent research profile of physics didactics" (PhyD, p. 307; cf. also GeoD).

The preferred dialogue partners of physics didactics, therefore, are rather educational psychology or other related didactics of the natural sciences (cf. also GeoD). By contrast, in computer didactics the academic reference discipline *computer science/informatics* as an academic field of research is emphasized as a crucial dialogue partner. But not only informatics functions here as a close subject-specific cooperation partner. Rather, as explicitly mentioned in one of the more known projects in that area (MeCoPflege = Media Coaches for the professional field of nursing), other disciplines such as media science, nursing science and medicine have newly come into focus as dialogue partners of computer science/informatics didactics (cf. also BioD with reference to ethics, technology, and the other natural sciences). From the point of view of General Subject Didactics, this finding deserves special attention: the fact that different academic disciplines have a varying status as dialogue and research partners for different subject didactics and undergo different dynamics over time, clearly influences the subject-specific teaching and learning processes and their observation: While research in physics didactics, due to the cooperation with educational psychology (*Lernpsychologie*), is strongly characterized by empirical teaching-learning approaches (which filter through into physics teaching), informatics didactics research has "as a rule a more practice-oriented research format, which, by applying a R&D (Research and Development) approach, supports the practical implementation of new teaching-learning concepts or of new methods of teaching and learning" (ID, p. 199); this is probably also due to their cooperation with computer science. Overall, the decisive selection principle for choosing academic discipline(s) or one's neighboring discipline(s) or certain sub-discipline(s) seems to be whether or not a cooperation partner is relevant for the respective subject-didactic object of study or for the concrete research project in question (see also "Interdisciplinary research areas", in section 14.2.5 below).

Furthermore, it has to be taken into account that the lack of mention of academic disciplines within certain subject didactics could also be due to the fact that current subject-matter scientific research has distanced itself considerably from the topics of school teaching and learning. In mathematics didactics, for example, the current research in mathematics as a science may play practically no role at all, because it is contended that school mathematics of today represents the state of mathematical research from more than 150 years ago. Finally, there is also a certain expectation that representatives of subject didactics are supposed to cover the scientific expertise in numerous interdisciplinary projects of the educational sciences, because they are also responsible for the content (e.g. PhyD).

14.1.3 Other subject didactics as dialogue partners

Compared to the previous science-theoretical self-positioning of subject didactics, especially with regard to their respective reference disciplines, it seems anything but natural that subject didactics bring other subject didactics into play as dialogue

partners, especially to the extent they do by now. This point, which could already be observed in chapter 12, is an important finding for the conceptualization of General Subject Didactics. It has also to be taken into account in the future when situating the individual subject didactics in terms of a theory of science. A basic motive for a subject-to-subject relationship and for internal subject-didactic dialogue emerges in the following quotation (which not quite clearly enough formulated): "Although the subject didactics have different models, their basic questions are similar due to their subject-based foundations" (PolD, p. 330).

In looking more closely at this quote, it can be substantiated further as follows:

First of all, the different subject didactics are by no means equally close to each other, but as we have seen, there are particularly close connections between certain didactics, for example, between the didactics of the natural sciences. This may be due to the proximity of the subject areas as well as to the common experimental methods applied in these disciplines (cf. ChD with reference to related or neighboring didactics within the STEM area).[1] In biology didactics it is claimed that dealing with so-called multidisciplinary "socio-scientific issues" requires close cooperation between different disciplines, e.g. between the didactics of different natural sciences, of ethics, and of technology (BioD). Also, institutional and policy reasons such as the formation of a joint umbrella organization for the didactics of chemistry and physics together in the form of a "Society for the Didactics of Chemistry and Physics" (*Gesellschaft für die Didaktik der Chemie und Physik*, GDCP) are explicitly mentioned as a way of strengthening ties in this context.

Secondly, the didactics of the natural sciences are particularly attractive for other subject didactics. The existence of the so-called STEM cluster was already emphasized, which includes cooperation of the natural sciences with mathematics, computer science and technology didactics and is supported by interdisciplinary research funding (ChD). Furthermore, the didactics of the natural sciences are explicitly named in the reports of the didactics of geography, politics and mathematics, although in fact there are cooperations with numerous other subject didactics on top of these.

Thirdly, the didactics of German as a mother-tongue (PolD, KuD, MuD) and language subjects in general (MaD) repeatedly appear as important dialogue partners. Reasons for this are seen in the proximity of a subject to language and language acquisition (as in MuD), in the necessary acquisition of general competencies such as argumentation (which are required both within and across subjects; PolD), and research into bilingual teaching and learning (EngD, SpoD), where linguistic and subject-specific goals interact. Joint comparative research projects of several subject didactics such as "PerLe" (KuD) and "FALKO" (MuD) also play an important

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1 STEM is an English acronym comprising the subject areas Science, Technology, Engeneering and Mathematics. The equivalent in German is MINT = Mathematik, Informatik, Naturwissenschaften, Technik.

role in the interdisciplinary dialogue, involving German and German didactics as a mediator.[2] In addition, research cooperation with German and music didactics is emphasized in art didactics, with specific reference to moving images: here, internal affinities within the larger subject area are also at work again, comparable to those of the subject didactics within the natural sciences.

Fourthly, the cooperation between subject didactics is not statically fixed, but is subject to dynamic changes. For example, in the didactics of geography, a certain proximity to the didactics of the natural sciences is stated, yet parallel there are tendencies developing towards networking with the didactics of the social sciences (e.g. through the founding of a journal and a series of publications). Undoubtedly, such tendencies are structurally strengthened if – as in the STEM field – appropriate research funding is provided or – as in sub-fields of the natural sciences – joint institutions are created (cf. GDCP or IPN).[3]

Finally, the intensity of connections with other subject didactics varies and the relationship is by no means always a mutual give and take. An indication for the latter are the expositions in music didactics, according to which the reception of results from other subject-didactic research has been taking place for a long time, while the establishment of joint research initiatives together with other subject didactics and with equal status of the participating disciplines (e.g. through projects such as FALKO, see footnote above) has happened only recently.

Last but not least, it would have to be examined historically in more detail whether or not and in which respect the dialogue between different subject didactics represents a "relative novelty" (as stated in EngD). This in turn would explain why this point has practically not been taken up in previous science-theoretical considerations of individual subject didactics nor in the debate about comparative subject didactics and the identification of commonalities and differences between the different individual subject didactics.

14.1.4 Empirical educational research as a dialogue partner

If this article were purely theoretical and not based on a comparative analysis of 17 subject reports, this point would probably have read "Education sciences as dialogue partners" (see also 14.1.5 below). However, there is a distinction to be made in terms of self-definition, suggested through explanations in the subject-didactic texts themselves: although in different terminological versions, the importance of

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2   PerLe is the short form for a federally funded research project "Projekt Erfolgreiches Lehren und Lernen" at the University of Kiel in Germany. Likewise FALKO is an interdisciplinary research project about the professional knowledge of teachers in which several subject didactics cooperate with the education sciences. The acronym FALKO stands for "*Fa*chspezifische *L*ehrer*ko*mpetenzen".

3   The acronyms of GDCP = Association for the Didactics of Chemistry and Physics and of IPN = Institute for the Pedagogy of the Natural Sciences and Mathematics were already explained above.

Empirical Educational Research (EER, comprising everything in the broad area of education studies with a clear empirical focus) is repeatedly emphasized and set aside specifically against the traditional Education Sciences. This specific role and self-assigned quality of EER is also expressed language-wise, e.g. by marking "psychology and educational science" as one's basis (BioD, cf. DD, EngD, MaD), especially in terms of research content, and by repeatedly emphasizing the methodological expertise assembled within EER (e.g., PhyD, PolD). These characteristics can also be seen as a decisive motive for a dialogue with EER; for example, in PhyD this is evidenced by the following statement: "Learning psychology 'provides' the methods and physics didactics the content" (see PhyD, p. 307; cf. also DD, among others).

Thus, educational psychology clearly stands at the forefront of empirical educational research (ChD, DD, MaD, PolD), but beyond that, psychology in general (BioD, EngD, PhyD, RelD) or learning theories/learning science and *cognitive* psychology (PhyD, GeoD) are equally mentioned more and more so as dialogue partners.

In addition to psychology as a foundational science, reference is also made at times to sociologically oriented child development research (SaD) or, more generally and more frequently, to the social sciences, especially to socio-scientific research groups (ChD) and socio-scientific research methods (DD, PolD, SpoD). Accordingly, it would not be appropriate in mentioning dialogue with Empirical Educational Research to think solely of psychology and of related psychometric expertise. Rather, as we have seen, other approaches and scientific domains such as sociology and the social sciences in general are also appreciated and linked to.

14.1.5 Education sciences as dialogue partners

In the reports of the individual subject didactics, reference to the education sciences is usually made by naming this broad research area in combination with other relevant disciplines, when listing dialogue partners: for example: "psychology and educational science" (BioD), "with psychologists or educational scientists of different provenance" (EngD), "educational science or psychology" (MaD) or "the educational sciences and subject didactics" (GeoD). In terms of content, there are certain focal points emerging for interdisciplinary interaction, namely thematic areas such as "inclusion" (EngD, SaD, SpoD), "diversity/heterogeneity" (EngD), "media education" (DD, ID) or "special education" (ChD).

Finally, we have to mention a special feature of sports didactics, in that it is institutionally anchored within education studies (and *not particularly connected to* the respective academic subject-matter field). Thus SpoD is largely organized and professionally active within the German Association for Educational Science (DGFE) in the form of a sub-branch "Commission for Sports Education" of its own.

14.2 Conditional factors of and motives for interdisciplinary dialogue

In the above descriptions, certain conditional factors and motives for an interdisciplinary dialogue have already been briefly introduced. These are now the focus of our special attention in the next section.

14.2.1 Third-party funding

Research support through third-party funding is repeatedly mentioned as a stimulating element for interdisciplinary dialogue, in which the German Research Foundation (DFG; e.g. BioD, EngD, GeoD, PhyD), the Federal Ministry of Education and Research (BMBF; e.g. GeoD, ID, PhyD) as well as the latest research initiative of the BMBW, named *Quality Offensive for Teacher Education* (e.g. GeoD, SpoD) are prominent. The various additional research foundations also deserve particular attention, the influence of which on research agendas becomes obvious in light of the following quotation:

> "… it is essential for science didactics to cooperate with their affinity partners in the STEM area, since many research projects relate to this area of education as a whole. For example, foundations often 'call for' interdisciplinary projects (see, for example, the funding programs of German foundations such as the *Stifterverband für die deutsche Wissenschaft*, *Volkswagenstiftung*, *Mercator Stiftung*, *Deutsche Telekom Stiftung, Siemens Stiftung, Robert Bosch Stiftung*, and others). Increasingly so, these calls for proposals also require contributions from applied subject-didactic research" (ChD, pp. 67–68).

Third-party research funding provides subject didactics with "relevant resources" that not only enable research projects, but also secure administrative and peer attention at universities and thus strengthen the academic status of subject didactics considerably.

The rising importance of third-party funding in higher education policy, conditioned by targeted calls for proposals in the field of education (in the broad sense of the term) has ensured increased funding for the STEM area and for evidence-based educational research in general. The latter is probably one of the main reasons why Empirical Educational Research, with its specific methodological expertise in psychometrics and in the social sciences, has become an important dialogue partner for almost every subject didactics (cf. PhyD).

14.2.2 Institutionalization

The importance of institutionalization has already been addressed in the context of the Association for the Didactics of Chemistry and Physics (GDCP) above and the resulting promotion of a dialogue between chemistry and physics didactics. In addition, the fruitful collaborations with Empirical Educational Research have enabled

subject-didactic work groups to participate in conferences of the 'Society for Empirical Educational Research' (*Gesellschaft für Empirische Bildungsforschung,* GEBF) and their professional discourse. The founding of the GEBF in 2012 reflects the distinction between Empirical Educational Research on the one hand and the Education Sciences on the other, as introduced above. Ever since, there have been two separate institutions and dialogue partners for subject didactics (the 'Society for Empirical Educational Research' (GEBF) as well as the 'German Society for Studies in Education' (DGFE)), both of which are helpful for the advancement of high-quality research also in subject didactics.

Increasingly, national as well as international conferences (e.g. PhyD, BioD, SpoD) take place for individual subject didactics or sub-groups of subject-didactic disciplines; also formal as well as informal associations are constituted within the transnational European space, such as the 'European Researchers in Didactics of Biology' (ERIDOB) or the 'European Science Education Research Association' (ESERA). At the same time Schools of Education or Centers for Teacher Education become established in many German universities. Surprisingly so, these are rarely mentioned within the subject reports, yet their importance for interdisciplinary dialogue can hardly be overestimated. The same is true for the umbrella organization of all subject didactics in Germany (*Gesellschaft für Fachdidaktik, GFD*), founded in 2001, with more than 30 member associations so far. The GFD has contributed significantly to a cross-sectional dialogue between the different subject didactics by holding regular membership meetings (normally with a focus on one of the pending issues concerning all subject didactics), by installing interdisciplinary work groups (like the one on General Subject Didactics), by holding bi-annual thematic conferences, and by establishing appropriate means of publication, e.g. founding of the series '*Fachdidaktische Forschungen*' (with more than 25 volumes so far) or of the unique English-speaking international peer-reviewed online journal, dedicated to "Research in Subject-matter Teaching and Learning" (RISTAL.org), among other things.

14.2.3 Added value through cooperation

Third-party funding (14.2.1) as well as the institutionalization of subject didactics (14.2.2) are important conditional factors for their development and for deepening contact and interdisciplinary dialogue. The importance of both must not be underestimated. However, in the long term, one of the decisive motivations for interdisciplinary dialogue has to do with the fact that subject didactics can acquire new insights, knowledge and experience as an "added value" (ChD, cf. GeoD) through cooperation with other disciplines, through developing "good working relationships" in the overall field (PhyD).[4]

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4 All of this reaffirms the academic status of subject didactics as a whole and of the different individual subject-didactic disciplines – together with appropriate material and staff equipment

With regard to Empirical Educational Research as a dialogue partner, this added value has already been pointed to earlier: It 'provides' the subject didactics above all with a much needed, corresponding methodological expertise (e.g. DD, ID, PhyD, PolD, RelD, SaD). Those contacts also help to raise the standards of empirical research unto a higher level, which are needed for the recognition of subject didactics as empirical research disciplines within academia (BioD) and for the acceptance of their influence of the professionalization of future teachers. A further gain through the cooperation with Empirical Educational Research is seen in potential development that hereby "a stronger interdisciplinary and international visibility could be achieved" (SpoD, p. 412).

With regard to other subject didactics as dialogue partners, it is emphasized, for example, that subject didactics can stimulate one another (WiD) and that they "could provide each other with additional points of departure for their respective research" (PolD, p. 331). As a result of subject-didactic co-operation, joint publications are mentioned, with a high degree of relevance and impact, such as two handbooks quoted, one on research methods and another one theories of science-didactic research, "the chapters of which were written by interdisciplinary teams of authors" (PhyD, p. 310; cf. also WiD).

In contrast, problems related to interdisciplinary dialogue are hardly discussed openly, one rather speaks of the limits to cooperation. However, with regard to the dialogue with Empirical Educational Research, some problematic consequences in terms of a reductionist understanding of education and of educational goals are cited, because the dominant focus on measurability can lead to a neglect of other educationally relevant subject issues, which turn out to be less easily evaluated or assessed (SpoD). An interdisciplinary dialogue of subject didactics with different reference disciplines can also reach its limits, when "noticeable effects in the cooperating discipline" are missing or when "the reflections of the scholars involved […] take place primarily within the horizon of their own discipline" only (RelD, p. 355), which indicates lack of openness or lack of readiness for new learning.

14.2.4 Interdisciplinary self-definition

Beyond the 'added value' argument just outlined, there is another intrinsic motive for interdisciplinary dialogue: Subject didactics are inherently interdisciplinary in themselves and thus depend on the exchange of ideas (ChD). This is especially true for a multi-layered, integrative field of education such as the "Didactics of an Integrated Natural & Social Studies approach" for primary school, because by its very nature it relates to several academic disciplines at the same time. This is why interdisciplinary dialogue is constitutive for it: "It is even an important characteristic of its self-defini-

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(professorial posts) as well as with the massive education and training of young emergent researchers who are a guarantee of future productivity and creativity in the field.

tion. The resulting interdisciplinary research context has to integrate findings from several academic disciplines, from the neighboring sciences related to the subject, from the education sciences as well as from other subject didactics: all of this is mirrored back in different ways within the research perspectives of this didactic field. This is all the more true, since the overall reference disciplines have to focus on the issues and questions of the originating subject area itself, the Didactics of natural and social subject-matter education in primary school" (SaD, p. 383; see also chapter 12).

Comparably, also in other subject didactics such as geography, the different varieties of interdisciplinary exchange are listed and discussed:

> "Networking of research activities in geography didactics is possible on different levels: on the one hand subject-internally, linking scientific research groups across locations (on the national and international level) as well as cooperating with school practice (e.g., design-based research). On the other hand, networking also takes place subject-externally, linking with the academic discipline 'geography' and its own reference sciences (e.g., geology, geoinformatics), with the education sciences and with other subject didactics in an interdisciplinary way" (GeoD, p. 147).

Listing the different reference disciplines of the various subject didactics is not a trivial task, when looked at more closely. The matter becomes even more complex when one takes into account the relationship of the various reference disciplines among themselves and to the respective subject-didactic discipline in the center. In the field of Didactics of Religion, for example, the view is widespread that this relationship (especially between theology and pedagogy) is characterized by both convergence and divergence, and that this must be taken into account in the research process. However, the research practice shows that these 'ideal standards' are usually not (easily) met (RelD).

Therefore, it is no coincidence that there is a meta-reflexive debate going on within several subject didactics about the utility and difficulties of interdisciplinary dialogue. In some disciplines, however, such as in religious didactics, such an intradisciplinary relationship is clearly advocated: "An intradisciplinary relationship is characterized by the fact that a science adopts theories and methods from other sciences for its own research and integrates them into its own cognitive process" (RelD, p. 355). Such a move towards interdisciplinary "independence", accompanied by appropriate meta-reflections, is also conducted in German didactics. Yet it is qualified differently, based on the distinction between intra-, inter-, and transdisciplinary relations (cf. DD; see also EngD, GeschD).

Thus, another important work field for General Subject Didactics emerges which needs much more empirical study and clarification. Without anticipating future discourse, the following section could provide the key to a deeper understanding of interdisciplinarity in subject didactics.

14.2.5 Interdisciplinary research areas

In the various contributions from the different subject didactics, there are repeatedly some hints to certain appropriate content areas for networking and for dialogue that could require or at least stimulate interdisciplinary research. Many examples of this are given in the subject reports; here are some of them listed:

– Promotion of creativity (KuD),
– Media Education (ID),
– Multimedia tools for a multi-perspective analysis of teaching actions / sequences (ID),
– Project MeCoPflege (*Mediencoaches für das Berufsfeld Pflege*) in cooperation with media science, medical science and various institutions of medical care / nursing: digital learning offers for the continuous improvement of care / nursing (ID),
– Diagnostic competencies (MaD) in simulation-based learning environments with the participation of the didactics of medicine, physics and biology as well as of pedagogical-psychological teaching and learning research (cf. also KuD),
– Argumentation competence (PolD),
– Communication competence (DD, SpoD),
– Modeling of Competences (in general) (ChD),
– Achievements in Mathematics and Level of Language Proficiency (MaD),
– Learning within experimental teaching situations (ChD),
– Ability to think in systemic terms (WiD),
– Heterogeneity, Diversity, Inclusion (EngD, SaD, SpoD),
– Multilingualism and Digitalization (EngD),
– Didactic conceptualization of the learning area "Nature and Technology" (TD),
– Neuroscientific Foundations of Foreign Language Learning (EngD),
– Multidisciplinary *socio-scientific issues,* with cooperation partners from ethics, technology and (other) natural sciences (BioD) etc.

This colorful bouquet of issues for joint study and analysis points to the fact that, beyond the dialogue partners already mentioned (academic subject-matter disciplines, other subject-specific didactics, Empirical Educational Research, and Education Sciences in general), a wide variety of further research partners could come into play (e.g., neuroscience, ethics, etc.). The required interdisciplinarity among dialogue partners would very much depend on the subject area to be researched, on the respective research question(s), on the research methodology appropriate, and on the results strived for or intended. Some research questions and topics follow the current mainstream of educational research (e.g., research on competencies or on inclusion in the classroom), while others may be caused by favorable social developments or certain coincidences. As already indicated, there is a wide range of further potential dialogue partners for subject-didactic research beyond the four main groups of dialogue partners which can be qualified as *constitutive*. Those additional co-operands

could become relevant only when certain topics or research question are dealt with, whereas otherwise they have little to contribute. Accordingly, they can be called *contingent*[5] dialogue partners (cf. also 14.3. below).

In principle, interdisciplinary research experiences can lead to the incorporation of certain elements into one's own subject didactic framework, either on the content level as, for example "inclusion", transferred as a topic from the education sciences or from another subject didactics (some of which might be more advanced in studying it, cf. SaD) or on the level of certain research methods or of a whole methodology respectively (cf. the notion of "intradisciplinary", as discussed earlier).

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DGFE = *Deutsche Gesellschaft für Erziehungswissenschaft* [German Society for Studies in Education]

ERIDOB = European Researchers in Didactics of Biology

ESERA = European Science Education Research Association

GDCP = Gesellschaft für die Didaktik der Chemie und Physik

DFG = Deutsche Forschungsgemeinschaft (German Research Foundation)

GEBF = Gesellschaft für Empirische Bildungsforschung (Society for Empirical Educational Research)

IPN = Institute for the Pedagogy of the Natural Sciences and Mathematics

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5   The term "contingent" in this context means possible, occasional or potential.

15. Merging Bottom-Up and Top-Down Approaches

General Subject Didactics as a Theory of Subject Didactics

Martin Rothgangel and Helmut Johannes Vollmer

In Part C so far (Chapter 8–14) the design and the results of a comparative analysis of subject didactics were presented in detail, including central pieces of information and of relevant reflections on the part of the 17 participating disciplines, based on their subject-didactic reports of which two were reprinted in an unedited, but translated form (see the examples in Chapter 6 and 7, the cases of Didactics of English as a Foreign Language and the Didactics of Religious Education). The reports as well as the analysis were structured similarly, according to six central impulses, agreed upon beforehand by the authors from the 17 subject-matter didactics. Accordingly, the written responses to each of the six problem areas produced an enormous amount of precious empirical data about the state of the art in the different German subject didactics and their manifold research perspectives.

It is now time to look back on the empirical findings of our study and turn to an overall evaluation of them from the perspective of General Subject Didactics. Whereas in the analysis we tried to identify the commonalities and the differences between the individual subject didactics and asked in how far we could generalize already or where we needed more research in order to be on the safe side with our claims, we will now be merging the empirical findings, gained through the bottom-up approach, with those of theoretical reflections from before, gained through a top-down approach. Both approaches, theory-building and empirical investigation, are constitutive pillars of General Subject Didactics, as has been laid down and explained in Chapter 4 of the book. One crucial point of this procedure is whether the empirical results turn out to be supportive of or contradictory to the theoretical assumptions made before. The present chapter will thus reflect on the empirical side of the study once more and relate it to our theory-building, as outlined abstractly in Chapter 4. The aim of this reflection is to deepen and concretize the understanding of General Subject Didactics, by choosing illustrative examples from the analysis. At the same time, this reflection will help to check our theory-building on the basis of these concretizations. In doing so, the focus will be on two separate questions: 1. In which respect does General Subject Didactics prove to be a meta-theory of subject didactics (cf. 15.1 below)? 2. In which respect does General Subject Didactics also function as an object-theory (cf. 15.2 below)? It should be recalled at this point that the understanding of General Subject Didactics as meta-theory was especially linked with the self-conceptualization and self-assurance function of subject didactics, and

that the understanding of General Subject Didactics as object-theory was especially connected with the function of generalization.

15.1 Exemplary results concerning General Subject Didactics as meta-theory

In the following, General Subject Didactics as a meta-theory and the related self-assurance function will be concretized by two examples: First, on the basis of the so-called *reference sciences* of subject didactics and, second, on the basis of *research designs* in subject didactics.

15.1.1 Reference sciences of subject didactics

In Chapter 3, the dominant and long prevailing understanding of subject didactics in the German-speaking countries was outlined. Here, two reference sciences were assumed to be influential insofar as subject-matter didactics (e.g. biology didactics) mediates between its respective academic discipline(s) on the one hand (e.g. biology as a science) and the education sciences on the other hand. In the past this self-conception, which can be found in various subject didactics, has been reflected under the following theoretical perspective: First, how can this position of subject didactics "between" its two reference systems, namely the respective academic discipline(s) and the educational sciences, be characterized more precisely (e.g. Rothgangel, 2013; Schweitzer 2006, p. 273)? Furthermore, with regard to the educational sciences as reference system, to what extent are certain types of general didactics (e.g., "Bildung"-theoretical, learning-theoretical ones) and the reference sciences of those (e.g., Pedagogy, Psychology) determinative here?

The model described in Chapter 3 was based primarily on theoretical considerations without any surveys or interviews with colleagues from different subject didactics and thus with no empirical answer to the question which reference sciences were decisive for them. In that respect, the actual data generated through our study (as documented in this volume) led to reliable, yet rather surprising and differentiated findings. In Chapter 12 (survey question 4) as well as in Chapter 14 (survey question 6), four different constitutive reference disciplines emerged which are mentioned in the reports and considered to be determinative for numerous subject didactics:

– Academic subject-matter disciplines (e.g. in BioD, DD, GeoD, ID, PhyD, PolD, SpoD);
– Other subject didactics (e.g. in BioD, ChD, DD, EngD, GeoD, ID, KuD, MaD, MuD, PhyD, PolD, SpoD, WiD);
– Empirical Educational Sciences in particular (e.g. in BioD, ChD, DD, EngD, GeoD, MaD, PhyD, PolD, SpoD);

– Educational Science in general (e.g. in BioD, ChD, EngD, GeoD, MaD, SaD, SpoD).

In this context the following points deserve particular attention:

1. So far, although the suggestion had occasionally been made that "other subject didactics" could be a reference discipline for subject didactics (Rothgangel 2014, 280), this understanding was not considered in the conventional model of subject didactics (chapter 3).

2. The differentiation between Empirical Educational Sciences specifically and Educational Sciences in general, which is often expressed in the reports, becomes understandable against the background of the enormous increase of empirical research after the so-called PISA shock in German-speaking countries. An "organizational" confirmation of this empirical result can be seen in the fact that besides the established "German Educational Research Association" (*Deutsche Gesellschaft für Erziehungswissenschaft*, DGFE) a new association was formed about ten years ago, the "Society for Empirical Educational Research" (*Gesellschaft für Empirische Bildungsforschung*, GEBF).

3. As was shown in detail in the analysis, the subject-matter sciences form a constitutive reference system for subject didactics, but their importance for the different subject-didactic disciplines varies in two respects: First, there are subject didactics such as biology didactics, for which the subject sciences play a primary role, while in other subject didactics such as music didactics, the subject-matter practices are more essential. Secondly, the reference to the academic sciences varies between the different subject didactics, depending on whether they refer to the most recent state of the relevant sciences (e.g. in computer science didactics) or whether they relate to a state of scientific knowledge of at least 150 years ago, without being able to cover the scientific developments ever since (e.g. in mathematics didactics). In view of the international discourse and especially the one in the Francophone countries, this point leads to a fundamental desideratum in the German-speaking context. The question arises how the reference to the "subject-matter" of a school subject is appropriately being made: by the approach common in German-speaking countries with reference to the academic subject-matter disciplines (with frequent locations of subject didactics in joint faculties, e.g. mathematics didactics in the faculty of mathematics) – or by the approach which starts with the school subjects themselves and which also ends with formulating a "teachable" curriculum and lesson plans.[1]

4. Compared to the traditional model, another result is surprising, especially for the German-speaking context: There is practically no explicit reference to approaches from general didactics in either impulse 4 or in impulse 6. Apart from

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1   Another approach has been presented recently by Deng (2021), in which the work of Schwab from the University of Chicago in the 1960s is combined with the Bildung-centred didactic theories of Wolfgang Klafki from Germany around 2000.

two explicit references to Wolfgang Klafki and his Bildung-centred didactics (*Bildungstheoretische Didaktik*; cf. ID, WiD), there are almost no specific references to the term or concept of general didactics in all the other subject reports. This does not mean that general didactics is no longer of any influence for subject didactics in the German-speaking world, yet it is a further indication of the considerable loss of importance of general didactics in the German-speaking world in the last twenty years.

5. The preceding points emphasize the fact that one should not assume a fixed reference system of academic sciences for subject didactics, but rather a certain dynamism which can lead to changes from time to time. Against this background, the distinction made in the analysis between constitutive and contingent reference sciences also gains in importance. These metatheoretical distinctions and explanations of the reference disciplines of subject didactics, which were gained through merging bottom-up and top-down approaches, can provide valuable impulses for the respective subject didactics. Conversely, it must be left open whether renewed and extended feedback from the different subject didactics themselves (bottom-up approach) could in turn lead to revisions of this current model of subject didactic reference disciplines and its dimensionality. This point is further illustrated by the next two examples.

15.1.2 Subject didactic research formats

As a second example for the meta-theoretical quality of General Subject Didactics we will turn to subject-didactic research designs ("*Forschungsformate*"). The Association for *Fachdidaktik* (*Gesellschaft für Fachdidaktik*, GFD) had already opened the discussion on research designs in subject-didactic research in 2011 on the basis of a bi-annual conference (Bayrhuber et al., 2012). The background to this was the experience that research proposals from subject didactics were sometimes unilaterally reviewed with standards of the subject-matter sciences or with those of educational psychology. So the question arose: what are appropriate criteria for adequately assessing subject didactics research proposals and their quality? Are there unique criteria specifically relating to research in subject didactics as opposed to other scientific domains? These questions were controversially discussed in the Association for *Fachdidaktik* (GFD) and its working group on "*Forschungsformate*" (research designs). Finally, the Association itself published a position paper (GFD, 2015) in which designs of subject didactic research were defined as follows: "A research design of subject didactics is defined as the totality of all content-related, methodological and organizational research aspects which can be described in the planning, implementation, evaluation and exploitation of results of a subject didactic research project [...]. These include, among other things, theory-related aspects, interest in knowledge, methods of investigation and evaluation, and procedures for using the knowledge gained" (GFD, 2015, p. 2).

With this information in mind, it can be understood why the parenthetical note to impulse no. 4 in our survey "Perspectives of didactic research and development" also included the keyword "*Forschungsformate*" (research designs). In fact, numerous subject reports addressed the item of subject didactic research designs. However, the responses from the subject didactics were disparate at first glance and also made clear that the understanding of research designs in the vein of the position paper of the GFD (see above) had by no means prevailed, and that a methodologically oriented understanding of research designs (e.g. empirical, historical etc.) was dominantly expressed in the feedback from the subject didactics. On the basis of this analysis, further clarification was needed on the issue of research designs in subject didactics. The following new understanding was reached that on the one hand research methods used in subject didactics (e.g. historical approaches, empirical approaches, theoretical approaches) and that, on the other hand, also subject areas of research in subject didactics (e.g. Teaching and Learning Research; Research on Learners; Professionalization Research) play a decisive role; they both have a "formatting" effect on subject didactic research.

After the publication of the empirical results of our study, further theoretical considerations led to the conclusion that, in addition to research methods and subject areas, a third dimension, namely that of reference theories also have a formatting effect on subject didactic research: Thus, a project in subject didactics leads to different results whether it is set up and interpreted with psychological or with social science theories, for example. By means of a Delphi study, which was conducted first in the field of Didactics of Religion (Rothgangel & Riegel, 2021) and subsequently in the different Subject Didactics in German-speaking countries (Riegel & Rothgangel, 2022), the resulting model of didactic research showed up as a framework, with three formatting research dimensions each of which could be operationalized precisely (ibid., p. 72, Fig. 2). During this process, further modifications and additions were made, but only concerning details of the three dimensions. For example, on the methodological dimension, the term "empirical methods" was specifically subdivided into qualitative-empirical and quantitative-empirical methods, due to their importance in different subject didactics and their different logics. At the same time it became questionable whether a separate practice-oriented method really exists, since it is basically a requirement to be integrated within numerous methods or methodological approaches used in subject didactic research. The following figure (Figure 1) visualizes these findings and revisions in a three-dimensional generic model.

Without being able to present the underlying Delphi study and the corresponding empirical data in more detail (but cf. Riegel & Rothgangel, 2022), it should be noted that further research work is needed and already planned for. It will aim at elaborating concrete research formats within the framework of this model of subject-matter didactic research for illustrative reasons. Such elaborations are desirable for sharing and transferring successfully this type of scientific knowledge.
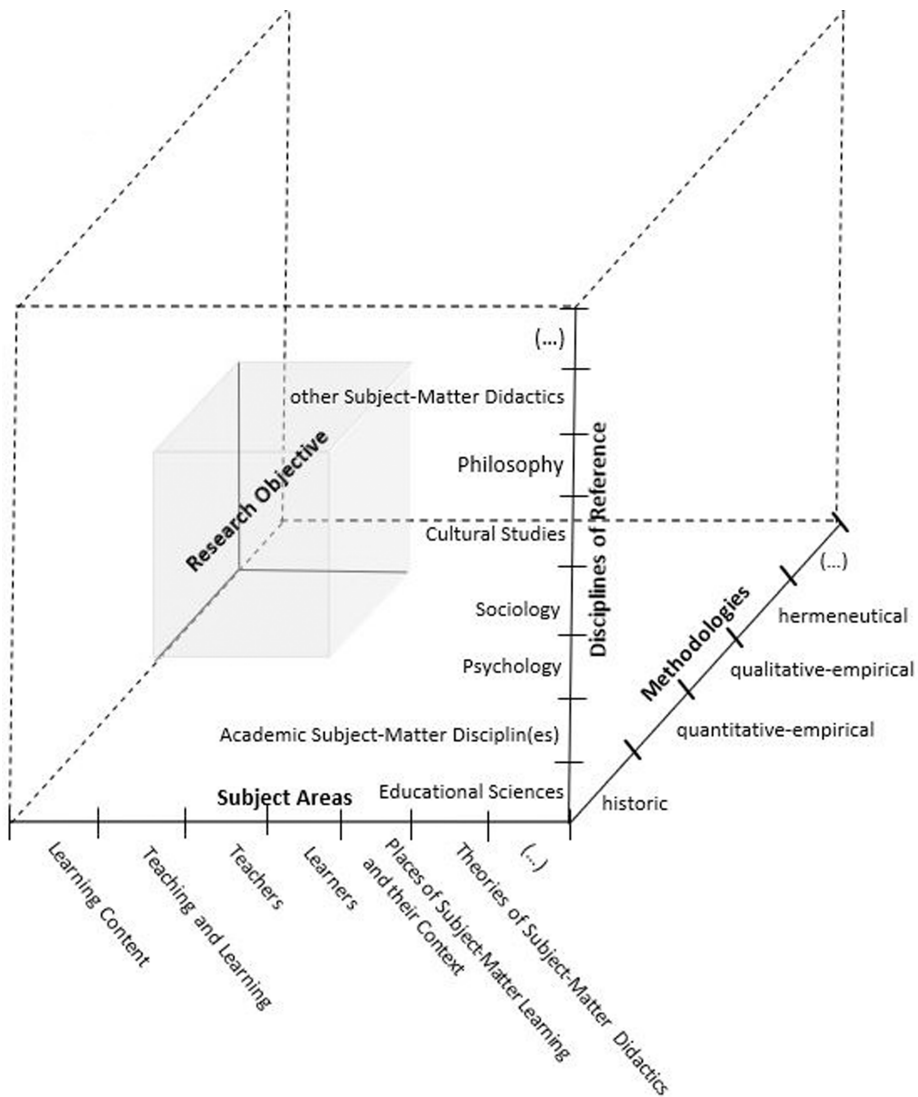
Figure 1: Revised generic model of research designs in subject-matter didactics

More importantly, we gained a fundamental insight into the nature of General Subject Didactics in this context: Overall, the three-dimensional features of research designs in subject didactics are an excellent example of the explanatory power of this new approach of "General Subject Didactics". It shows, first, how the interplay of theoretical "top-down" considerations and empirical "bottom-up" studies can lead step by step to a deeper understanding of subject didactics and of subject-didactic research, achieved through revisions, additions, or confirmations of previous findings. Secondly, it becomes clear why results obtained by General Subject Didactics are

always of a provisional character. According to R. Popper (1973, p. 21), this is true for any research, but especially in view of the diversity of subject didactics. This principle of scientific theory must be constitutively observed for the overall methodological set-up of General Subject Didactics: It is about a constant process of "merging bottom-up and top-down approaches" which leads to further specifications of earlier, preliminary results on the basis of new reflections or of new data about the self-understanding of subject didactics.

15.2 Exemplary results concerning General Subject Didactics as an object theory

After having dealt with General Subject Didactics in meta-theoretical terms, this section will illustrate in which respects GSD can also be seen as an object theory. To do so we will introduce three examples. Already the first one, a historical example on the "Establishment and Development of Subject Didactics", will show how the generalization function leads to results which take into account the similarities as well as the differences between subject didactics. These results of the analysis are not meta-theoretical, but object-theoretical, because they are not theories about theories. Nevertheless, these are interesting observations that result from the comparative, generalizing procedures of General Subject Didactics and which are worth to be presented in the following.

15.2.1 Establishment and development of subject didactics

A comparison of subject didactics under this heading shows that each and every individual subject didactics can look back on a history of different length and developmental features. Their beginnings lie to a large extent between the age of Enlightenment (e.g., Didactics of Religion) and the years of the 1990s (e.g. Didactics of Computer Science). As characteristic features of this development and above all of the establishment of a particular subject didactics, the reports often cite either the first systematic subject didactic publication(s) (e.g., from an English as a Foreign Language Didactics perspective, cf. Vollmer & Vogt, 2020, pp. 104–106) or the establishment of a first university professorship (e.g., from a Mathematics Didactics perspective, cf. Reiss et al. 2020, p. 239).

In this context, three conditioning factors are attributed a positive effect on the development of subject didactics: first, specific time circumstances (e.g., Enlightenment, turn of the century around 1900, Sputnik shock, or the 1970s as a modernization and reform period); second, certain institutional framework conditions (e.g. the establishment of subject didactics at universities, the founding of subject teachers' associations and subject didactic societies); and third, influential personalities (e.g., Johann Amos Comenius for various subject didactics, Friedrich August Finger for the

didactics of local history, Wilhelm Viëtor for the didactics of foreign languages, and Leo Kestenberg for the didactics of music). In this context, Johann Amos Comenius (1592–1670) is outstanding, as he is explicitly addressed in the historical accounts of biology, chemistry, art, and physics didactics. Thus he can be called not only the 'founding father of didactics' (Meyer 2016, p. 57), but also the 'founding father of *subject* didactics'.

15.2.2 Contents of the school subject: Sources and selection

Another result of the comparison on the level of object theory has to do with the content dimension of teaching. This is of importance for subject didactic research in general as well as for the practice of subject teaching in the classroom. On the basis of the subject didactic reports, the following four sources could be identified for choosing and selecting subject content (Rothgangel 2021, pp. 506–509):

– Subject sciences,
– Practices of the subject area,
– subject-related social, life-world and cultural contexts,
– subject-related anthropological aspects.

These four sources are not equally important in the subject representations; rather, different subjects, or even particular approaches within individual subject didactics, may place varying degrees of emphasis on these four sources. For example, subject didactics differ in that the subject-scientific references or the practices within a subject area have a different weight, as a comparison between biology and music didactics, for example, shows.

Furthermore, it can be observed that in principle each of these four sources of subject content can condition their selection and structuring. Here, too, different variants of mediation can be observed: For example, the two sources "subject sciences" and "subject-related social, life-world, and cultural contexts" can be related to each other in such a way that either the starting point is taken from subject sciences or from subject-related contexts, or that a combination and a mediation of equal importance takes place (e.g., Schecker, 2021; Schomaker & Tänzer, 2021). Furthermore, other interesting approaches to the question of selection can be found within individual subject didactics (cf. Reiss, Reinhold & Strohmaier, 2021; Magenheim & Romeike, 2021), which could be equally relevant for other subject didactics.

This view on the analytical results can also prove instructive insofar as one does not have to play off subject-specific practices against subject-scientific references. The opposite is in fact the case: they can be merged selectively. Furthermore, it should be considered whether in principle all four sources can be taken into account in the creation of curricula as well as in the selection of topics for subject-specific teaching and learning and how they can be placed in an appropriate relationship to each other. Finally, the selection of subject-matter content is a core issue in all subject didactics:

this could lead to a renewed discourse with general didactics as well as internationally with curriculum theory and curriculum studies altogether.

15.2.3 Bildung, competence, literacy as multi-facetted goals in subject didactics

As we have seen especially from the data in Chapter 11, the terms Bildung, Competence or Literacy come up quite frequently in connection with goal formulations, always or mostly linked with a subject-related adjective (e.g. geographical Bildung or mathematical competences). The notion of Bildung in particular is frequently used with a meaning which goes beyond what it signified traditionally for many decades, based on the work of Wilhelm von Humboldt: namely the development of the character and the personality of an individual, the self-cultivation of a learner. However, in the reports we also find other, more functional meanings attached to and associated with the concept, in addition to the personal one just mentioned.[2] As a matter of fact, the term Bildung, but also Literacy is often used as a synonym for education in general, but now in connection with a qualifier designating the specifics of *subject-based* education and even relating to a specific subject didactics such as "geographical Bildung" or "foreign language education = Bildung" or "mathematical literacy". These terms are created in order to make them fit for the subject-matter or the content area in question, as illustrated before. This clearly represents an extension in the meaning of the traditional term, comprising subject-based knowledge or "competences" of different kinds as part of Bildung, of *subject-based Bildung*, to be more precise. Due to the early introduction of national educational standards in Germany for most school subjects (since the beginning of this century), the data reflects this competence orientation which is all-pervasive throughout the different subject didactic reports, yet with a certain critical distance by some scholars. As the empirical data also shows clearly, the reflections and solutions per subject are based on a number of competing competence models which will have to be studied, analyzed and developed further in the near future. Overall, we could talk here of a *functional* understanding of Bildung in the widest sense, where the different types and kinds of (subject-based) competences add up to critical empowerment of the learners and a preparation for tackling and solving the global, social and political challenges of the 21st century.

In the data there are further aspects associated with Competence and Literacy, those of transfer capabilities or generic competences. They are less explicitly mentioned, however, and therefore cannot be considered as straightforward results of the study. These types of competences (such as analytical skills, capacity to think,

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2 This additional layer of meaning, related to a more functional interpretation of (school) education in connection with specific subject-matter teaching and learning, can already be observed in the long history of education and educational philosophy in Germany, as Frederking & Bayrhuber (2017) demonstrated.

to question or to reason) are acquired parallel to dealing in-depth with subject-based knowledge or issues and can be applied and used outside the context of acquisition. They may also be seen or qualified as "functional", as part of functional Bildung, since they serve other purposes than only themselves in a particular learning situation. Rather, they lay the groundwork for life-long learning and problem-solving in the future. Possibly, such competences could constitute a third category of Bildung, one that could be called "generic" or "generative". But all of this would have to be empirically tested, through another Delphi study, for example, in order to bring out more details in the self-understanding of the different subject didactics on this point before generalizing the new results (again).[3]

In dealing with the Anglo-Saxon concept of "scientific literacy" as opposed to "basic scientific literacy" (*Naturwissenschaftliche Grundbildung* in German) the author of the subject-didactics report about Physics didactics touches upon the generic aspects in learning science and about science (PhyD, p. 296). But the educational scope is even more widened when it is pointed out that within the German understanding of education through subject-specific Bildung there is also a cultural and a political component implied (ibid.). This comprises preparation for the role as a citizen, who can participate in the culture, but also includes elements of (self-)reflexivity. And in at least two other subject-didactic reports (Politics and Geography didactics) still another facet of goal definition for subject-matter teaching and learning (beyond what was introduced above already) is mentioned additionally: the development of an interdisciplinary mindset in the learner, the need to cooperate among individual learners in order to tackle and solve existing problems (in the 21st century) together, Again, this could possibly be interpreted as part and parcel of a comprehensive new understanding of subject-specific *Bildung* as education – but without any further convincing empirical data this line of thinking will not be followed here.

As diffuse or fuzzy as the notions of Bildung or Competence appear nowadays in the way they are used by different educators and subject didacticians (cf. Horlacher, 2017), as obvious is the need for more fundamental research on these particular goal dimensions which seem to be multi-facetted in themselves, possibly comprising something like functional and personal (and even generic) Bildung simultaneously (cf. Frederking & Bayrhuber, 2020; Vollmer, 2021b, Vollmer & Klette, 2023; Vollmer, proposal). Such considerations can only be hypothetical at this point. Given the preliminary data sets from the survey study on 17 subject didactics in Germany, a comprehensive, more systematic follow-up study would have to bring more clarity into this under-researched area of subject didactic goal setting, of principles for content definition and of competence orientation in general, all of which are closely linked to the concept of Bildung. First sketches of this enormous task are already available. Possibly this could be further substantiated beyond what we can observe today already in

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3   None of the subject-didactic reports talks about 'epistemic quality' in this context, by the way.

the subject-didactic reflections at hand, through another Delphi study or equivalent research approaches. Only then will we be able to merge theoretical insights and empirical findings again and better, with more precision and with more scientific validity and substance.

In addition to the three examples demonstrating the object-theoretical function of General Subject Didactics there are of course many other issues and aspects which could be listed as topics here, showing up in the reports. One of them is the impact that the construction of General Subject Didactics might have on the debate about the professionalization of future subject teachers. It has been suggested that the notion of Pedagogical Content Knowledge (PCK) should be replaced by SDK (Subject-Didactic Knowledge or Competence; cf. Vollmer & Klette, 2023), which includes knowledge of subject-didactic research and the specifics of a particular content domain, but also knowledge of the commonalities among all school subjects and subject didactics. In this way, an awareness and a sensitivity can be built up in teacher education relating to the teaching of a specific subject in the curriculum, but also concerning the joint responsibility of all of subjects for reaching general educational goals (on top of subject-specific ones) and cooperating about them.[4] All of this cannot be elaborated upon at this point for reasons of space. We hope, however, that the theoretical achievements and the generative power of General Subject Didactics as a theory of subject didactics have become quite clear on both the two levels of meta-theoretical and of object-theoretical argumentation plus on that of teacher education.

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4 Another suggestion for a re-conceptualization of professional teacher competences in the light of subject-didactic research is that of "subject-specific educational content knowledge" (SSECK), discussed in Hudson, Gericke, Olin-Scheller & Stolare, 2023.

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Part D
International Perspectives –
an Ongoing Discourse

16. Didactics – Subject Didactics – General Subject Didactics

Issues of Translation and of International Knowledge Transfer

Helmut Johannes Vollmer

After having merged the major results of the comparative analysis with our theoretical reflections from before at the end of Part C, and before expanding our perspective towards international exchange and comparisons in Part D, we will first insert a meta-reflexive section at the beginning of the this part on the conceptual and socio-linguistic realization of our findings in English as a foreign language. The first chapter in Part D, therefore, will deal with issues of translation and the international transfer of scientific knowledge. Accordingly, some of the challenges given and some of the solutions found will be addressed, exemplified through some of the central notions as used in this book, namely Didactics, Subject Didactics and General Subject Didactics.

In the sections following we will open towards an international perspective and pass the floor to some internationally known experts in the field who have agreed to comment on our specific educational approaches and empirical findings from Germany and relate them to their own thinking and the discourses in their own educational setting. As a preparation for such an exchange we offer condensed overviews of our empirical findings by way of short, concise résumés (see Chapter 17), with the goal of presenting them to these experts in the field for quick reference, but also to all scholars and professional readers outside of Germany for easier access and inspection.[1]

The experts have been asked explicitly for their responses to our comparative analysis, by relating our results to their own educational context. Three of those responses from different parts of Europe and also one from Israel are documented here (see Chapter 18–21). The response from the Francophone perspective was written by Bernard Schneuwly, University of Geneva, Switzerland; the one from the Danish perspective was written by Ellen Krogh, University of Southern Denmark. In addition we have a contribution by Brian Hudson, University of Exeter & University of

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1 Those who want to compare the longer and the shorter version of summarizing our empirical findings, based on data collection and interpretation, are free to do so: We made it a point to have as much overlap and meaning equivalence as possible between those two summaries – only the résumés are much shorter (14 pages instead of 130 pages). Whether the résumés are liable to reach more readers, remains to be seen, In any case, they are quicker to process.

Karlstad, who will explain why there is no subject didactics in England – with a slight twist at the end, informing us about positive changes in recent years – in comparison to Swedish developments in subject-didactic research. The response from Israel by Hanan Alexander is interesting insofar as it reflects a certain reference to the developments in Europe over the last centuries (ever since Enlightenment); but it also shows the dominant influence of an American-based philosophy of education, struggling with the insecurities of North-American curriculum theory. For a better and quicker orientation, we have numbered the most prominent results within those résumés, separate for each of the six survey sections in alphabetical order (e.g., from 1a to 1e etc., see below). This might make it easier to read and process them with less time and effort involved on the part of the experts and of the readers. As an additional support for guiding and structuring the responses, we have listed a few sample questions at the end of each of the six sections, as demonstrated below.

Both the résumés and the sample questions can be looked at and studied separately, but basically they are meant as background information meant to promote international awareness and exchange about subject didactics and General Subject Didactics in particular. In other words, our major interest within this Part D is to hear not only from the four colleagues as experts in the field, but to encourage as many colleagues as possible to articulate their professional perceptions or views on our overall approach to define subject-matter didactics as academic disciplines in their own right as well as on the attempt to develop a theory of subject didactics based on that. In this way and in the long run, we would like to hear more about the discourse in other countries, in other parts of the world, about awakening interest and concern or about the state of institutionalization of didactics / subject didactics there, if applicable – or whatever theory of content-based teaching and learning is replacing the one(s) presented here.[2]

Following the six résumés, the six questions and the four contributions from the experts invited we will then relate to them in our own thinking and to our own evaluationsin our final Chapter 22 . These evaluations can only be short for reasons of space;yet they are considered just as the beginning of a longer and deeper exchange and of an international discourse on the central issues addressed. Overall, we hope that this book might lead to a successful transfer of knowledge world-wide about subject didactics in education and to a stimulating, vivid discourse and mutual exchange about it, e.g. in the form of international conferences on the issues and

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2 Only recently did we get inquiries from different universities in Japan, finding interest in the conceptual work done in Germany and the developments of subject didactics in Europe. These colleagues are now checking the relevance for their own setting, in relation to their own questions and concerns. At the same time, the GFD will also be able to learn in many different ways from them.

topics addressed[3] or in the form of joint publications, with many more comparative contributions from all over the world.

Before expanding our German study towards international perspectives through commentaries on our specific educational approaches and theories by known experts in the field, we will insert a meta-reflexive chapter at this point on the linguistic and contextual dimensions of our findings. This intermediate chapter at the beginning of Part D will deal with issues of translation and with conditions necessary for an international transfer of scientific knowledge, applied to our case. Accordingly, some of the challenges encountered in this context and some of the solutions found will be addressed, including a reflection on some of the central notions used in this book and their different meanings.

16.1 Preliminary reflections

Scientific work lives by and depends on making research findings transparent and accessible to academic communities world-wide as well as interacting with the interested public, as Schweitzer (2022) and others argue. As a matter of fact, part of the self-definition of a scientific discipline lies exactly in its commitment to sharing newly acquired aspects and pieces of knowledge with the rest of the professional world, to get and give critical feedback and to exchange about it with colleagues in a rational way. On all of these levels adequate and successful translation into English as a foreign language plays a central role, since there is no common world language, except if one considers English as global means of communication already. Due to the very fact that a certain portion of academia speaks English as a first or home language, whereas others are only foreign or second language speakers of English, a certain imbalance is unavoidable.

Throughout the book it has become obvious how much a promotion of the concepts of subject didactics and of General Subject Didactics depends on an appropriate translation of them in a multiple sense, making the ideas, the notions and the text as a whole well comprehensible for the respective readership, bringing them closer as communication partners. Such a translation requires extra efforts, mainly because of central terms which are not easily rendered in another language, because of a specific socio-cultural embedding of important notions and findings and because of difficulties in transferring knowledge between different educational and scientific cultures. In other words, it should not be underestimated how much interpersonal understanding and mutual exchange rely on proper wording or phrasing and on the appropriate

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3 An invitation to an international conference of this type has recently been extended, namely to the one organized by the KOSS network (Knowledge and Quality across School Subjects and Teacher Education; see above). It is going to take place at the University of Trier, Germany, in May 2024, under the title of "Transnational and Interdisciplinary Perspectives on Subject Didactics".

structuring of a message and of information. Some of the problems encountered have already been mentioned or dealt with in the course of the book. And hundreds of translation challenges have of course been met and settled in the course of writing the past chapters. Sometimes this involved reconstructing an idea differently in English than in German, e.g. by avoiding too many nominal expressions or by breaking down complex sentences and splitting them into two smaller ones. At other times this meant paraphrasing some findings with more effort than in the original language, so as to make it better comprehensible in English. Also compound words in German had to be partly segmented into their components, before bringing them together again in a simplified way. Finally, in a number of instances we had to work with images or illustrations rather than with abstract verbalizations or we had to introduce an example to illustrate a point. All of these translation activities have to do with much more than just linguistics: they involve appropriate perceptions and meaningful mental models, searching for the right expressions with the right connotations and touching upon the relevant issues and the key problems in education, which help create a common ground between writer and readership, in spite of different cultural backgrounds. The issues dealt with here have more than one side: on the one hand, they involve the level of meaning-making and of meaning equivalence (exchangeability) between two languages; on the other hand, they involve the level of "translatability" in general, given the context-embeddedness of research and of research results and the inherent limitations of English as a lingua franca language system in academia. For mutual understanding and the management of comprehensibility to succeed, two additional factors are decisive: the degree of intercultural experience and the readiness to deal with new information and thus with the conceptual insecurities that go along with it.

By writing this book in English we have deliberately tried to reach out to a larger audience – an audience which might not only consist of English native speakers, but of speakers of many other languages turning to English as a lingua franca as the dominant language of communication in the world, and especially in academia, engaging in transnational scientific discourse. A good translation is essential to win people over to a certain idea and to comprehend a certain point in a discussion. Yet translation implies much more than providing a correct and smooth version of the same as in the original: it requires above all the construction of meaning which is comprehensible and meaningful for the reader as well. Accordingly, it was our intention to transfer insights and newly gained knowledge, generated in Germany, based on German concepts, and export them into other socio-cultural and educational contexts. This self-set task proved to be demanding: At first, we thought that our empirical contribution, based on accepted data collection and interpretation procedures, could "add" to an already existing body of knowledge and be integrated into this stock of shared insights and a network of firm references, as a given world-wide. But we underestimated the deep cultural embeddedness of both our research questions and of the findings we came up with. For the humanities, at least, we had to realize that the situation is much more open in science-theoretical terms and also in terms

of acknowledging the cultural influences and dependencies of research findings and thus the need to relativize them, at least in part. So the notion of "transfer" with its somewhat technical implications of taking any piece of information and re-implanting it within a new environment, was to be replaced by a more cautious concept like that of sharing, with a possible open dialogue or mutual exchange to follow (cf. Vollmer, 2022).

Questions arose such as: How can we be as precise and comprehensible as possible, how can we make sure to be understood in the "right" way, how can we influence the reading of our readers, given their different backgrounds, their different philosophies and their educational traditions at work? Accordingly, we had to deal with three issues: that of comprehensibility (including connotations and implications of meaning) and that of contextualization and of relevance or meaningfulness.

16.2 Comprehensibilty – Some challenges of translation

Writing academically in English as a non-native speaker is an intellectual and socio-cultural challenge and at the same time an act of creativity. To be as precise as possible according to our own perception and point of view, resolving ambiguities where possible, identifying intended or unintended connotations (as with the terms didactics or "didactic" in English), defining and operationalizing meaning and concepts as a working hypothesis, but in a decisive manner, including making implications transparent: those were some of the challenges on the linguistic level.

The problem of comprehension and comprehensibility actually involves efforts on both sides and in both directions: Scholars of any language background other than English who decide to write in English and present their research contributions internationally, are faced with problems of transposing their own language-, context- and culturally contingent concepts into another, sometimes very different educational world. This is not only true for Germans who have to struggle additionally with idiosyncratic German terminology and a background in German philosophy of education which is sometimes met with reservation elsewhere. But the same is more or less true for the speakers and representatives of all other languages, coming from cultural backgrounds outside the Anglo-Saxon world. An interesting survey, for example, made among didacticians of mathematics world-wide showed, that the majority of them felt that they could not fully express what they wanted to express in English as a lingua franca, they could only say or name it precisely *in their mother-tongue* – and this relates just to the *content* area of mathematics (not to talk about goals, methods or measurement issues). As this example in mathematics didactics shows, some words or concepts do not ever make it from "local" usage into other languages or socio-cultural contexts: there are possibly educational experiences and terms which are thus "absent from the educational literature in English" (Mesiti et

al., 2021, p. 1). [4] How much more will that apply to the human and social sciences, the categories of which are even more culture-bound and sometimes vaguely defined or multi-faceted in their meaning. In spite of all the attempts to convey new knowledge in good and proper English, a residue of untranslatability and of dissatisfaction will always stay, sometimes more, sometimes less. This can be matched, however, with some feeling of satisfaction or even pride in having succeeded to translate certain ideas appropriately.

The other side of the coin has to do with the fact that English itself does not always offer clear and appropriate equivalents of terms which need to be well (enough) defined for international use. Even for some English speaking colleagues it does not always seem easy to express a new concept in their own language if it was not part of their own educational world before. A good example is the notion of *Didaktik* or even the anglicized form "didactics" which exists in the English dictionaries only with a somewhat pejorative connotation (see Chapter 2). This concept derives originally from Greek, where the word *didaskein* (διδάσκειν) means "to teach" (German = lehren). This term, though not German by origin, probably remains foreign to many native English speakers. Yet some concepts originating from outside the Anglophone cultural sphere are assimilated as loan words or in the form of anglicized counterparts in the long run, as is the case for didactics and subject didactics, but also for *Bildung* or one of the many compounds formed with *Bildung* as a noun or with the linguistic element *bildungs-* in adjectives or adverbs. There are many attempts to render the concept of Bildung in English, namely "self-cultivation" or "personal formation" or development of personality. But these renderings are controversial and probably too narrow, given the expansion of this notion towards additional meanings, for example a functional understanding involving the acquisition of subject-based knowledge and of relevant abilities, capabilities or competences through subject-specific teaching and learning (see Chapter 15.2.3 above; cf. also Frederking & Bayrhuber, 2017, concerning a historical analysis of this additional meaning). For some scholars the different English translations or paraphrases may sound strange: the whole concept is complex and difficult to handle and often even considered as *untranslatable.* This might be a reason why informed researchers such as Deng (e.g. 2021) do not use translations, but introduce the term 'Bildung' itself into their writing and to talk freely about "*Bil-*

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4   The example above illustrates the limitations of linguistic transfer. It shows "how the English translations of educational terms originating in non-English languages can misrepresent the meaning of the original terms, and potentially distort the educational practices that the terms are intended to represent. It also illustrates the handicap of doing all our writing and theorising in English (Clark et al., 2006). In particular, the use of English as the international lingua franca of the research community in education denies use of many sophisticated terms developed in languages other than English. This means that however productive a collaborative analysis might be, the international search for effective classroom practice is hampered by the universal use of English as the classificatory, analytical, and communicative medium of international research." (Mesiti et. al., 2021, p. 2); for more details cf. Vollmer, 2022.

dung-centred Didaktik" in referring to the work W. Klafki (1995, 1998, 2000). In some other cases, these concepts are also actively used in describing what happens outside the Anglophone world, but they are not easily appropriated nor incorporated into one's own conceptual framework.[5] Comparable examples are the terms and notions used in the Anglo-Saxon world such as "curriculum" and "curriculum theory" (Pinar, 2019) or "pedagogy" (Biesta, 2011) and above all "Pedagogical Content knowledge" (PCK, originally developed by Shulman, 1986, 1987). All of these involve complex concepts and are not easy to follow without further in-depth study, but they are not the focus of this chapter and cannot be dealt with here.[6] Still other examples of English notions posing some challenges in understanding by outsiders are terms such as "knowledge", "epistemic quality" and above all "education" itself. The ambivalence in this latter case lies in the two meanings of the notion or rather in the two ways of using the term: it normally designates the *practice* of teaching and learning, in school and beyond, in whatever context. For some scholars, however, "education", especially in combination with a subject-specific adjective, also comprises the research in that very field (e.g. mathematics education) – where others would tend to add the word "research" explicitly so to avoid misunderstanding: they would rather explicitly speak of "mathematics education research". This equals exactly what we would prefer to call "mathematics didactics" – which includes research as much as philosophical, social or political reasoning and also reflections on teaching methodology, for example (see Vollmer, 2021a).[7]

Throughout the book we as authors took the liberty to use certain terms in their original authentic form (e.g. *Bildung*, for details see below), taken directly from German as the language of origin where the concept was first defined and developed, already in the 19th century or even earlier (cf. Frederking & Bayrhuber, 2017). This practice of using the untranslated word is quite common in the relevant literature by now. In other cases such *Didaktik* or *Fachdidaktik* or *Allgemeine Fachdidaktik*,

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5   A case in point here would be the contribution of H. Alexander from Israel (in this volume) who is using the term 'subject didactics' in his paper as a more or less foreign term, without an anchor in the local philosophy of education and without opening fully to the European discussions around the concept. The reason being that he is influenced or governed by the American way of thinking and their manner of handling education on the basis of curriculum theory (cf. Biesta, 2011, also 2015).

6   According to Kasanen (1999, p. 25) *Didaktik* and curriculum (theory) can be considered as "parallel areas of the same subdiscipline", since they address a very similar set of issues (teaching and learning goals, content selection and organization, teaching methods, teaching and learning media, etc.; cf. also Westbury, 2000). However, as we already know, Didaktik "is largely lacking in Anglo-American countries" (Deng, 2021, p. 193). The big, unanswered question is: Why is this so?
    See also the critical re-assessment of curriculum theory in the US by Deng, 2021; cf. the critical remarks by H. Alexander, in this volume.

7   Another voice in this context, this time from South Africa, suggests a "pedagogic compact", retrieving 'powerful' educational knowledge from the traditions of both *Didaktik* and of Curriculum Studies (Muller & Hoadley, 2021).

these have been anglicized at least in the European discourse by informal agreement, leading to expressions such as didactics, subject didactics and to General Subject Didactics as a new approach and concept existing for about 10 years.[8] These translations are widely accepted by now outside the Anglophone realm, and hopefully at least understood by an increasing number of English-language speakers.

In still other cases we had to invest more effort in order to find sensible and convincing equivalents in the English language for notions which are also central for our theory-building. A good example of this is the notion of *Fach*, which has two different albeit conceptually related meanings in German. The first one is that of *subject-matter* in teaching or *content area* in school, a unit of administrative management or of the overall "curriculum", so to speak, which has come into existence through historical and social processes and that can change over time. The second meaning and possibly the one historically existing beforehand, is that of a *scientific or academic field of study and research* in higher education, that is within academia, where a "Fach" or a research area reflects a certain segment of the natural or social reality under scientific scrutiny.[9] The relationship between the two concepts (school-based vs. science-based), although related, represents a central problem in defining what subject didactics is and in how far a scientific field of study is the major or even the only source for deriving teaching content in school or whether it is one out of several sources. This is exactly what has to be investigated empirically more closely in each individual case, for each concrete subject area in school, for each educational context and in each political, social and administrative setting. Within our comparative analysis of observing the different theories circulating within each of the subject-didactic disciplines in Germany, we ended up with an overview of possibilities given (between *Fach* as in school subject and *Fach* as an academic or scientific discipline) and of forms actually defining and realizing this relationship on the meta-level: as a matter of fact, this proved to be an important theoretical element of General Subject Didactics (cf. Chapter 15.1). Another such element was the reflection about the role subject-didactic research plays for shaping the goals and practices of actual classroom teaching (see above).

In translating the German notion of *Fachdidaktik* we resorted to a compound which is actually a neologism in the English language: "Subject-Matter Didactics".[10] As indicated before, this term carries ambiguity, however, since "Fach" can designate

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8   In the case of General Subject Didactics this concept was also named "generalized" subject didactics at the beginning (cf. Vollmer, 2013, 2014) – as opposed to "comparative didactics", anchored in the more recent Francophone tradition and a Scandinavian one respectively.

9   The same extended meaning relating to all levels and types of institutionalized education is also inherent in the equivalent Danish term "fag" (see Krogh, this volume).

10   The short form 'Subject didactics' (instead of Subject-Matter Didactics), though very useful for quick reference, could also offer a certain ambivalence, since 'subject' could equally relate to a person, to an individual which is not meant in this case. Yet *subject didactics* has made its way as a pragmatic term, agreed upon by many, at least in Europe.

the subject-matter of a scientific discipline as much as the content of a school subject. It was argued above that in the term *Fach*didaktik both meanings and relations are actualized and drawn upon, that of *Fach* as a scientific category and that of *Fach* as a unit of institutional organization of school education.[11] But interestingly enough, the majority of German native-speakers would probably interpret the term along the second meaning, although semantically speaking the first one is just as appropriate and applicable. That is why in the French setting, but also in the Scandinavian countries the particle *Fach* is deliberately rendered as "*disciplinary* didactics" or "didactiques disciplinaires" respectively, leaving it open whether the reference to the scientific disciplines or to the subject-matter 'disciplines' in school are stronger or whether both are meant in equal share. The same is actually true for an open, unprejudiced interpretation of the notion *Fachdidaktik* in German, but as said in practice and conventional language use the connection with school subjects seems to be more dominantly associated. Traditionally speaking, the term *Fachdidaktik* draws upon and mediates between the scientific content disciplines on the one hand and the educational sciences on the other hand (cf. Abraham & Rothgangel, 2017, translated as Abraham & Rothgangel, this volume). Yet *Fachdidaktik* has become an academic discipline itself: it designates the science of teaching and learning within a specialized subject-matter area as defined either by the curriculum, by the school administration or by the academic system of sciences themselves.[12]

The presence of didactics, of subject-matter didactics and of General Subject Didactics as linguistic terms and as concepts in large parts of Europe, spreading in number and regions, and the increasing reflection about the need for a specialization in teaching and learning, depending on subject-matter, are clear indications of the fact that these concepts have reached wide acceptance in educational philosophy, at least outside the Anglophone world. Within that latter socio-cultural space, there still seem to be many reservations to be overcome against these terms and their conceptualizations of teaching and learning, structuring content in-depth within school subjects or in different sections of the curriculum.

At the end of this section, the question arises whether Anglo-Saxon colleagues could accept the anglicized versions of 'didactics', of 'subject-matter didactics' and of General Subject Didactics as quasi-English cover terms and as useful categories. This seems to be happening at the moment, at least to some extent, given the increased use of those terms in international educational literature. Proposals to merge the two traditions of *Didaktik* and Curriculum Theory are not new, but the chances of bring-

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11 Cf. also the compounds formed with the element "Fach", such as "Fachinhalt" (subject-specific content), "Fachspezifik" (subject specificity), "fachbasiert" (subject-based), "Fächer verbindend" (across subjects), "fachübergreifend" (interdisciplinary) etc.).

12 Didactics (mit "s") ist ein Substantiv (plurale tantum: grammatischer, nicht semantischer Plural); didactic (ohne "s") ist Adjektiv; daneben gibt es didactical, ebenfalls Adj., was aber auch (moralisch) "belehrend" bedeutet.

ing these approaches closer together, by experiment or systematically in the long run, might be slowly improving (cf. Muller & Hoadley, 2021; also Hordern, Muller & Deng, 2021). Certainly this idea of a 'pedagogic compact' is worth considering in more depth. In that context one would also have to update one's knowledge on Klafki (1996, 2000) and his followers today as well as on other concepts or models of didactics.

The attempts to paraphrase what the specific approaches and lines of thought on subject didactics in Europe are, have been publicised within the last years in journals such as the "Journal of Curriculum Studies", the journal "Research on Subject-Matter Teaching and Learning" (RISTAL), but also through the French journal "Éducation et Didactique" as well as the "London Review of Education" which recently dedicated a thematic issue on 'Specialized Subject Education' and the training of teachers for specialized education in school (London Review of Education, 2018; see also Hudson 2018, Hudson, this volume). With this book at hand we offer empirical evidence in connection with theoretical perspectives and thus make subject didactics even more comprehensible and visible.

16.3   International transfer of scientific knowledge

The central issue in transferring subject-didactic knowledge beyond German speaking countries and in introducing it into the international discourse is certainly that of making the international communities familiar with what we understand by the terms "didactics", "subject didactics", General Subject Didactics and by *"Bildung"*. This goes beyond the issue of translation. Starting with the first two notions which do not exist in English (except with a negative connotation), we want to point to the history and emergence of those notions from early on and particularly since the Middle Ages, when they appear either in an explicit form (as with the work "Didactica Magna" by Comenius), or by way of a more tacit implication, already documented before Comenius as well as in his own work: The subject-specific basis of didactics and of an additional understanding of Bildung as "functional" can be traced back for centuries in the development of German educational thinking (cf. Frederking & Bayrhuber, 2017). The usage ever since has been diverse and often less pronounced.

In the case of Bildung, for long an unknown term in the English language, the history and development of that German-based notion to this very day is very complex or even fragmented (cf. the distinction between personal, functional and generic usage of that term as introduced in Chapter 15 and the urgent need to do more systematic research on this topic; cf. Volllmer, proposed). Overall, the context in which General Subject Didactics as a theory of subject didactics emerged, is a complicated issue for an international transfer of knowledge.

In the next two sections we will focus on two issues which are related to the reception of our approach beyond Germany: first, we will discuss contextuality as a conditioning factor and the potentials as well as the limits of generalizability of our

study and its results. By implication these steps will bring us to the second point of discussion, to the related problems of relevance and of meaningfulness of our study for others.

As to *contextuality and generalizability*, the reflection on different educational traditions, institutionalisations and the political framework situation in other educational cultures is part of our responsibility as international authors. In doing so, one is liable to perceive even more clearly the (restrictions and) "peculiarities" in one's own educational setting and professional thinking. Vice-versa it is even more difficult and would require an enormous effort to understand the context in which alternative educational philosophies operate. Without doubt there would be a need to contextualise one's own situation in which concepts emerged, in which empirical data were generated and in which theories were developed. But beyond what was offered in the chapters so far, we cannot go into this complex issue of providing more background information or socio-cultural explanations which might have an effect on the generalisability of our findings. There is simply not enough space here for this. Some of these German specialties in the institutional set-up of subject didactics and their theoretical orientation will become more transparent through the writing of the international educational experts who will be commenting on central results of our study and thus, by implication, on some of the differences between the German setting and their own. Nevertheless, the overall context-dependency of subject-didactic research results does not seem to be too strong or distorting so as to prevent other scholars to relate to them positively, yet critically, especially in Europe. One particular piece of context information has to be mentioned, however, in order to explain the good quality and also the unfolding quantity of subject-didactic research in Germany: in the 1990s and at the beginning of the new century there was a strong movement among several subject-didactic disciplines to become acknowledged and appropriately supported by the German funding agencies, above all by the most prestigious one, the "Deutsche Forschungsgemeinschaft" (DFG, German Research Foundation). The DFG as the central, self-governing research funding organization promotes high quality research at universities and other publicly financed research institutions in Germany. At the time, groups of subject didacticians got together in order to discuss openly and formulate their research proposals jointly through a process of mutual support and improvement. This happended nation-wide in some subject-didactic domains (e.g. in the Didactics of natural sciences or the Didactics of Foreign languages) and was accepted on the part of the DFG it was accepted for reasons of promoting these underdeveloped fields of research. In the end, several neighboring proposals could be clustered and handed in as some sort of group application, considered in relation to one another, before each of these proposals would then be evaluated individually on top.

At this point, the criteria for defining good subject-didactic research had to be reconsidered and stated explicitly (with the help of the already founded *Gesellschaft für Fachdidaktik*, GFD), next to the ones already established for long for the educational

sciences and all other scientific disciplines. Parallel, the demand for professorial posts as well as for the massive support of young emergent researchers rose considerably. Both would be trained and become qualified through the very fact of doing substantial empirical research and had the opportunity to bring their experiences and competences into new projects. So subject didactics became attractive, esteemed and well founded as a field for academic career, but also as a base for professionalization in teacher education.

As to the second issue mentioned earlier, that of *relevance and meaningfulness of insights* gained in one educational setting and shared with colleagues from another setting, this plays also an important role for the international transfer of scientific knowledge. Given the enormous differences between educational systems and between educational philosophies (in the world), we can hardly assume that the research results generated in one part of the globe will be of equal value in another part – even if the data produced are based on methodologies and research procedures established and accepted globally. Insofar, it might be a false expectation that every new finding, independent of where it was obtained, is of interest to others. Results of this type cannot necessarily be generalised on a global scale nor be incorporated into a body of already existing knowledge nor be applied in whatever circumstances (cf. Schweitzer & Schreiner, 2021). In which way other scholars can profit from our research and how relevant our findings might be for them, will only show in the future, through international exchange (cf. also Vollmer, 2022).

16.4 Outlook

The intention of this intermediate chapter was to raise awareness of the problems involved in translating subject-didactic research from German into English as a foreign language, as a matter of fact into English as a *lingua franca*. Aside from addressing some challenges, we also wanted to demonstrate that mastering these challenges of translation and of publishing internationally is a worthwhile endeavour.

Although we have to acknowledge the limits of generalizability and meaningfulness of findings in our field of study and expertise, we nevertheless perceive the fruitfulness of intercultural and international exchange to which we will turn now. In the hope of critical commentaries and evaluations, we have asked four international educational experts to respond to our results from their own background and perspective. For their convenience and for a quick reference we have condensed our findings once more and summarized them in a concise form, namely as résumés of the six clusters of research questions corresponding to the six (longer) Chapters 9–14. These résumés will be found in the next chapter (Chapter 17), together with some orienting questions to be followed by the experts in case of need. In this way we have tried to provide a good basis for a productive international exchange about subject didactics and General Subject Didactics. Accordingly, we hope that this discourse

will be picked up by others or continued, depending on one's own interest and involvement.

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17. Opening the International Exchange About General Subject Didactics

Résumés of Findings From Germany

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On the basis of our empirical study and the findings presented in the comparative analysis of the 17 subject didactics (cf. Chapter 8–15 in Part C), we have asked a number of international experts in school education and in subject didactics to comment on our overall approach as much as on some of the major results of the study and relate them to their own setting or socio-cultural context.

In the invitation letter, we pointed to the massive volume of existing publications, mainly in German, but also to some extent in English or French, from the last ten years 2013–2023. By making our empirical study of 17 individual subject didactics and the results of our comparative analysis available in English, we arrived at a rich data base about the state of art and the research perspectives of Subject Didactics in Germany. For reasons explained above, we have summarized these findings in a condensed form by way of résumés which we hereby present (cf. 17.1). We have numbered the most prominent results through in alphabetical order (e.g., from 1a. to 1e. etc.) within each of the six sections. This might help to quickly orient oneself and reduce the burden of processing the text with less time and effort. We also listed a few sample questions in relation to the six parts (see 17.2), which are meant as an additional orientations and guidelines for responding systematically to our findings from different national and regional backgrounds.

17.1 Short résumés of empirical findings about subject didactics in Germany

Earlier we have already described our procedures and the results of our comparative analysis as differentiated as possible, focusing on individual text passages in the reports as samples, indications or documents, in some cases as evidence for certain views, developments or generalizable tendencies. In the following we will summarize the major results in the form of short résumés.

**Résumé of section 1: Historical developments in the school subjects –
Résumé in view of General Subject Didactics**

Basically, this problem area is about the question of how the subject didactics observe the historical development and anchoring of their reference subject (or subjects) as a teaching subject. General Subject Didactics, for its part, takes note of these representations of the subject didactics and evaluates them comparatively. The following aspects emerged:

a) The subject didactics' representations of the history of their teaching subjects reveal *influential personalities* from the 5th century BC to the 20th century AD. In addition, they focus on *formative historical periods* (Enlightenment, Turn of the century around 1900, Nazi period, period of two Germanies and the "Wende" (re-unification), the 1970s as a period of reform) on the one hand that are significant for several subjects. On the other hand, they bring certain historical events into focus that play an outstanding role for the establishment of certain school subjects only (cf. e.g. Paris World's Fair of 1869 for art instruction).

b) If one looks at the subject-didactic observations on the *prehistory of teaching subjects*, these reveal above all two aspects: First, a serious change is perceived in various teaching subjects, which goes beyond the change of central ideas or the renaming of a teaching subject. For example, the didactics of German or mathematics can each refer to several predecessor subjects among the *septem artes liberales*, or the didactics of chemistry can cite not only alchemy, which no longer exists academically, but also medicine as its former subject-matter sciences. Secondly, competitive relationships or super- and subordinations in teaching subjects become apparent again and again. This happens, for example, when from the point of view of the didactics of technology reference is made to the 'artes mechanicae', which were also called 'artes illiberales'. Likewise, from the perspective of the didactics of physics, the troublesome confrontation with the ancient and later neo-humanist educational ideal, which favored the classical languages Greek and Latin, is emphasized. It should be noted in passing that the 'decline' of the classical languages Greek and Latin, which dominated for centuries, on the one hand, and conversely the 'rise' of scientific subjects and modern foreign languages on the other hand, exemplifies how changeable the status of a teaching subject is over time.

c) From the comparative perspective of General Subject Didactics, it can be observed with regard to the *establishment* of teaching subjects that some subject didactics state relatively concretely a specific founding date for their teaching subject in today's sense. Conversely there are subject didactic reports (e.g. biology, history, and mathematics didactics) in which the development of the respective teaching subject is presented without a specific time frame being clearly recognizable; however, in these cases a distinction can be made between

a "prehistory" and the actual establishment of the teaching subject. Ultimately, it depends on very specific criteria defined and named (e.g., in the didactics of the German language as a "mother" tongue: the introduction as a school subject at general education schools is highlighted). Sometimes it is difficult to decide whether merely a new stage in the development of the subject is observed or whether a distinction is made between a 'prehistory' (forerunner) and the 'actual history' of the subject.

d)   Again from the perspective of General Subject Didactics, certain *problems in the establishment of teaching subjects* can be listed and typified relatively clearly, based on descriptions by the respective subject didactics:

– Competitive situations between different subject groups (e.g., classical languages vs. natural science subjects), which can revolve around the allocation of hourly quotas, for example;
– Competitive situations also within a subject group (e.g. Classical Languages vs. Living Languages);
– Subject conflicts in so-called integration or combination subjects; lack of quality and economic limits of the school system (e.g., no sufficient teaching staff);
– Negative impact of certain guiding ideas (e.g., New Humanism, favoring classical languages), which more or less clearly contradicted other guiding principles (such as equal opportunities and self-responsibility for all).

e)   Finally, subject didactics observe the development of established school subjects in such a way that they focus their attention, first, on *causal conditioning factors* and, second, on the *development of guiding ideas or principles* of the subjects. With regard to the conditioning factors, the following points are particularly emphasized:

– the importance of the type of school,
– the importance of didactic as well as pedagogical-psychological impulses,
– the importance of scientific impulses,
– the importance of international impulses.

Concerning the development of the main guiding ideas of teaching subjects, again concrete changes as well as continuities are presented. In addition, a subject can come under tension between diverging and competing central ideas, historically as well as up to the present day.

   In some texts, moreover, fluid transitions between the presentation of the history of the teaching subject and the history of the respective subject didactics become discernible. As much as the distinction between both categories is helpful for analytical purposes, it becomes clear at the same time that both levels are often closely connected (see, among others, sports didactics). At the same time, interesting observations can be made regarding the relationship between these two levels. Especially from the perspective of physics didactics, the difference between the 'subject-matter

level' of the school subject as well as the current state of the corresponding subject-specific science is emphasized critically: On the lower secondary level, predominantly knowledge of physics from the 17th-19th century only is treated, then in the upper secondary classes hardly any knowledge or insights beyond the first half of the 20th century is offered. Thus, recent developments in physics (according to this judgment) have practically no effect on physics education. Conversely, this seems not to be the case at all from an Informatics Didactics perspective: here, ultimately the rapid developments in the still young field of informatics directly result in content changes or constant extensions of informatics teaching (cf. informatics didactics).

Two further points are remarkable, which refer to the relation between the historical development of the subject in contrast to that of subject didactics. They both become clear in a statement from geography didactics: First, the establishment of the subject 'geography' in schools formed an essential precondition for the academic discipline 'geography' to be established parallel at universities, because teachers had to be trained for the already existing school subject. Secondly, however, the assignment of the teaching subject 'geography' to the social sciences (as is often done in school curricula) does not correspond to the self-conception of a university geography (neither the academic science nor the related subject didactics), which see themselves as a bridging discipline between the social *and* the natural sciences.

Résumé of section 2: Development and establishment of the different subject didactics – Résumé in view of General Subject Didactics

In this section, it was reflected from the point of view of General Subject Didactics (third observer level, see above) how the respective subject didactics (= second observer level) *describe* their own origins and their development as a systematic, "scientific" undertaking. We can summarize the results by stating that the following points emerged in this process:

a) The different subject didactics focus their attention on a number of different *aspects in the portrayal of their development and establishment*:

– formative periods of their discipline: roughly ranging from Enlightenment to the 1990s,
– degree of successful establishment within academia (from low to high),
– quality and process of establishment: taking place in stages or happening all in one,
– given characteristics of this establishment: depending on self-defined criteria such as first systematic subject-didactic publication(s), first establishment of a subject-didactic professorship etc.

All of these points can stimulate future research into the development of subject didactics in a number of different ways. But simply understanding the definition, indicators or characteristics of such an "establishment" is already a seemingly small,

yet important step in the subject-didactic self-confirmation allowing comparative research for a comparative outlook.

b) On the basis of the different subject-didactic reports, essentially *three influential factors* have been identified, which have a positive effect *on the development and establishment* of subject didactics:

– *specific historical conditions and circumstances* (Enlightenment, turn of the century around 1900, existence of two different political systems within Germany until 1989 (German Democratic Republic versus Federal Republic of Germany), Sputnik shock at the end of the 1950s, reform period of the 1970s in Germany),
– *certain institutional framework conditions* (anchoring of subject didactics at universities, founding of subject teacher associations and subject-didactic academic societies, founding of national research institutes such as the Institute for the Pedagogy of Natural Sciences (IPN) in Kiel or the Institute for the Didactics of Mathematics (IDM) in Bielefeld),
– *influence of important personalities* over the centuries, among whom Johann Amos Comenius (1592–1670) stands out as the most influential pedagogical figure, considered by many as the 'founding father' of subject didactics.

Again, all of these factors could be studied further, in more detail and breadth, but the data offered was limited. Just to give one example in this perspective: a closer look into the relationship between *general didactics* of J. A. Comenius as opposed to his *subject-didactic* considerations would be worth further investigation. Studying this issue would be just one particular aspect of the many possibilities for future research in this historical area.

In terms of content and concept as developmental dimensions, the contributions of the different subject didactics reveal *five typical characteristics* in the development and approaches for establishing subject didactics in general. We find:

– competing didactic approaches between the different didactic disciplines,
– changes and development of subject-didactic approaches over time,
– influences from the educational sciences (e.g., curriculum theory) on the conceptual level,
– influences from within the academic subject area itself (e.g., cultural-scientific as well as praxeological understanding and orientation of music).

c) Finally, the *scientific quality of subject didactics* is also already reflected in this historical section. The following points can be identified through the subject reports under this heading:

– "*Scientificity*" or the claim to be an academic discipline: For some, this poses a certain problem, at least at earlier stages, because of subject didactics being "essentially experience-oriented and less theory-driven");

– *Relationship between theory and practice*: This relationship is unsettled to a certain extent to this very day (e.g., "discrepancy between theory and practice", "theory formation and practice reflection as cornerstones of subject-didactic research");

– *Shift of focus in subject-didactic activities and output*: From modelling and experimentation with teaching material including recommendations for teaching until the 1990s to a clearly empirical research orientation after 1990);

– *Increasing relevance of academic subject-matter sciences* [German: "Fachwissenschaft"] as reference disciplines for subject didactics (e.g., biotechnology as a new subject area in Biology Didactics);

– *Continuous significance of the educational sciences* as subject-didactic reference disciplines (e.g., reception of pedagogical approaches in Religious Didactics, of (socio-)psychological ones in Physics Didactics and in English as a Foreign Language Didactics). Generally speaking, this also comprises the role of General Didactics as part of the educational sciences – it seems to vary in significance over time and to contribute sometimes less, sometimes more to subject-didactic thinking and modelling (depending on mutual perception and recognition).

In sum, we can see that basic science-theoretical issues also result from the observation of the historical dimensions, conditions and processes in the establishment and development of subject didactics. This needs to be considered and elaborated further in the perspective of a General Subject Didactics.

Résumé of section 3: Goals, content, competences – Résumé in view of General Subject Didactics

In section 3 we analyze and reflect how subject didactics view their goals and their subject-specific content, in connection with more or less 'measurable' outcomes of teaching and learning as 'competences' or as 'capabilities' in the respective school subjects. In doing so, some commonalities and differences between the subjects and subject didactics become pretty obvious. The same is true for the needs and potentials of future research in terms of basic theory-building. Given the complexity of these findings, the résumé of this part will be somewhat longer.

Goals

a) Overall, there is a complex discourse going on regarding the definition of subject-specific goals, on many different levels. Some subject-didactic disciplines such as geography or economy didactics use the term *Bildung* in a comprehensive and undifferentiated way: accordingly they speak of "geographical or economical Bildung" as their superordinate goal structure, under which all different sub-goals can be subsumed. This documents the closeness, if not equality in the use of Bildung and education in the two different languages.

In the light of the preceding analysis, a fundamental challenge for subject didactics consists in what is explicitly stated in physics didactics, especially with regard to the relationship between *'scientific literacy'* versus *'basic scientific education'*: "The Anglo-Saxon concept of scientific literacy and the term scientific education in the German understanding represent different views on the goals of physics education" (Physics Didactics, p. 296). This insight can be extended from the perspective of General Subject Didactics: It is very important that the different meanings, potentials and limitations of the key terms used such as 'scientific literacy, scientific competence, basic scientific education or responsible scientific action' have to be well reflected upon when using them in different socio-cultural contexts and different languages. Explicit definitions are particularly needed when explaining the goals of a specific subject-matter teaching and learning inter-culturally. This point of translating and establishing appropriate meaning equivalences is also quite a challenge for General Subject Didactics.

b) The basic tension between functional definitions and person-centered views of education and particularly of subject-specific education as *Bildung* (as expressed in many of the subject reports), deserves more in-depth consideration, which has already proven to be crucially important in our earlier work (cf. Frederking & Bayrhuber 2017, 2019; Vollmer, 2021a, for example). In the context of the currently prevailing paradigm of *competence orientation*, some subject didactics critically claim that the concept of (school) education as a multi-level *Bildung* is much wider in meaning than that of competence acquisition. It seems to possess more potentials and perspectives than either one approach alone (the functional view of training 'abilities or skills' in learners versus the traditional view of developing self-cultivation and self-responsible personalities). Accordingly, a new and wider understanding of *Bildung* is developing: on the one hand it can express different views of subject-based 'literacies' in each subject area and on the other hand integrate the classical concept of personal *Bildung* as personality development (again in close connection with *subject-specific* teaching and learning) in equal measure. This insight requires a distinction (or transition) between something like a 'functional' versus 'personal' development, but not on a general educational level, but precisely within subject-specific education. And both aspects or dimensions can relate to one another at the same time, they could develop parallel to each other (in terms of transition) or even 'through' each other (in terms of mutual support and strengthening; cf. the earlier concept of "learning within, beyond and through a school subject", Vollmer, 2014). In this sense, subject-based *Bildung* proves to be more fundamental and comprehensive than the concept of competence (independent of whether defined as more or less measureable knowledge or skill or as subject-specific ability). In contrast, the concept of competence seems to offer a specific framing and hierarchical perspectives when it comes to the differentiation of goals or objectives, since sub-areas or individual aspects can be referred to and focused upon (e.g. with semantic composites such as perceptual competence, in-

terpretive competence, participatory competence, judgment(al) competence, action competence etc.). In taking a closer look, operators such as 'perceive', 'evaluate' or 'explain' etc. are used, which are familiar from the discussion of curricula. However, it is by no means the intention to "construct a stark contrast" between education, literacy and competence at this point (as Physics Didactics, p. 296 states). Rather, the different potentials of all indications and terms for describing or defining subject-specific goals are to be emphasized and considered next to one another. And this includes transfer abilities and other generic goals (although none of the reports speaks about 'epistemic quality' explicitly). On the other hand, some reports like that of politics or geography didactics hint at the need to include an interdisciplinary perspective in the mindset of the learner, the need to cooperate among individual learners or citizens to tackle and solve existing problems (in the 21st century) – all of which can be considered as part and parcel of a comprehensive understanding of subject-specific *Bildung* as education. The comparative reconstructions of this subject-didactic discourse on these matters has to account for all the guiding concepts and aspects that subject communities bring into play and rely on, for how they establish the subject-related references and differentiate systematically between these notions and points.

c) Beyond the use of key terms, the systematicity applied in defining subject-specific teaching or learning goals is of equal interest: how are those goals actually differentiated and justified? In the context of General Subject Didactics, the basic question is whether and in which respect different forms of reasoning and systematics can be traced back to domain-specific approaches – as could be seen in examples from 'basic science education' (German: *Naturwissenschaftliche Grundbildung*) as opposed to economic education. However, it was also noticed in some reports that alternative approaches within one and the same subject didactics can lead to the formulation of different objectives (as in the case of Technics Didactics or English Didactics). Generally speaking, this means that the reconstruction of different forms of systematization vis-à-vis subject-specific goals and sub-goals is an important research topic and desideratum for the future, in view of General Subject Didactics. In this perspective, more caution is necessary against hasty conclusions, because even within individual subject didactics different reasons are put forward for different goal definitions and different positions possible, both historically (cf. Chemistry Didactics) or systematically motivated (cf. Music Didactics).

Content

d) As to content definition, the present analysis confirmed that there are *four sources of definitions and identification of subject content for teaching,* apart from minor modifications and concretizations. This is in accordance with results already found earlier (cf. Volume 1 "Towards a General Subject Didactics" of our publication series

'General Subject Didactics'; cf. also Rothgangel 2017, p. 104 f). In the current analysis, these sources are labelled as follows:

– Academic, Scientific Disciplines,
– Social Praxis within a certain subject area,
– Subject-related Life-world and cultural contexts,
– Subject-related Anthropological aspects.

Individual subjects or even different approaches within individual subject didactics can give very different importance to these four sources in detail; also the subject-specific reference is of varied relevance. Another remarkable result is that the analysis of subject-didactic competence models shows that their domain specificity and their construction logic are also conditioned by the same four factors. In other words, we find not only differences in formal structuring principles (e.g., competency structure assumptions and competency development modelling), but also strong content-related considerations. In particular, domain- or subject-specific conditional factors (related to the academic disciplines or 'subject-matter sciences' and their knowledge systems, to the practices within the subject area, to subject-related social, lifeworld and cultural contexts as well as to subject-related anthropological aspects) reappear on the level of construction or rather construction logics of subject-specific competence models and their differentiation.

As to competence models in themselves, however, there is one serious research desideratum: After more than 15–20 years of competence-oriented reform, there is still a lack of interdisciplinary discourse addressing the construction logic of competency models in an evidence-based and fundamental theoretical manner. It is sobering to note that even one-dimensional models such as that of integrated Science Didactics have not yet been empirically tested as an overarching model (cf. Chemistry Didactics). So one specific potential of competence orientation – namely the interlocking of theoretical basic research and its empirical testing – has only been used and achieved in a very limited way, and in limited areas.

Overall, these four sources of definitions of subject content also entered the subject-specific competence modelling – concerning their selection and structuring. This implies far-reaching consequences for didactic theories in general as well as for General Subject Didactics, which will have to be addressed elsewhere.

e) Final point: The present analysis of the 17 subject reports leads to a much more nuanced conclusion with regard to the selection and structuring of subject content – in comparison to an earlier evaluation, founded on a more limited data-base: There, the focus was on the insight that selection and structuring of content can take place via academic subject-matter science (example Biology), via social practices, either alone or as the dominant approach (example Music), or via a combination of both (the respective scientific discipline *and* respective practices; see the example of German as a mother-tongue; cf. also Rothgangel, 2017, p. 140). With the inclusion of

subject didactics beyond the five ones originally and the addition of further data, it was confirmed that each of the four sources mentioned above can in fact condition the selection and structuring of subject content.

Different methods of mediation between the sources could also be observed, e.g, how two sources such as 'subject science' and 'subject-related social, life-world and cultural contexts' can relate to each other: starting point either (with) the subject-matter scientific disciplines or starting point (with) subject-related contexts. This specific type can be called *equal-ranking mediation*, e.g., in Physics Didactics or in the 'Didactics of an Integrated Nature & Science Teaching in Primary School' (in German called *Didaktik des Sachunterrichts*). However, the different subject reports do not show a mediation model for all four sources mentioned alike. Apart from references to general didactics, other interesting approaches to the issue of selecting content can be found within some subject didactics (cf. Mathematics and Informatics Didactics); these could also be relevant for other subject didactics; however, without any empirical evidence so far.

Generally speaking, the *definition of subject content based on different sources and the process of selecting and structuring subject content within subject-specific models of competence is a core issue for subject didactics*, which in turn could lead to a revitalization and further exchange with general didactics. The present findings clearly indicate that the relationship between content and competence as well as the subject-specific aspects mentioned for the selection of subject content have not been sufficiently clarified in the literature nor taken into account in previous models and studies, also and particularly not by those of general Didactics.

The tensions between the notions of knowledge and competence are not really addressed, certainly not (yet) in a systematic way. Also, the concepts of 'powerful educational knowledge' (as unfolded by Young (2013, 2015) and by Muller & Young (2019) in the last decade) or that of 'epistemic quality' of teaching and learning within an individual school subject as well as across school subjects (as expounded strongly by Hudson (2018) and more recently in Hudson et al., 2022a, 2022b) are not yet present nor visible in the subject-didactic thinking of the subject-didactic disciplines of Germany at the time. After all, the data was collected in the year 2018 and partly in 2019. The survey will have to be updated urgently, possibly with a wider scope and with additional research questions and certainly with a particular focus on the 'mysterious', by now almost fuzzy notion of *Bildung* and its clarification through the different subject-didactic approaches in question.

Résumé of section 4: Subject didactic research – Résumé in view of General Subject Didactics

This section examines how the respective subject didactics reflects on its own research practice and on their basic research patterns and perspectives. How can this be put together into a comparative analysis and be evaluated with respect to General

Subject Didactics? One of the central issues was focusing on the question of "formats" or "designs" of subject-didactic research, including competence research. The following points, all of which are most relevant for the construction of a general theory of subject-matter didactics, emerged in this context:

a) The analysis shows in detail that subject-didactic research is often referred to in connection with the qualifier 'increasingly': The progression referred to within didactic research consists particularly in an *increase of empirical approaches and expertise*. This takes the formerly dominant experience-based material development and the purely theoretical concept construction of earlier decades a decisive step further: at least some observational data are now needed as 'evidence' in argumentation. Nevertheless, it is not that theoretical and pragmatic approaches are being completely replaced by empirical research, rather a new balance between these three cornerstones of subject-didactic research is developing. To a certain extent, the present summary can also be seen as an indication that theoretical and empirical approaches can fruitfully complement each other: There are good reasons to determine General Subject Didactics primarily as a meta-theory in which a reflection of the theoretical observations of subject-didactics takes place (cf. Rothgangel et al., 2021). However, such a comparative meta-theoretical analysis can be done with the help of empirical data gathering and data processing itself, namely on the basis of principles of the Grounded Theory, as the present work shows (cf. Strauss & Corbin, 1990).

b) As in the preceding sections, the *importance of conditional factors* also emerges in this context. With regard to current subject-didactic research, three variables have been identified on the basis of the subject reports, namely the strong influence of third-party funding, the influence of subject-didactic associations and their academic activities and finally the internationalization of subject-didactic research. This point is also relevant for the understanding of General Subject Didactics and its self-definition within a theory of science: Specific conceptions such as those of Karl R. Popper (1959; 2002), which are primarily or even exclusively based on methodological research programs, do not do sufficient justice to subject didactics as sciences. Rather subject-didactics are also determined by so-called *contingent* conditional factors, as is teaching the subjects themselves. Third-party funding of certain research projects or of whole areas such as competence-oriented research are good examples of this. For this reason, scientific theoretical approaches that are able to take into account the justified aspects of the so-called contextual turn in the philosophy of science (e.g., Kuhn, 1970), deserve preference.

c) It is remarkable that General Subject Didactics largely confirms what was already found earlier, in tendency at least (cf. Volume 1 of our publication series). This concerns the *result of competence research:* On the one hand, there are subject didactics in which lively and elaborate empirical research activities

prevail and in which the critical discourse about competence orientation as such is much less pronounced – by contrast, there are subject-didactics on the other hand, in which controversial theoretical disputes about the meaningfulness and implications of competence orientation dominate as educational topics, in comparison to the quantity and quality of their research output.

d) The comparative analysis concerning the *formats of subject-didactic research* reveals that both the *research methodological approaches* of subject-didactics (historical, empirical, theoretical, comparative, practice-related) as well as the *specific subject areas* of subject-didactic research (such as research on content, on the history or the theory of subject-didactics) have a formative effect on the choice of procedures in a concrete project. They are therefore both to be taken into account when determining the type of format in subject-didactic research. The provisional matrix resulting from these two dimensions (as presented above) can be seen as a first result of General Subject Didactics in this matter, which owes itself to the meta-theoretical observation and comparison of the subject reports.[1]

e) Observations on the *reference sciences for subject didactic research* lead to the conclusion that there are basically four such *constitutive* reference sciences:
   – Academic subject-matter disciplines,
   – Educational Sciences,
   – Empirical Educational Research,
   – Other subject didactics.

In other words, depending on the individual subject didactics or on the specific research project, there can also be additional reference disciplines at play. This outcome represents an important modification and differentiation in comparison to previous views and findings in which subject didactics were primarily or exclusively seen in a field of tension between just two other fields, the academic subject-matter sciences and the educational sciences. But, as demonstrated above, *Empirical Educational Research* as well as *other subject-didactics* have to be considered also as reference disciplines.

In addition, the present analysis also shows that the relationship between subject didactics and the academic subject-matter sciences is quite complex in itself under (many) different respects. Among other things, this is due to the fact that in some subject areas (e.g., Mathematics) a considerable difference between the two is claimed, or that a considerable variation within an individual subject didactics can be observed in an international perspective (e.g., Religious Didactics); finally, that the particular subject-matter science is an entity composed of various sub-disciplines,

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1 Meanwhile Riegel & Rothgangel, 2021, have elaborated upon these issues of how to define "formats" in subject-didactic research more precisely and which other dimensions might influence this categorization.

each of which may have a different significance for the respective subject didactics. These insights lead to the identification of certain desiderata which have to be covered in further research within General Subject Didactics: namely, the development of a model that enables a differentiated description of the relationship between subject didactics and the academic subject sciences and which is able to take into account for the characteristic differences of the respective subject didactics and the related subject-matter disciplines, as indicated.

Résumé of section 5: Linking content across subjects – Generalising subject-specific competences – Résumé in view of General Subject Didactics

The following section deals with issues which are of particular importance from the perspective of a General Subject Didactics.

a)   Subject-didactic observations about the necessity and possibilities of establishing interdisciplinary links between subjects led to the conclusion that these are primarily conditioned by the perception and evaluation of three different contexts: Life-world context, educational-political conditions and subject-to-subject contexts. In particular, it becomes clear from the explanations of the educational-political context that subject-specific cooperation on the level of subject teaching and of cross-disciplinary research can indeed be influenced by those external, politically motivated decisions (e.g. history teaching in combination with other subjects). This discovery of those educational-political influences can be put into perspective by international comparison (cf. Chemistry Didactics).

b)   If one compares the way in which the subject didactics monitor their subjects with regard to interdisciplinary links, then this leads essentially to ambivalent findings with positive and negative, critical aspects: On the one hand, there are *positive* potentials in linking topics or whole subjects (cf. general potentials, special subject potentials, potentials of deepening and flexibilizing knowledge, potentials of generalization, or educational potentials); on the other hand, some *negative* potentials or challenges have been mentioned critically within the reports, namely the risk of limiting or instrumentalizing cooperation, neglecting built-in, systematic differences between subject approaches which will always continue, increase of remaining research desiderata and thus lack of information and reduction of knowledge.

This final point in particular shows that General Subject Didactics could stimulate and guide further empirical studies with regard to the announced, yet unfulfilled promises about the positive effects of interdisciplinary linkages. This in turn implies a close dialogue with empirical research approaches and with Empirical Educational Research in particular and thus with the possibilities of collecting the right data for

advancing this topic. Otherwise, the perspective of gaining more insight into students' learning and understanding by linking content across subjects and of producing better knowledge on their part will remain too vague. Possibly the challenges and strains of coordination and cooperation might be too high at times or demand too high a price in some cases.

It is stressed that performing high quality subject-specific teaching and learning is an important goal in itself, also in cooperative projects. To bring out or to maintain largely the specificities of subjects and subject-embedded teaching is therefore a vital issue for cross-curricular approaches and continues to be crucial, even if more comprehensive topics are tackled in an interdisciplinary way. In other words: Being knowledgeable and clearly anchored in subject-specific thinking and structures on the part of each of the cooperating subjects and teachers seems to be an important prerequisite for successful cross-curricular endeavors, in spite of the compromises that might become necessary. But premature consensus-building, for example, is seen critically and will question the advantages of interdisciplinary cooperation.

c) In principle, the present results can inspire the dialogue among the different subject didactics with regard to interdisciplinary links or potentials insofar, as the individual subject didactics could systematize or even categorize, on the basis of the present analysis, to which other subjects they have special affinities and why (cf. Mathematics). They could also reflect and practice how the give and take between cooperating subjects can be supervised and secured in detail:
    – They could explore the question of whether and in what sense their specific subject has a particular subject potential for cross-curricular linkages;
    – they could deal with the potentials of deepening knowledge or making it more flexible as well as the potentials for generalization through interdisciplinary connections;
    – they could receive new research impulses resulting from comparative observations on the level of General Subject Didactics, and these new experiences could in turn provide further impulses for General Subject Didactics which can thus serve as a platform and a transmission belt for the dialogue between the different subject didactics.

d) The results of our analysis concerning cross-curricular links could also stimulate more of an exchange with the Educational Sciences in general and with general didactics in particular. For example, it could be examined in detail what significance a subject-specific context has for certain issues of interdisciplinarity, what the subject-specific potentials are for dealing with certain topics and what the constitutive, remaining differences are between subject-specific approaches involved. Finally, it is considered worth investigating what meaning these differences could have in the discourse of general didactics for the future.

e) With due caution, it can be stated with regard to the overall potential contribution of a school subject for the education of learners that the provisional dis-

tinction between personal and functional contributions also emerges at the end of this analysis (as already tentatively made at the end of Volume 1 of our series on General Subject Didactics). The first perspective refers to the *personal development of an individual* through subject learning and teaching, whereas the two other aspects (basic and general education as well as applicable knowledge and skills in different subject areas) can be assigned to *functional education* to be used way beyond the circumstances of acquisition. In any case, with regard to educational potentials of subject-based teaching and learning, this topic stands out in importance, yet it needs much further clarification, also for discussion with the educational sciences. Accordingly, the research perspective of *spelling out a subject-specific theory of education* still awaits systematic consideration: it will be further addressed at the end of this summary in a reflective manner.

In retrospect, the issues dealt with in this particular section illustrate the urgent need for more comparative clarification in many details. Likewise, they illustrated the potential of General Subject Didactics for a dialogue both among the subject didactics themselves as much as with the educational sciences.

Résumé of Section 6: Linking subject-didactic research across subjects – Résumé in view of General Subject Didactics

Section 6 finally deals with perspectives of networking not only subject teaching and learning, but also *subject-didactic research itself cross-sectionally* – building cross-curricular forms of cooperation in subject-matter didactics as research disciplines. In the perspective of General Subject Didactics we can draw the following conclusions for a meta-theory of subject didactics, based on the preceding analysis of the individual subject-didactic reports:

a) There are a number of interdisciplinary dialogue partners that are *constitutive* for subject didactics in their research activities. According to our findings in the comparative analysis, these are currently the following ones:
   – the respective academic subject-matter areas,
   – other subject didactics,
   – Empirical Educational Research (as a complex, strictly empirical research field of its own),
   – educational sciences in general.

These results correspond with those of section 4 above, where identification and naming of subject-didactic reference disciplines was asked for under a scientific-theoretical perspective (that is in more or less abstract terms). Now *the actual cooperation with different partners* in subject-didactic research projects and in concrete

practice is decisive and topicalized.[2] As long as the identified dialogue partners were either structurally close to a specific subject didactics or close in content terms, these were called '*constitutive' dialogue partners*. The other types of co-operands in didactic research are more of a temporary choice and accompaniment, depending on a particular project or issue dealt with: these were called *'contingent' dialogue partners*. One characteristic of *constitutive* dialogue partners of subject didactics is also that they are mentioned by numerous different subject didactics – and in certain cases even when in fact little cooperation exists in concrete terms (e.g. Physics as a subject-matter science for Physics Didactics).

b) A comparison of the individual subject didactics shows that they conduct their dialogue with the *constitutive* partners with varying degrees of intensity and in different ways. This can be exemplified by contrasting the importance of the respective academic discipline in the Didactics of Physics on the one hand (loose connection) and in the Didactics of Informatics or Computer Science on the other hand (strong connection and dependency). This variation in quality and intensity of exchange also applies to the dialogue of the subject didactics with the three other constitutive dialogue partners, namely with other subject didactics, with Empirical Educational Research as well as with the education sciences in general. The reasons for this variation may be manifold, but the consequences are far-reaching in every single case, because they have a decisive influence on the perception and processing of how a specific subject didactics perceives and processes subject teaching and learning in school and in the classroom (cf. Rothgangel & Vollmer, 2020).

c) There are still other 'contingent' interdisciplinary dialogue partners for subject didactics. Up to now, existing meta-theories of subject didactics or general didactics have insufficiently considered their existence and thus the distinction made here between constitutive and contingent interdisciplinary dialogue partners. One reason for this could be that those theories operate rather abstractly and with a focus on fixed reference disciplines of subject didactics, but they insufficiently consider the *concrete research practice* for modelling their meta-theory. Such relationships are indeed more diverse, temporary and dynamic in practice than abstracted and deduced models have taken in view. The categorical distinction between constitutive and contingent reference disciplines of subject didactics, however, enables us now to design an extended model. In such a model, essential dialogue partners are clearly named, on the one hand, but at the same time other reference disciplines are not lost out of sight. Yet they become relevant only through outside contingent factors and demands, such as orien-

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2   The notion 'contingent' is used here in the sense of 'real or possible', but not essential or necessary, *not* defining the substance of a matter (cf. the entries in the Duden / Merriam Webster or in the Cambridge and Oxford dictionaries, the latter one being the most comprehensive).

tation towards research funding, educational policy decisions (e.g., regarding topics such as 'inclusion' or 'competence modelling' as urgent or pre-dominant) or even certain research preferences according to contemporary styles or fashions.

As said before, more research is needed to examine in detail whether or not and to what extent the constitutive reference disciplines of subject didactics are changing over time. An obvious hypothesis is that Empirical Educational Research as a relatively new academic field is only gradually acquiring the status of a firm, constitutive reference discipline for subject didactics within the last 20 years, while the lively dialogue between subject didactics and general didactics in the late 1950s and throughout the 1960s, for example, was a clear indication of the fact that the latter (general Didactics) had the status of a constitutive reference discipline for subject didactics at that time.

d) Last but not least, another point that already became transparent in the preceding analysis, holds true more and more so: A close observation of subject didactic research shows that it is decisively influenced, if not almost conditioned by supposedly 'external' factors such as research funding and the forms of institutionalization under which it operates. This is, of course, not really surprising, given the need for such support systems in order to do research successfully. Examples of these contingent factors or 'dialogue partners' were already given in the text above.

Outlook

At the end of these résumés, containing some essential observations, insights and findings, this round of a summarizing comparative analysis proves to be extremely informative for quick reference and consultation. It has given concise access to existing self-perceptions and self-descriptions, to research priorities and to research practices (at least in part). In a nutshell it has also given insight into patterns of argumentation and justification as well as into subject-didactic thinking with its theoretical underpinnings.

Based on these six résumés, we want to reflect on the question of what the empirical findings mean for an international perspective of subject-matter didactics? How can developments in the English or French speaking world become better known and related more quickly to the multi-layered types of discourse in Germany? And can this notion of "subject didactics" and its conceptual unfolding in Europe be made better understood and appreciated in other parts of the world, especially in the Anglo-Saxon space or in the English-speaking world in general? What are the key issues of school education in the 21st century, organized around subjects, topics, competences or areas of basic knowledge and *Bildung*? Is there a sensible way of bringing the different school subjects, the different subject didactics, the different subject didacticians and the various subject teachers into closer contact, based on what has recently been

phrased as "subject-didactic thinking" or subject-didactic knowledge, again embedded into the framework of General Subject Didactics, as defined earlier (cf. Vollmer & Klette, 2023)? Or can the different school subjects and their topical areas be clustered together under certain epistemic criteria in such a way, that commonalities are strengthen, overlaps discovered, the development of generative transfer abilities supported and thus the burden reduced of too much knowledge acquired instead of concentrating on the necessary and powerful educational knowledge to be agreed upon for solving problems in the near future.

How is all of this viewed within other educational traditions and how are these issues analyzed and talked about in theoretical terms and studied empirically in other parts of the world? How can one describe and characterize not only the goals and specific effects of subject teaching, but also the appropriate research strategies through which we will know what is being acquired, learned, used, transferred or generalized in the mind of a learner, triggered by subject-specific teaching and learning, by instruction or education or the processes of Bildung in its most comprehensive sense?

Instead of only speculating about the relevance and role of didactics and particularly of subject didactics in other educational contexts of the world, we hope to be able to engage in a productive discourse and exchange with known representatives of education and of educational philosophy from around the globe – it is up to each of us to contribute, to follow and evaluate these efforts and to make critical comments and suggestions for further improvements. In this perspective, you may also want to consult other theoretical articles which appeared in Rothgangel & Vollmer, 2020; Vollmer, 2021a, 2021b; Vollmer & Klette, 2023). We are fully aware that there are other initiatives which are trying to bring different educational theories and traditions into contact with each other and which organize platforms for international exchange on a similar basis (e.g., to name just a few important ones: Hudson & Schneuwly, 2007; Hudson & Meyer, 2011; Ligozat & Almquist, 2018; KOSS, 2020; Deng, Hordern & Muller, 2021; Krogh, Qvartrup & Graf, 2021; Hudson et al., 2022a, 2022b; Ligozat, Klette & Almquist, 2023). Through our own empirical, data-driven approach we hope to contribute substantially and meaningfully to a wider understanding and discussion of what the unique quality, the potentials and the advantages of subject didactics as academic disciplines are and what the subject-didactic paradigm contributes to a timely theory of education as much as for the educational practice including the training of future teachers and their adequate professionalization. According to our view, these can only be based on a concept which promotes the integration of (powerful) subject-specific knowledge-building in combination with (an educationally powerful) subject-didactic competence on the part of the teachers as subject teachers, who are deeply educative in their mind, oriented towards developing personal, functional, generic and cooperative capacities on the part of the learner (Vollmer & Klette, 2023). It is our conviction that all of these aspects are necessary for preparing students successfully for the challenges of the 21st century.

17.2   International perspectives on subject didactics –
Sample questions for experts

We asked the experts to compare our findings with the situation in their own educational setting and context, based on their own professional or personal experience and perceptions. The experts were free to pick up any of these questions and issues involved in them, as far as they relate to the situation in their own country or region. Otherwise there was also the option to demonstrate and explain why our issues and findings were not relevant for the given context, as seemed to be the case for the United Kingdom or for England at least. In this way we also hoped to initiate or deepen our international exchange about central issues of education, of teacher education, of the professionalization of teachers and what it means to equip them with powerful educational knowledge in each of the specialized subject areas they teach (if applicable). At the same time, we are striving to understand how educational foundations and the educational sciences in general as well as curriculum theory and practice relate to didactics, particularly to subject didactics as scientific fields and as elements or frameworks for teacher education. To turn the point of view around: How are the issues of integrating content and pedagogy reflected in the situation of *Didaktik/Fachdidaktik as described in our research?* And how does General Subject Didactics contribute to answers in that direction?

In the following we reproduce our questions to the experts.

17.2.1   General questions

First, we would like to start with the *general* question of whether or not something like "didactics/subject didactics" exists in your country at all or what it is replaced by in terms of educational theory and function. If you cannot respond to the specific questions below, it might be best to deal with this topic in more general terms, describing and analyzing the situation in your country or setting concerning subject didactics.

Below, we will ask you to go through the six clusters of our original survey questions and read about the structure of our findings, comparing the seventeen subject-didactic reports. Overall, these six areas of inquiry and discussion to which we ask you to respond as international experts, have been outlined above already, in our Invitation Letter as well as in the résumé of our findings.

17.2.2   Selected questions for responding and for discussion

The summary of our comparative analysis with the six parts of résumés (as in 17.1 above) corresponds exactly to the six areas of inquiry that we have dealt with empirically so far. After reading the résumés, one might want to turn to some of the selected questions formulated below. These are to be understood as orientations or

suggestions, in order to give you some illustrative examples of potential questions that might be worth addressing as the basis of your response.

Questions for section 1

Given the results from the German context (as presented above under 1a to 1f), are they also true for your own context or educational setting? For example: Is it true also for your own context that certain historically relevant and meaningful conditions or other influential variables for the development and establishment of school subjects such as personalities, socio-political conditions or educational-organizational contexts can (more or less clearly) be identified and distinguished? *Please compare the results from the German context with your own experience and observations.*

Questions for section 2

Given the results from the German context (as presented above under 2a to 2e), are those results also true for your own context or educational setting? For example: Is it true also for your own context that certain formative periods in the unfolding of subject-matter didactics as scientific disciplines can be identified on a time line, e.g. between Enlightenment and 1990s? And what are the criteria for the establishment of subject didactics in your context – in comparison to the ones presented from the German data? *Please compare the results from the German context with your own experience and observations.*

Questions for section 3

Given the results from the German context (as presented above under 3a to 3h) are they also true for your own context or educational setting? For example: Is it true for your context that the following four sources for defining the content of a subject can be identified and distinguished: 1) by academic disciplines, 2) by subject-based *praxis*, 3) by socio-cultural and lifeworld contexts, and 4) by subject-related anthropological aspects? And what are the traditions or conventions of talking and exchanging about subject-specific goals? How are the notions or terms "literacy", "competence", "education", or "*Bildung*" being used in your setting, if at all? *Please compare the results from the German context with your own experience and observations.*

Questions for section 4

Given the results from the German context (as presented above under 4a–4e), are they true also for your own context or educational setting? For example: Is it true also for your own context that research in subject didactics can be observed as "increasing" over time, especially *empirical* research? And which other methodological

research approaches are common in your own setting or country (e.g. historical, theoretical, comparative, practice-related or practice-based?). *Please compare the results from the German context with your own experience and observations.*

Questions for section 5

Given the results from the German context (as presented above under 5a- 5e) are those results also true for your own context or educational setting? For example: Is it true also for your own setting, that interdisciplinary links between subjects are primarily conditioned by three aspects: Life-world contexts, educational-political conditions and subject-to-subject relationships? *Please compare the results from the German context with your own experience and observations.*

Questions for section 6

Given the results from the German context (as presented above under 6a–6e), are those also true for your own context or educational setting? For example: Is it true for your own context that four interdisciplinary dialogue partners are *constitutive* for subject didactics: 1) the respective academic subject areas, 2) other subject didactics, 3) Empirical Educational Research (as a specific field of its own), and 4) the educational sciences in general? *Please compare the results from the German context with your own experience and observations.*

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18. Subject-Matter Didactics as an Academic Discipline[1]

Bernard Schneuwly

"Our major interest is to hear about your perceptions and comments on our overall approach to view and define Subject-Matter Didactics as academic disciplines in their own right and hear about the discourse and state of institutionalization of didactics / subject didactics in your own country, if applicable." (invitation letter) This sentence defines what is expected by me as an expert in "Subject-Matter Didactics" (SMD in the following). I will first formulate some general methodological reflections that allow readers to understand the point of view I will adopt in my answers to the six general questions asked. These correspond to the six general domains that oriented the "17 Subject-Matter Didactics in Germany" which produced a report each concerning their respective discipline.

The approach chosen in the study constitutes a most interesting bottom-up way to elaborate more general insights in what SMD is, or, to put it more precisely, what representatives of different SMDs have as insights about their discipline. It is obviously a comparative approach that is most suited to contribute to the construction of a "Allgemeine Fachdidaktik". It gives it an empirical base. The results are without doubt one way to know the state of the art of SMD. There are of course limits of this approach which do not at all diminish the richness of the results, but which are important for me to mention since it allows to define my own point of view in the present short paper:

– There were of course not SMDs that produced the reports, but representatives of them that adopted a point of view which could have been different. I underline this point because I know that my point of view (or our way representing one possible point of view) which I would adopt in representing my SMD (French as a first language) would significantly differ from others. I think this would of course be the case for every SMD. In other words, my answers to the questions asked are heavily influenced by my way of defining SMD from a theoretical point of view, constructed through many texts and discussions (some of which are referenced throughout the text).

- The reference to my "own country" is the more difficult question, as "my country" belongs to different didactic cultures, at least three (German, French, Italian). I wonder why the authors refer to "Germany" in the text: most of what you say applies also to the German part of "my country" which is Switzerland. The other way around: most of what I will say applies, with variations, also to other French speaking countries (France, Belgium, Quebec, but also Marocco and Tunisia that have recently founded section in different SMDs such as "didactique du français" and launched SMD journals; a Maroccan one has the significant title "Didactiques et disciplines"). But even language as defining what one could call a "cultural area", is not a sufficient criterion: SMD in Spain, for instance, but partially also in Italy, are strongly influenced by approaches in the French cultural area, for example in the way of defining school disciplines.

This means that my answers are written not from the point of view of somebody who produces a "*discourse and state of institutionalization of didactics/subject didactics in [my] country*": such a discourse does not exist – elements will be given however concerning institutionalization of SMD in French-speaking countries and sometimes in Switzerland. My answer will be above all theoretical, representing one possible discourse about SMD as it can be produced in the French speaking area of SMD, a discourse that is articulated with discourses elaborated in other areas.

In the following, I will proceed like this: for almost every section (for section 1, I even include a short text which is attached to the present document), I describe the point of view from which I will comment on the different issues (identified as points a. to e. etc.) mentioned under the six sections in the Résumés of Findings for experts (see Chapter 18.1). In doing so, I will often refer to my own texts in which many other contributions are discussed. I apologize for the narcissistic impression this might create, but this is due to the very special text genre at hand.

Section 1: Historical developments in the school subjects

There is a huge I would say "Latin" tradition on the question of "school disciplines" (I use this term of course intentionally; "Schulfächer" in German; "disciplines scolaires" in French) that contests the Anglo-Saxon view dominated by Goodson (1993) and Popkewitz, (1987), for instance. This tradition is not anchored mainly in SMD, but something to which researchers in SMD in Francophone countries tend to adhere (cf. Schneuwly, 2021).

Point 1a. The basic claims are: a) school disciplines as systematic organization of school content ("savoirs" would the Francophones often say) in the whole system is a result of the deep transformation of schools as more and more systematically built system under the aegis of the State, with compulsory schooling etc. School disciplines are therefore a general phenomenon or a new social fact that rises in the 19th century

above all. Of course, each undergoes a "disciplinarisation" process of its own, in relation with others; some appear and disappear etc. (below), yet everyone evolves. But first of all, school disciplines have to be understood as a product of the organization of a school system in the context of the process of industrial revolution and the struggles for democracy.

Point 1b. There are indeed "prehistories of school disciplines"; and there are competitive relationships between disciplines: this is a constitutive characteristic of the system of disciplines, and one could even say, a *raison d'être* of the fact that they form a system which precisely allows hierarchy between disciplines (see Schneuwly, 2018a, about this aspect).

Point 1c. This observation is true also for the Francophone discourse, with the general reflection made in Points 1a and 1b on school disciplines as an ever-evolving system. The disappearance of certain school disciplines is particularly interesting in this respect (and can of course not be described by a current SMD). On this question, cf. some remarks in Criblez & Manz (2015).

Point 1d. This is indeed a consequence of the idea of school disciplines as a system.

Point 1e. School disciplines have to be looked at from the point of view of a constant and necessary process of disciplinarisation (see the attached text under 18.1), i.e. the fact that their content, status, and place in the system constantly changes. The main conditioning factor, not mentioned in the list offered, are the transformations of the school system as a whole, for instance the massification of secondary schools in the 1960s. These transformations are considered as absolutely central for SMDs. The other factors (didactic, scientific, international impulses) are clearly subordinated to this central factor of the constant change of the school system as a whole. An interesting example among many others is the analysis of "technologie" as a school discipline by Lebeaume (2008) or of grammar teaching in first language education as a school discipline by Darme (2018). This latter study also shows a certain independence of contents from the evolution of one possible academic reference discipline "linguistics" or "sciences du langage", close to the examples given for physics. Other examples could be mathematics (D'Enfert, 2005).

The observation of the reciprocal relationsphip between school and academic discipline, described by Goodson (1993) some time ago and which is mentioned in 1e., is also discussed in SMD, for instance for first language and linguistics by Chiss et Puech (1998) or for literature by Védrines (2023), but not in the strong sense of the example of geography.

Section 2: Development and establishment of the different subject didactics

There is again a huge body of literature on this topic which is embedded in a "story" that is quite different from the one that appears in this section. For the general story, I refer to Schneuwly (2021) where it is told. This is the point of view adopted in the following remarks. Generally speaking, in order to analyze the establishment of SMDs, a clarification is necessary. SMDs (*Fachdidaktiken, Didactiques disciplinaires*) have to be conceived, like medicine, on three levels: as practice in a school discipline, developed by a teacher profession; as normative discourses in teacher education and as academic disciplines (see also Tenorth, 2006). I suppose this third meaning of SMD is under scrutiny in this section. This means that it is necessary to refer to the larger question of what academic disciplines are. In our own studies (see for instance Hofstetter & Schneuwly, 2014) we rely on different authors in the sociology and history of disciplines and use the concept of predominantly secondary disciplinarisation, proposed by Stichweh (1994), for analyzing the emergence and establishment of SMDs as academic disciplines. Disciplinarization, the establishment of academic disciplines: process that allows for the renewal of knowledge, theoretical concepts and models, and data collection and analysis methodologies in a discipline. This process has three dimensions, which can be considered as the institutional emblems of any discipline 1. A field of knowledge emerges and unfolds through the conquest of an institutional base (positions, chairs, laboratories, centers), favoring the specialization and professionalization of research in the field. 2. This institutionalization and professionalization contribute to the constitution of communication networks (associations of researchers, congresses, colloquia, etc.) and especially editorial supports (in particular journals) that allow the construction of a community of researchers working on similar problems and regulating, thanks to these networks, their exchanges. 3. This institutional and communicational infrastructure allows for socialization within the field, and this is all the more easy as the field unfolds as a unit closely intertwining research and teaching (courses, curricula, diplomas, theses). "Secondary" means that this process builds on contents already elaborated by the teaching profession, including its educational institutions.

From this point of view, it is possible to date approximately, very cautiously, the appearance of the SMDs as academic disciplines or as disciplinary fields in the French-speaking countries until 1990. This construction, often on a small scale, proceeds by limited and fragile communities of which we can sketch a sort of chronology in the creation of associations as an index of the constitution of the different fields:

– didactics of mathematics [1973]
– didactics of French as a first language [1986]
– didactics of foreign languages [1989]
– didactics of history [1996]

– didactics of sciences [1998]
– didactics of physical education [1999]
– music didactics [1999]
– computer science didactics [2003]
– comparative didactics [2005]

Other didactics are developing, without necessarily taking the form of an association, as for example

– didactics of the arts
– ethics and religion didactics
– didactics of technology
– didactics of fundamental learning

This is the point of view adopted in the following remarks.

    Point 2a. The above means that enlightenment cannot at all be considered as a formative period for a SMD discipline. The other aspects coincide with what is said above. And most important indeed: "the definition, indicators or characteristics of such an "establishment" is already a seemingly small, yet important step".

    Point 2b. The factors mentioned are indeed important. The essential ones are

– transformations of the school systems
– transformations in teacher education, and in relation with this the profound changes in the institutional setting that allows the institutional anchoring of SMDs.

Institutional framework conditions seem to be the key factor for the development of SMDs as disciplinary fields. There is almost a mechanical link with the institutions created in the context of the teacher education institutions that appeared, for example, in Quebec with the universitarisation of this education at the end of the 1960 or in the creation of the *Instituts universitaires de formation des maîtres* (IUFM) in France in the 1990's (Amade-Escot, 2013). In the 1970s mathematics didactics appeared in France in the context of continuous education of secondary teachers), and in Switzerland, the creation of *Haute écoles pédagogiques* (Pädagogische Hochschulen; often called "Teacher Education Universities") had a most important impact (Heitzmann, 2013; Prusse, 2022); similar observations can be made in other Latin countries like Italy and Spain. More particularly, in French speaking Switzerland a *Centre de competence romand de didactiques disciplinaires* has recently been created in order to foster socialization of young researchers and collaboration between different SMDs (I will come back to this in my comments on Section 4).

    Personalities have of course a certain influence in this respect, but if, indeed Comenius can be considered as something like a founding father of didactic thinking (see my thoughts on this in Schneuwly, 2011 instance), this is *not* the case for SMDs as academic disciplines. In the French context, there are some theoreticians that have played a major role in the theorizing of SMDs like Chevallard (1986) or Brousseau

(see his first publication, 1986; 2002), but also Astolfi (who are very frequently referred to.

In what concerns the "five typical characteristics", I have some problems in catching their precise meaning:

– "competing didactic approaches": this factor is not discussed
– "changes and development of subject-didactic approaches over time": this is included in the concept of disciplinarisation – an evidence in every academic discipline;
– "influences from educational sciences": one could also mention, and this is very important in the francophone context, theories about evaluation processes;
– "influences from within the (academic) subject itself": an important factor, discussed for instance SMDs of history, literature, geography, arts, etc.; probably less in natural sciences where the distance between SMDs and academic discipline is greater.

Point 2c. This is also true for the SMDs I know in Francophone culture, with the exception of "increasing relevance of academic subject-matter sciences". This factor may occasionally play a role, but it doesn't seem to have an "increasing relevance"; on the contrary, the overall tendency is an increasing autonomy of SMDs from academic reference disciplines.

In what concerns the "continuous significance of educational sciences", this also is generally true, but "general didactics" does not play any important role in this matter (more generally on this point, Schneuwly, 2018b). Pedagogical approaches, evaluation, curriculum theory, sociology of education, history of education are obviously part of didactic research.

In this context, one cannot underestimate the influence of developmental psychology which is even one starting point of certain SMDs in Francophone cultures, for instance in the didactics of mathematics (strong influence of Piaget), or in the didactics of first language education (cognitive psychology in reading and writing; Vygotskij's historico-cultural approach for instance). I will come back to this later on.

Section 3: Goals, content, competences

It is very difficult to define a common view on the questions of goals and competences of school disciplines in a Francophone context. Generally speaking, it seems that three tendencies can be observed that I will then comment upon following the different points made in this section. The first one is linked to the definition of school disciplines and the definition Chervel (1988) gives of them in relation to goals or more generally the function of school disciplines.

The real function of the school in society is thus twofold. The instruction of children, which has always been considered its sole objective, is only one aspect of its

activity. The other is the creation of school disciplines, a vast and largely original cultural ensemble that it has produced over the decades or centuries, and which functions as a mediatization at the service of school youth in its slow progression towards the culture of global society. (p. 90).

I would like to underline two aspects: a) school disciplines are an essential dimension of the *culture of the school*; I will come back to that. b) the question of mediatization is the francophone way of expressing what in German is generally called *Bildung*. I have discussed this more in detail in Schneuwly (2018a). This kind of understanding has as a corollary that the concept of competence does not play an important role in the discussion of school disciplines, at least from the point of view of the SMDs (although syllabuses have claimed to be built on this notion, which is highly questionable if one looks at it in more detail). Here, one can see an important difference with the Germanophone culture of SMD (Schneuwly, 2014), where the concept of competence has had quite an important impact: in that culture, I could build on a tradition that preceded the strong influence of the OECD which popularized the concept, whereas in Francophone culture, the concept was considered as a way of dominating school by economic interest (Schneuwly, 2015; Erard & Schneuwly, 2005). On the basis of this point of view, without entering in detail into the long development of this section in the résumé, the following comments can be made.

Point 3a. The question of the goals of school disciplines cannot be discussed without reference to the question of what in SMD, even in Francophone culture, is called *Bildung* (see also Schneuwly & Vollmer, 2018).

Point 3b. This means of course that I fully agree with the following statement: "In the context of the currently prevailing paradigm of *competence orientation*, some subject didactics critically claim that the concept of (school) education as a multi-level *Bildung* is much wider in meaning."

Point 3c. This part is outside of my competence domain.

Point 3d. I cannot agree with the statement that there are *four sources of defining and identifying subject content for teaching*.

My first remark is marginal: I simple don't understand what is meant by "subject-related anthropological aspects". More importantly: I never would place "academic, disciplinary research areas" at the first place. This place is not chosen by chance, but reflects in my view a much stronger dependance of "*Fachdidaktik*" on "*Fachwissenschaft*" in the Germanophone culture compared to the Francophone one. In this context the two dimensions of "(Social) Praxis within a certain subject area", and of "Subject-related social, life-world and cultural contexts" in relation to the theory of didactic transposition would be much more highly considered (see for instance the part in Schneuwly, 2021, on this question). The difference between the two dimensions though is not very clear for me.

But much more important yet, the main dimension in the discussion of the elaboration of school disciplines is completely absent: the contents of school disciplines are for a large part created by school itself, through the process of transposition in

order to make them "teachable". When didactics of physics claims that their contents are by far not directly defined by the academic discipline, this shows the highly autonomous nature of school disciplines that constitute quite a strong autonomous *school culture.* This concept is central in Francophone SMDs and constitutes probably the main factor of defining contents of a school discipline (see for a discussion in German Schneuwly, 2018c; for a much more developed discussion of this question, see Denizot, 2021). This central place of school culture in the definition of contents for school disciplines has to be linked with the process of *sedimentation* that characterizes the process of continuous disciplinarisation of school disciplines (Ronveaux & Schneuwly 2018), a concept that is more and more used in the discussions of SMDs.

Section 4: Subject-didactic research

Generally speaking, there is agreement about the development I can observe in the Francophone context with the ones described in this section. The major tendencies of the disciplinary field of SMD as a research discipline can be described as follows:

– Empirical foundation of research in a large sense including historical research, hermeneutic technics, ethnography etc.;
– Autonomy of the field with respect to academic reference disciplines;
– Enlargement of the contents of the field beyond the limits of school disciplines that constituted their origin: university, professional fields, preschool, etc.

Curiously enough, there does not seem to be a systematic approach for defining possible contents or a common research agenda for all SMDs in this section. Such an approach has been tried, however, by the above mentioned *Centre de competence romand de didactiques disciplinaires.*[2]

I would like to add an important topic that appears across SMDs, namely Gender as a content and as a research issue (Verscheure & Collet, 2023).

What concerns the different other points made in this section, here some more comments:

Point 4a. "increasingly": this is exactly what can be said of the field of SMD in general in all Francophone countries, with a constant, but increasing awareness and discussion about methodological and conceptual problems, exchanged about in congresses and journals (see for instance several special issues of the generalist journal for SMD *Éducation et didactique,* Université de Rennes, on questions like these).

Point 4b. The conditional factors are the same in all these countries, with the same very profound critique of too narrow a definition of Popper's theory (the last

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2   Since I do not have the original data base at my disposal, I give the research content areas in French (see Figure 1): I think they are understandable even by a person not educated in French.

History and epistemology of school disciplines and their practices	Analyses of the construction of knowledge through class interactions	Observation and analysis of didactic sequences regarding their effects on students	Experimentation and evaluation of innovative practices and their integration into daily school practices
Analysis of the current organization of school knowledge in a given school discipline	Analyses of the student's capacities in function of knowledge taught	Elaboration of didactic models of knowledge to teach	Development of didactic sequences for teaching (tasks, material, text books, etc.)

Subject didactics as descriptive and explicative research ← → Subject didactics as praxeology

Figure 1: Research agenda: defining research contents for all SMDs

congress in Didactics of French on the question of what is a "result" in didactic research had this even as a red thread).

Point 4c. The concept of "competence" has not become a central one in any of the SMDs in French-speaking settings. This is probably due, more generally speaking, to the fact that this concept has been introduced from above (see remark above).

Point 4d. The point made here is very general, and comments are difficult to formulate. Globally, it seems that there are similar tendencies also on this point. One very important domain of discussion in most SMDs is collaborative research in didactics. See also the remarks made above about concepts and methodology and about contents.

Point 4e. Here, there seem to be quite important differences which are similar to the ones already mentioned under point 3d.

– The academic subject-matter discipline plays of course an important role in many SMDs, but in function of the questions asked it is not necessarily the most important one. This corresponds exactly to what is said for instance about mathematic didactics. The relationship is particularly complex in First Language didactics where questions of reading and writing are much more discussed in relation to psychology and sociology (see below), grammar in relation to linguistics and literature to "*études en lettres*": there is by far not a single "academic subject science".
– The distinction between "Educational sciences" and "Empirical educational research" makes simply no sense outside the very special institutional context in Germany (and to a much lesser degree in other German-speaking countries). Educational sciences are "empirical" to a large extent; "empirical educational research" introduces a useless distinction.

– Other subject didactics of course play a certain role (I will come back to this in section 6).

What is interesting in this context is the fact that two central reference disciplines in Francophone SMDs are not mentioned here that play a central role in SMDs: psychology (beyond educational psychology which can be considered as being part of the educational sciences) and sociology. As I already said, for the didactics in natural sciences and in mathematics, Piaget's developmental theory plays an important role ever since. And Bourdieu's sociological theories (namely his books on *Les héritiers*, *La reproduction, La distinction*), but also Bernstein's theories are very often used to formulate and justify didactic research.

Section 5: Linking content across subjects

What is written by the authors in this section corresponds clearly to similar tendencies I can observe. I would like to stress the following passage: "subject didactics monitor their subjects with regard to interdisciplinary links, […] this leads essentially to an ambivalent finding with positive and negative, critical aspects". Most curricula in French speaking countries contain what sometimes is called, for instance in the "*plan d'étude*" of French-speaking Switzerland the "global project of the education of the students". It is the result of five disciplinary domains that combine different school disciplines (for instance: arts with manual and creative activities, visual arts and music), transversal capacities (collaboration, communication, learning strategies, reflexive approaches, creative thinking) and general education (media education, health, personal projects, exercise of democracy, social, economic and environmental interdependencies). As one can see: links between disciplines are constitutive of the "*plan d'études*". The concrete realization is object of research in SMDs that quite often is realized across disciplinary bounderies, more particularly in social sciences SMDs.

Point 5e. The point made here is of course discussed in many contributions of educational sciences, but has not a strong tradition, as far as I can see, in SMDs.

Section 6: Linking subject-didactic research across subjects

The discussion on this topic has taken for instance the form of the question "Didactiques et/ou didactique?" asked in a workshop organized by the "*Association pour des recherches comparatistes en didactique*" (ARCD; which in a certain sense pursues similar goals as the German "*Gesellschaft für Fachdidaktik*") and in a special issue of *Éducation et didactique* entitled "Didactiques et/ou didactique? D'une question polémique à la construction d'un espace de problématisation scientifique" (2014). The question is interesting in two respects:

– "Didactique" in the French speaking context means more or less automatically "disciplinary didactics", "Fachdidaktik"; there is no generally established general didactics as a fully developed research domain (although it exists as a topic in teacher education);
– More interestingly of the point made here: one can play with the plural "didactiques" (Fachdidaktiken) and the singular "Fachdidaktik" as a domain that contains different "Fachdidaktiken". In other words, one can imagine something like a general discipline "Fachdidaktik" made of different "Fachdidaktiken" (like physics made of different domains of physic, or history, and so on). This "didactique" is in a certain way automatically "general", and one could even speak of a "didactique générale" in the sense of "Allgemeine Fachdidaktik".

Of course, this very important domain would have to clarify

– General conceptual and methodological questions that are transversal to the different specific didactics
– Questions of the contributions of different disciplines to what is quite often called, even in the French context, *Bildung*.

These general remarks allow me to move on to some more specific comments.

Point 6a. With respect to "constitutive" partners, I could make the same comments as in section 4 above. And there are of course also "contingent" dialogue partners.

Point 6b. Concrete observations of real practices are necessary to comment on this point. I could only give anecdotal evidence since I do not know any systematic research on this issue or question.

Point 6c. The same comment as in 6b. applies here.

Point 6d. I fully agree.

Concluding remarks

Obviously, in order to continue to elaborate international perspectives on the development of SMDs, international comparative research projects on the institutionalization of the field of "Didactique" ("*Fachdidaktik*" in singular) in the French sense referred to above would be necessary. Such projects could be realized by associations like the German *Gesellschaft für Fachdidaktik* (GFD) and the French *Association pour des recherches comparatistes en didactique* (ARCD).

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19. Subject-Matter Didactics as an Academic Discipline

Reflections on the Danish Setting

Ellen Krogh

> "Our major interest is to hear about your perceptions and comments on our overall approach to view and define (Subject-Matter) Didactics as academic disciplines in their own right and hear about the discourse and state of institutionalization of didactics/subject didactics in your own country, if applicable.
>
> What would your response be to the six areas of research in subject didactics and our findings in Germany, as presented in Appendix 1+2? How does that relate to your own experience, setting, country, region or background?" [Text of the invitation by the authors of this book].

I consider the German Subject-Matter Didactics (SMD) project a most timely and important effort for establishing SMD as an academic discipline in its own right. The empirical approach is interesting and impressive in scope. Within the single disciplinary didactics, these studies will, I presume, encourage further research and theoretical development as well as discussions of differing perspectives and positions. Regarding the meta theoretical level of General Subject Didactics (GSD), the rich empirical grounding through acts of comparing and generalizing these studies offers an important substantial dimension of GSD that qualifies and complements the more philosophical top-down reflections on purpose and aims of GSD.

This paper is a tentative response to the above quoted invitation to share comments on the project as well as on the discourse and state of subject didactics in Denmark. It is *tentative,* because I cannot claim to represent the Danish field of subject matter didactics. In Denmark as presumably in other countries, there are differing discourses both of single subject matter didactics and of SMD as a meta field. My own main expertise regarding in-depth questions of subjects and subject didactics is within the upper secondary subject Danish, and even though I have been active in the wider field of SMD developments in Denmark during the past two decades, my degree of insight as well as my understanding of the field will be shaped by my disciplinary and institutional departure. Due to this limitation, the list of references holds unproportionally many publications that I have authored or co-authored. Another reservation concerns the problem of language. Studies that I can refer to, have often been written in Danish, and even though I have translated titles, of course these do not offer satisfactory access and documentation for non-Scandinavian readers. Finally, regarding translation into English of the core concept of "fagdidaktik" (subject matter didactics), my translation would normally be "disciplinary didactics" since the Danish word "fag" is used at all educational levels, including university, as well as in professional contexts (e.g. "he is a carpenter by trade (fag)"). As my understanding of "fagdidaktik" applies to all these dimensions, "disciplinary didactics" appears to be a

better match than "subject matter didactics". Still, to avoid confusion, in the following I shall stick to the translation used in the present project.

1. Historical developments in the school subjects[1]

> "Given the results from the German context (as presented above under 1a to 1f), are they also true for your own context or educational setting? For example: Is it true also for your own context that certain historically relevant and meaningful conditions or other influential variables for the development and establishment of school subjects such as personalities, socio-political conditions or educational-organizational contexts can (more or less clearly) be distinguished?
>
> *Please compare the results from the German context with your own experience and observations.*"

The main overall condition of the development of school subjects is the establishment by law of a Danish public school system in 1814, offering seven years of basic schooling, "almueskolen", focusing on reading, writing, arithmetics, and religion, and "realskoler", offering sons of the urban bourgeoisie education within a wider range of subjects to prepare them for work within commerce, trade, and industry. Teacher education was established at "skolelærer-seminarier" (teacher training colleges). A third tier was the learned school, "latinskolen", offering religious education to the very few. The learned school had existed for centuries and was closely tied to the university. It was reformed in 1775 so as to include Danish language and history next to the classical languages. These were, however, still dominant and only gradually lost their position within the university and learned school systems during the 19th century (Haue, 2008; Korsgaard, 1999). The three-tiered system was in effect until the second half of the 20th century when the Danish comprehensive school (grades 1–10) was gradually implemented. Within this educational system, a growing number of school subjects have been established, competing for positions when new scientific developments or historical change called for reforms (Haue, 2008; Qvortrup & Ljungdalh, 2019).

Regarding the prehistory of school subjects and the problems of the establishment of teaching subjects, the trends and typifications of the German context can largely also be observed in the Danish context, although I cannot provide reference to any meta study of the kind offered in the SMD-GSD project.

A few exemplifications to document similarities: Regarding prehistory vs establishment of subjects: Aspects of natural science didactics were introduced in the new bourgeois 'realskole' in 1814, but the primary legitimation of "Naturhistorie" (the history of nature), Naturlære (the teachings of nature) and Geography was their rel-

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1 Within the following six sections, I will first quote the respective questions as formulated by the authors of this book, before responding to them accordingly.

evance and use-value for commerce. Natural science subjects did not become part of the learned school until 1871 when problems with the growing number of subjects were solved through establishing two lines of study with programmes for respectively languages and history and mathematics and science. Since then, struggles of positioning and legitimation have taken place, both regarding the position of natural sciences as opposed to other subject groups and regarding the mutual positions of natural science subjects (Krogh & Andersen, 2016). Another example is the upper secondary subject Danish which replaced Latin and Greek as the most prominent Bildung agent of upper secondary education at a reform in 1903. A key personality regarding the development and description of subject Danish as a literary nation building subject was the first university professor of Danish literature, Vilhelm Andersen. His construction of subject Danish was largely in effect until 1971 and has formed the standard recollection of the subject within the professional community while the early, rhetorical version of subject Danish from the late 18th century was forgotten. It was, however, rediscovered as an inspiration for reforms of the subject in the 1970s and 1980s when language and writing gained a stronger position in the subject (Krogh, 2003, 2021).

Concerning the way subject didactics are developed, when looking into Danish subject didactic literature, we will, I believe, find a comparable pattern to the one provided in the summary of findings about German subject didactics: initially causal conditioning factors are focused, and secondly the development of guiding ideas or principles are discussed. The textbook *Subject didactics in social science* (Fagdidaktik i samfundsfag, Christensen, 2015) may serve as an example. The introductory section opens by positioning social science as a subject in respectively 'folkeskolen', the Danish mandatory school (grades 1–9) and 'gymnasiet' the upper secondary school. Further, the text provides six causal conditional impulses for the changes that led to the establishment of the subject from around 1960. They include didactic impulses (the coupling of democratic Bildung, social-scientific Bildung and an analytical approach to topical issues), scientific impulses (a focus on social scientific disciplines: sociology, politology, economics etc.; interdisciplinarity), and international pedagogical impulses (the discourse on study competence). Delving into the prehistory of the subject, competing guiding ideas are discussed, such as the case of history and geography as nation building subjects in the 19th century meeting democratic ideals of independently thinking citizens in the 20th century. Finally, the introductory section concludes that today, social science is a well-established subject which with every reform has gained a stronger position and growing success in attracting students, in spite of opposition from critics (from other subjects) who have regarded social science as a subject without disciplinary depth, a 'chatter subject' (snakkefag) (Christensen, 2015, p. 14).

2. Development and establishment of the different subject didactics

"Given the results from the German context (as presented above under 2a to 2e), are those results also true for your own context or educational setting? For example: Is it true also for your own context that certain formative periods in the unfolding of subject-matter didactics as scientific disciplines can be identified on a time line, e.g. between Enlightenment and 1990s? And what are the criteria for the establishment of subject didactics in your context – in comparison to the ones presented from the German data? *Please compare the results from the German context with your own experience and observations.*"

In the Danish setting, institutional framework conditions are very important factors in the establishment of subject didactics as individual disciplines and as a general field of knowledge. The following is a rough account of the development of the field, mainly focusing the institutional framework.

Subject matter didactics (fagdidaktik) was institutionalised as an academic field at Denmark's Teachers High School (Danmarks Lærerhøjskole) which was established with university status in 1963. The high school offered master's degree programmes to elementary school teachers and teachers at teacher training colleges. Next to general didactic and psychological-pedagogical programmes, a 'subject pedagogical' programme was established with branchings into most general school subjects, and research into these fields was initiated. Nielsen (2012, p. 12) argues that three interacting problem fields are of fundamental importance for the conditions of subject matter didactics: a subject-pedagogical relation, a theory-practice relation, and an institutional relation.

In his paper "Didactology as a Field of Theory and Research in Music Education" (2005), Frede V. Nielsen, a key personality in Danish subject didactics, exemplifies his understanding of the subject-pedagogical and the theory-practice relations within music education. This study builds on Nielsen's influential thesis on music education from 1994 (2nd edition 1998) and is also generally relevant for SMD. In the study, Nielsen argues for a distinction between normative didactic practice and descriptive "didactological" theory and research. He further develops a model for "a relationship of reciprocity between the basic subject (musicology) and subject didactology" (Nielsen, 2005, p. 17). Hence, Nielsen's study reflects aspects of the scientific quality of subject didactics that are identified in the summary of findings in the German context.

Regarding the institutional relation, the Teachers High School was closed down in 2000 to become *Denmark's Pedagogical University* (DPU) where a re-organisation took place by which the position of the subject dimension was reduced. Later, DPU became part of Aarhus University, presently as a department, but keeping up the DPU acronym: "Danmarks Institut for Pædagogik og Uddannelse". Here, subject didactic master's degree programmes are offered within Danish, Mathematics, Material Culture, and Music. Subject didactic "research units" comprise: Danish SMD, SMD of

the understanding of technology; Didactics of Mathematics; Material Culture; Music Pedagogy; Natural science didactics and natural perspectives. Today, professorships within the didactics of subject Danish and Math education as well as a number of subject didactic associate professorships are established at DPU. The subject didactic research community at DPU have published several Danish language cross disciplinary studies in which subject didactics is thematised, among which are Schnack (2004) *Didaktik på kryds og tværs* (Didactics in all directions) and Haas & Mathiesen (2020). *Fagdidaktik og demokrati* (Subject didactics and democracy).

Since around 2005, subject didactic research and development related to 'Folkeskolen' (primary and secondary school) is also conducted within "National knowledge centres" in e.g. reading, educational aids, math didactics. These are housed by University Colleges where profession-specific education such as teacher education is administered. University colleges do not have university status.

While SMD connected to the elementary school and teacher education has been institutionalised since the 1960s, there was some delay regarding the development and institutionalisation of upper secondary subject didactics. Albeit some upper secondary subject didactic research as well as research and development were conducted, it was not until the late 1990s that an institutionalisation took place. In 1998, "Danish department for upper secondary pedagogy" was established at the University of Southern Denmark, later to become a unit in larger department structures, presently "Institut for Medier, Design, Læring og Erkendelse" (Department of Design, Media, and Educational Science). The department established an advanced further education programme in 'upper secondary pedagogy' for upper secondary teachers and also administered the theoretical "Pædagogikum" for coming upper secondary teachers. During the first years, the initiator and first head of department, professor in Danish literature Finn Hauberg Mortensen, was further able to secure public funding of PhD education for a fairly large number of upper secondary teachers. Most of the permanent positions of the new department were filled with experienced upper secondary teachers who formally qualified as PhDs while engaging in teaching, supervising, and developing research communities. Units of subject didactic research were developed within specific school subjects, primarily Danish, History, and Social Science, but for periods of time during the first decade also Mathematics, Physics and Foreign Languages. Professorships within the didactics of Danish and History and a number of associate professorships were established as part of a subject didactic research programme of subject didactics. This programme, for a decade headed by me (Ellen Krogh) in the position as professor of the didactics of subject Danish, in principle covered all upper secondary subjects and engaged in developing both research and general subject didactic theory. From around 2010, research in general didactics was included in the programme, and relations between subject didactics and general didactics were taken up and theoretically researched as elaborated in the study "Laboratories for meta-reflective didactics" (Krogh & Qvortrup, 2021). This programme also initiated and hosted the international network

project *Didaktik and Curriculum in Ongoing Dialogue* from which two publications resulted (Krogh, Qvortrup, & Graf, 2021; 2022).

These two educational science institutions, housing units and programmes of subject matter didactics both in specific subjects and as a general research field, have been core agents of the rise of Danish subject didactics as a general field. Apart from these, prominent research within particularly math education and natural science didactics has been conducted in dedicated departments at the disciplinary universities: Copenhagen University, Aarhus University, Roskilde University, University of Southern Denmark, Aalborg University.

3. Goals, content, competences

"Given the results from the German context (as presented above under 3a to 3h) are they also true for your own context or educational setting? For example: Is it true for your context that the following four sources for defining the content of a subject can be identified and distinguished: 1) by academic disciplines, 2) by subject-based *praxis*, 3) by socio-cultural and lifeworld contexts, and 4) by subject-related anthropological aspects? And what are the (linguistic) conventions for talking and exchanging about subject-specific goals? How are the notions or terms "literacy", "competence", "education", and "*Bildung*" being used? *Please compare the results from the German context with your own experience and observations.*"

The observations regarding goals, content, and competences in the German SMD context are recognisable to a high degree also in the Danish context. This, of course, is connected with the fact that global educational trends have pervaded national education policies, calling for an orientation towards the notion of competence that holds an understanding of knowledge as defined not only from within the subjects but also by reference to societal demands. In the following, observations of the specific Danish situation are presented.

The Danish language holds terms for both Bildung (dannelse) and competence (kompetence). The mainly OECD-inspired introduction of competence as a new educational goal in the late 1990s has resulted in radical curricular changes at all school levels. Curricula, however, still promote Bildung aims also and thus present a pattern of what has been termed 'merging semantics' (Sivesind, 2013). At the SMD theoretical level, competence is interpreted both as a general Bildung concept – as for instance in Foreign Language didactics (intercultural, communicative competence, cf. Andersen et al., 2015) and as a foundational disciplinary aspect of Bildung (subject-based or disciplinary-based Bildung; Krogh et al., 2017). The term literacy, however, does not have an equivalent in the Danish language. This fact and, of course, the growing influence of literacy as an aim both in the subjects and across subjects, stress the necessity of explicit definitions and reflections when discussing this educational goal inter-culturally (cf. Holmberg et al., 2019). Regarding the use of the term literacy, there has been some controversy in the Danish context. The English term is not found

in curricula, but literacy is widely adopted in subject didactic theory and research as a term that may integrate writing, text, and wider semiotic practices (cf. Krogh, 2020, pp. 171 f.).

Discussions about the introduction of competence in the Danish educational context and a conceptualisation of Bildung that may be viewed as a critical response to this, can be found in Krogh (2020, pp. 100 ff.) and Krogh & Piekut (2015, pp. 8 ff.). With reference to the Danish philosopher Lars Henrik Schmidt, Bildung in these studies is viewed as "self-Bildung", basically growing from a sense of powerlessness that creates a need to look for 'otherness' beyond oneself. The task of schooling, therefore, is to ensure that students do not experience an antithesis between the collective and the individual in their everyday and schooling experience. Based on this general conceptualisation of Bildung, the mentioned studies evolve a theory of mother tongue/L1 didactic Bildung tied to the notion of perspective and the metaphor of voice or voicing.

In both Foreign language didactics and Didactics of Mathematics, however, the notion of competence has been developed to encompass both more functional skills and knowledge dimensions and a personal Bildung dimension. Danish Foreign language didactics is based on an international subject didactic model that illustrates how the overall goal, intercultural communicative competence, is reached through sub-goals of knowledge, skills, and attitudes (Byram, 1997). Within the Didactics of mathematics, a model of competences has been developed by two key personalities in Danish math education, Mogens Niss and Tomas Højgaard (2002). This model visualises eight competences as a flower, supplemented by goals of judging the application of mathematics historically, in society, and as a disciplinary field. According to Blomhøj (2016), this model has influenced Danish curricula at all levels and gained international attention. He argues that this way of characterizing didactic goals in mathematics may serve both competence and general Bildung aims at the same time.

According to available sources, it is also true for the Danish context that subject content for teaching is generally defined and identified by the above mentioned four sources: academic disciplines, subject-based praxis, socio-cultural and lifeworld contexts, and subject-related anthropological aspects. Individual subject didactics give different importance to these. Hence, subject related anthropological aspects are given special importance in arts subjects (Nielsen, 2005) as is also subject-based practice (Kirk & Krøgholt, 2018) while academic research areas and the application of academic knowledge are given more importance in math and natural science education (Blomhøj, 2016; Krogh & Andersen, 2016).

Interestingly, a similar, or parallel, logic can be found in a model of "rationales for the selection of teaching/learning content", or didactic "paradigms", originally developed by Frede V. Nielsen (2005, pp. 6 f.) as a contribution to music education. Nielsen distinguishes between

– "'basic subject didactics' in which the point of departure is the subject itself and its structure, in our case the subject of music"

- "'ethno-didactics' in which the point of departure is pupil culture and the everyday experience of the pupils or criteria arising out of current local culture. It represents a micro-cultural position in post-modern style"
- "'challenge didactics' in which the point of departure is the great social problems, such as environmental issues, global North-South relations, conditions of democracy, or for that matter terrorism. This position may be said to have a macro-cultural, problem-oriented, and inter-disciplinary bias. A theory of social criticism is a frequent theoretical anchoring point"
- "'existence didactics' in which the point of departure is a person's fundamental existential condition, that is, the question and view of what it means to be a human being. [...]. It revolves around issues that are dealt with in philosophical anthropology, for instance".

According to Nielsen, these positions jointly represent supplementary angles on determining what is essential in general education and Bildung and offers basic criteria for dealing with those questions. The model has been influential in Danish subject didactics and illustrates that this kind of generalising logics is at work in subject didactics, and even that the analysis of sources of content developed in the German context has a resonance in the Danish context.

4. Subject-didactic research

> "Given the results from the German context (as presented above under 4a–4e) are they also true for your own context or educational setting? For example: Is it true also for your own context that research in subject didactics can be observed as "increasing" over time, especially *empirical* research? And which other methodological research approaches are common in your own country (e.g. historical, theoretical, comparative, practice-related?) *Please compare the results from the German context with your own experience and observations*".

The summary of results from the comparative study of SMD research practices stresses the observation that the qualifier "increasingly" is often referred to, mainly indicating an increase of *empirical approaches and expertise* which takes formerly dominant *experience-based material development* and the purely *theoretical concept construction* a decisive step further, without completely replacing them though.

The Danish history of math education indicates that these observations are also relevant for the Danish context:

Blomhøj (2016, pp. 16 ff.) identifies four phases of mathematics education research. The first phase (-1960) brought focus to the selection and organization of disciplinary topics with tasks and activities for the use of teaching. In the second phase (the 1960s) the didactics of math was considered a loosely coupled scientific discipline, focusing the design of curricula and cognitive aspects of learning related to the new mathematics of set theory and math structures. During the 3rd phase

(1970–1990), math education was constituted as a scientific discipline focusing the whole problem field of the teaching of mathematics. "Classroom research is *increasingly* used…" (Blomhøj, 2016, p. 17; translation and italics by EK). Theory development takes place regarding difficulties of appropriating mathematical concepts. In the 4th phase (from around 1990) continuing scientific development of the discipline takes place, and larger theory constructions such as the French Theory of Didactic Situations (Brousseau, 1997) and Anthropological Theory of Didactics (Chevallard, 1992) are developed, offering frameworks for researching math education, but also for researching subject didactic issues in general. Empirical classroom research is still frequent, but a more prominent role is taken by new integrated methods of design and research where experiments with the development of practice take place, often in collaboration with teachers. Research in the application of informatics and digital math tools is a strong theme.

In this history of Danish math education, theory development initiates empirical research, and in the design research, experience-based development has been given new life. Thus, interestingly, we see that the three cornerstones of SMD research rather than replacing each other are merged and mutually developed in still new constellations.

The study reported about below of the Didactics of subject Danish covers a shorter historical span and also provides a somewhat less clear picture regarding shifts of cornerstones. Unlike the math case, in this study, problems and controversies are indicated regarding the historical development. The case further illustrates other observations from the German context: the importance of conditioning factors such as institutional hosting, external funding, subject didactic associations and networks, and internationalization. What may also be observed is the fact that formats of SMD research show close connections with the specific subject areas of the present subject didactics.

Holmberg et al. (2019) is a cross-Nordic study that aims at contributing to the understanding of the dynamics of the L1 research field by mapping and analysing patterns in Nordic PhD dissertations since the turn of the century (2000–2017). In the present context, however, focus is brought to the Danish PhD research. A co-conditioning background of this is that national, Nordic, and international research networks, associations and conferences are developed during the period, supporting growing internationalisation. With some delay, this has clearly influenced PhD-research. Although most dissertations from the period studied are Danish language monographs, this pattern has changed dramatically since 2017 so that today most dissertations are anthologies containing at least one paper in English.

Compared with the other Nordic countries, the number of Danish dissertations during the period under scrutiny is fairly small (n 32), probably mainly due to the institutional situation: the majority of the Danish dissertations have been hosted by university research units for educational sciences at Aarhus University and the University of Southern Denmark respectively. While SMD research programmes were

organized at these universities (cf. above), the research units had no systematic co-operation with teacher education. This is still true regarding the research unit at the University of Southern Denmark which has no systematic cooperation with the disciplinary education of upper secondary teachers. Regarding DPU at Aarhus University, this was changed to a certain degree during the second decade of this century due to a new funding system.

As to content, a pattern is that productive practices (especially writing) have a strong presence (n 11), followed by lesser numbers of literature didactics (n 8) and media and technology studies (n 8). Six dissertations theorise the subject didactic construction and aims of the subject or changes in didactics and identity that follow from the integration of media and technology in the subject. These dissertations were conducted in the first half of the period, while this kind of general studies of the subject are not found after 2010. Regarding research methods, a stable trend through the period is that ethnography (classroom observations, interviews) is conducted in one third of the studies, often supplemented with student texts. Since 2010, next to these, we find a growing number of design-based and intervention studies.

The conditional influence of funding is remarkable regarding quantity, institutional patterns, and content. Until 2010, there were no national funding agencies for educational research. In 2011, however, a new national program for practice-oriented school research into primary and secondary education was launched, offering 10–12 PhD stipends each year, and aiming at raising the educational level at the university colleges. Hence, the program has mainly funded PhD projects conducted by teacher educators and, through this policy, has also established mandatory co-operation between university PhD providers and university colleges, most strongly involving DPU, Aarhus University. This program has changed the Danish research into L1 education. Hence, since 2014 we have witnessed a steep growth in research towards lower secondary and primary school as compared to stagnant numbers for upper secondary school, a pattern which has become even more striking since 2017. As to content changes, these reflect a stronger direct impact of national policies and curricular reforms on issues and approaches in the research. One such trend is the growth in more specialised issues of teaching and learning where specific didactic practices or concepts are investigated, often through interventions. This trend could be conceived as the other side of the shifting picture concerning studies that theorise the school subject as a subject didactic construction and identity.

Thus, in summary, the case of PhD didactics of subject Danish illustrates a history of both gains and losses. The growth in practice oriented empirical design studies appears to have replaced theoretical studies into subject construction and identity, mainly due to external factors of funding and the more direct influence of policies and reforms.

Regarding the second theme, reference sciences for subject didactic research, the German analysis points at four constitutive reference sciences: Academic subject-matter disciplines, Educational sciences, Empirical Educational Research, and Other

subject didactics. Regarding the Danish case, to my knowledge, no general analysis of these matters exists. In the above two cases, however, we may observe that the three first reference sciences are at play while 'Other subject didactics' is a less obvious reference.

According to the Danish subject didactic community, especially regarding the SMD research programme at the University of Southern Denmark, *a fifth reference science* needs to be included, namely *semiotic communication theory*. Strongly inspired by Sigmund Ongstad (2006, 2014, 2021), subject didactics is theorized and researched as "*double reflectiveness*" (Krogh & Qvortrup, 2021, pp. 124 ff.). Hence a research-based subject didactics rests on relations between the content of the subject, the methods, and the reasons for choosing content and approaches. These aspects provide the point of departure for subject didactic practice and research. There is, however, also a need for meta-didactic reflection and communication which constitutes the primary task for contemporary disciplinary didactics. In today's knowledge economies, specialised knowledge is under pressure, and therefore, there is a need for subjects and disciplines to discuss and justify their special contribution to education in response to fast-changing conditions and contexts. Subject didactics occurs through and as communication, which as a meta-dimension involves reflection on subjects and disciplines. Ongstad has introduced *didactisation* as the key concept for the communicative processes of reflection that propel contemporary disciplinary didactics (Ongstad, 2006). He states, as a purely descriptive observation, that contemporary subject didactics, realised as didactisation, must take on a strategic responsibility to preserve, continue, and develop specialised knowledge that is under pressure from permanent change.

The above presentation is an almost direct reproduction of a passage in Krogh & Qvortrup (2021, p. 129) where these reflections are elaborated further. Semiotic communication is a reference discipline for both theoretical and empirical SMD research from the Danish SMD community. As a prominent example, we may mention the comprehensive cross-disciplinary project *Writing to learn, learning to write* where ethnographic studies into students' writing in the different school subjects resulted in a number of publications, both in Danish, directed at Danish and Nordic teachers, teacher students, and research communities, and also in English as in the finalising publication *Understanding Young People's Writing Development: Identity, Disciplinarity, and Education* (Krogh & Jakobsen, 2019).

5.   Linking content across subjects

"Given the results from the German context (as presented above under 5a- 5e) are those results also true for your own context or educational setting? For example: Is it true also for your own setting, that interdisciplinary links between subjects are primarily conditioned by three aspects: Life-world contexts, educational-political conditions and subject-

to-subject relationships? *Please compare the results from the German context with your own experience and observations.*"

Generally speaking, it is also true for the Danish educational setting that primary conditioning factors for interdisciplinary links between subjects are *Life-world contexts*, *educational-political conditions*, and *subject-to-subject relationships*.

Regarding *Life-world contexts*, based on general impressions, I believe that these are a common conditioning factor for problem-based interdisciplinary work in primary and early secondary education, while societal and global problems are more frequently addressed in the last years of the mandatory school (folkeskolen) and in upper secondary education. *Educational-political conditions* are highly important, in particular in upper secondary education where a radical reform in 2005 introduced mandatory "disciplinary collaboration" (fagligt samspil), organised systematically during the upper secondary years. Part of this was to write extended, interdisciplinary research papers which were ascribed great importance for the preparation of students for higher education. *Subject-to-subject relationships* have formed long traditions of interdisciplinary links, most often within groups of subjects that are disciplinarily related, such as collaboration between Danish and history, physics and mathematics, or between foreign language subjects.

Both potentials and ambivalences have been focused in Danish SMD research. At the fifth biennial symposium on comparative subject didactics in 2017, interdisciplinary work was the overall theme. Contributions were published in Andersen, Hobel & Holgersen (2019). *Tværfaglighed og fagligt samspil* (Interdisciplinarity and disciplinary collaboration). Potentials are emphasised in several projects. Martin Niss (2019) argues that highly specialised university studies in physics need to be put into perspective so that students may understand the nature and role in the world of their subject as well as similarities and differences between their subject and other subjects. In the chapter he illustrates this point by means of two cases where interdisciplinarity is put to work in projects addressing "Nature of science" issues. In these cases, approaches, methods and concepts from philosophy and history are brought to support the projects. As another example we could mention the study by Petra Daryai-Hansen and Susana Fernández (2019) who develop a theoretical conceptualisation of interdisciplinarity in foreign language didactics. They distinguish between an internal interdisciplinarity that bridge the sub-disciplines of foreign language subjects, a linguistic interdisciplinarity that bridges the foreign language subjects, and an external interdisciplinarity that bridges language learning with other disciplinary learning. The chapter, hence, adds to the theoretical understanding of interdisciplinarity and may also improve the quality of interdisciplinary work that includes foreign languages.

Ambivalences are, however, also addressed in this publication as well as in other subject didactic literature. Hence, Mie Buhl (2019) claims that in today's educational settings challenges of interdisciplinary work include not only differences of knowledge fields and differences of subject didactic traditions, but also include influences

from political management by standardising frames and goals and from the growing digitalisation of both educational administration and teaching practices. These "subject transforming mechanisms" increase the complexity of interdisciplinary work and call for a 'context-sensitive' approach to interdisciplinary work.

Two studies of upper secondary writing and writer development also provide insight into both ambivalences and potentials. Peter Hobel, who is a prominent voice in the Danish research on interdisciplinarity, investigates two young adults' writing experiences within mandatory multi-subject coursework and documents how the writing trajectories of both students fail to meet their expectations of knowledge development and disciplinary goals. Explanations of this appear to be the teachers' lack of collaboration and general challenges of meeting the interdisciplinary curricular demands. Hence, the study documents a mismatch between curricular ambitions of demanding interdisciplinary work and teachers' competences and resources. Ellen Krogh's (2019) study in a way turns this picture around. In this study, two upper secondary student writers are followed through three years, focusing their writing of extended "research papers". This study documents that the curricular aims of the extended papers are ambivalent since on the one hand, they call for disciplinary and interdisciplinary Bildung processes of 'immersion' and knowledge seeking, but on the other hand they reduce the aims to documentation of competence in the final product. Still, the students' trajectories reveal that experiences with writing "research papers" framed a commitment to disciplinary knowledge and writing as well as experiences of epistemic jumps. Hence, this study highlights strong potentials of interdisciplinary writing.

6. Linking subject-didactic research across subjects

"Given the results from the German context (as presented above under 6a–6e), are those also true for your own context or educational setting? For example: Is it true for your own context that four interdisciplinary dialogue partners are *constitutive* for subject didactics: 1) the respective academic subject areas, 2) other subject didactics, 3) Empirical Educational Research (as a specific field of its own), and 4) the educational sciences in general? *Please compare the results from the German context with your own experience and observations.*"

In the Danish setting, during the first decade of the century, the conception of a generalized subject didactics was given much attention in the subject didactic community, and in 2010 a network was established to pursue this idea. The network for "Sammenlignende fagdidaktik, SFD" (Comparative subject didactics) organises biennial symposia, documented in a number of (Danish language) publications (Krogh & Nielsen, 2011; Krogh & Nielsen, 2012; Krogh & Holgersen, 2014; Krogh & Holgersen, 2016; Andersen et al., 2019; Christensen et al., 2021). Since 2020, the network also publishes a digital journal, *Sammenlignende fagdidaktik.* At the initial symposium,

Frede V. Nielsen presented an elaborate model for the conduction of comparative subject didactics and argued that the comparative project created a need for basic, conceptual subject didactic analysis or constructions as a prerequisite for the comparative work. He further suggested that comparison has extraordinary potentials for contributing to this.

Through this, SFD takes an interesting double position. On one hand, the comparative activity presupposes a basic subject didactic conceptual identification. On the other hand, it contributes to the establishment of this. Hereby, comparative subject didactics gains something like a perspective that, with some caution, I shall term a "*General Subject Didactics*", that is, the establishment of subject didactic concepts and categories that are valid across subjects. (Nielsen, 2011, p. 29 translation and italics by EK).

While the agenda of the first three symposia were meta-questions of comparative subject didactics, the later symposia focus on more concrete issues. The comparative aspect has been actualised in the organization of the symposia where different subjects and educational levels and programmes are represented, and where dialogues are established between main papers and response papers. In Krogh (2021a), a response paper to the sixth symposium in 2020, I discuss this movement and argue that meta-studies are still highly relevant for comparative subject didactics as a young research field. In this response, I also introduce the present German GSD project as an inspiration for further work within the network.

Regarding constitutive and contingent reference disciplines for GSD – and comparative subject didactics – I am not able to offer any systematic information that goes further than what has already been discussed in section 4.

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20. Subject Didactics

An Israeli Perspective

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Introduction

To answer the questions posed, it is important to realize that there are currently four streams of education in Israel each with its own schools. There are state general schools, primarily for secular Jews; state religious schools, primarily for religious (orthodox) Zionist and nationalist Jews; state Arab sector schools, for Muslims, Christians, and Druze; and independent Haredi schools, for ultra-Orthodox Mizrachi and Ashkenazi Jews, both Hassidic and non-Hassidic. The language of instruction in the state Jewish schools, both general and religious, is Hebrew, in the state Arab schools, primarily Arabic, and in the independent Haredi schools primarily Yiddish. I say primarily in the latter two cases, since these schools cannot always avoid Hebrew as it is the language of public discourse in Israel and is required for entrance to most colleges and all universities. All three sectors of state education receive state funding through the Ministry of Education. The Haredi schools function independently, although they receive some funding from the public purse outside the Ministry of Education. Many elements of the curriculum in state sector schools are common, especially in math and science, but those elements relating to religious and national identity are different. Jewish and Arab Israeli schools also have different histories, even if those histories have overlapped to some extent since the establishment of the State of Israel in 1948. For the present purpose, I will focus on Jewish state schools, both general and religious. Most independent Haredi schools focus primarily on religious studies, with little secular education if any. Hence, I will refer to them to some extent in relation to the history of Jewish education as it has emerged in Israel, but not in relation to secular studies.

It is also important to emphasize that historically, Zionism, the ideology that inspired the creation of the modern state of Israel, resulted from two European revolutions, Enlightenment and Emancipation. Enlightenment was an 18th century intellectual movement that placed human reason at the heart of belief and practice (Gellner, 1992; Kant, 1989, 1997). Emancipation was a 19th century political movement that offered citizenship to all inhabitants of newly established nation states regardless of religious faith. This challenged the two pillars of premodern Jewish identity, religion and the politics. Throughout the Middle Ages, Jews lived in separate communities governed by rabbinic law that paid homage to local rulers as a collective, not as in-

dividuals. Enlightenment reason challenged Jewish religious belief and practice and Emancipation politics enabled Jews to leave their small communities as individuals, whether or not they wished to be identified as Jews, to become citizens of the larger nations in which they lived (Goldfarb, 2009).

Zionism is one of three major responses to this challenge. The others were religious liberalism – Reform, Conservative, and Modern Orthodox Judaism, which accepted the terms of emancipation and reconceived Jewish religion to adapt to citizenship in non-Jewish nation states, and Haredi or ultra-Orthodox Judaism, which rejected modernity altogether to preserve the traditional marriage of politics and religion. Zionism rejected the terms of Emancipation and redefined Jewish affiliation primarily in political terms, as citizenship in a Jewish (and later democratic) state (Alexander, 2018).

At the heart of this nationalist response to the challenge of modernity lies what Max Horkheimer and Theodor Adorno (2007) called "the dialectic of enlightenment." On their account, the celebration of reason by 18th-century Enlightenment thinkers led to the development of technologically sophisticated, but oppressive and inhumane modes of governance. Horkheimer and Adorno viewed twentieth century fascism as the primary outcome of this dialectic, which, among its other sins, perpetrated genocide against the Jews. In this connection, Zionist thought recognized that modernity had transformed the otherness of Jews in Europe from its theological roots into politically and racially motivated hatreds. According to this view, modern "enlightened" Europe may be less tolerant of Jews as a distinct cultural and ethnic entity, tied to a religious heritage, than its predecessors were in medieval Christendom.

Isaiah Berlin recognized, however, that the tensions within modern thought were more complex than this. He made two important distinctions in this connection. First, Berlin noted that the 18th century Enlightenment celebration of reason engendered a 19th century response. He called this response, counter Enlightenment (Berlin, 1998). It involved, among other characteristics, a romantic celebration of feeling, some aspects of which could be elevating and humanizing, but as Horkheimer and Adorno correctly pointed out, other expressions of which could lead to hatred and oppression. Second, Berlin (1969) also distinguished between positive and negative liberty. The former holds that in order to enjoy the benefits of citizenship one must profess a particular view of how to live, whereas the latter asserts that the state should only interfere with a person's actions when they impose illegitimate constraints on others. Berlin had deep reservations about positive liberty, untempered by its negative counterpart, because it entails forcing people to behave and believe in particular ways, whether or not they would choose to do so. He noted that this danger prevails especially within the totalitarian tendency of counter Enlightenment politics, on both the left and the right. However, he also noted that it exists within Enlightenment oriented liberalism as well, especially when it requires embracing a universal account of reason as a condition for participation in the public sphere (Alexander, 2015).

Even though modern Zionism arose in response to the dialectic of Enlightenment, it embodies rather than transcends that dialectic. The very idea of a Jewish and democratic state not only combines romantically motivated counter Enlightenment nationalism with rationally inspired Enlightenment liberalism, it also embodies the tensions between positive and negative liberty embedded within each of them. Witness the attempt by several right wing parties in Israel's current government to dismantle judicial oversight of parliamentary legislation, which they view as an unjustified imposition of liberal values on those who do not choose to accept them.

This Zionist response to the challenge of modernity became the backbone of a new state sponsored form of education for Jews rooted in these tensions. Among Jews of European origin, known as Ashkenazim, each of the Zionist ideologies – cultural, labor, liberal, revisionist, and religious Zionism – created their own schools in pre-state Palestine, which evolved into what became state sponsored education once the state was established. Among Jews of North African and Middle Eastern origin, known as Mizrachim, the *Alliance Israelite Universelle* created schools to teach secular subjects to Jews. The Secular Zionist and Alliance schools formed the basis of "general" state education, while the religious Zionist schools the basis for religious state education. The former interprets the Jewish side of the Jewish-democratic dialectic in terms of secular national culture, the latter in terms of the traditional marriage between religion and politics. I will now turn to the six areas of research on subject didactics, as proposed in the project.

1. Historical development of school subjects

Asked whether historical conditions including key personalities, socio-political or educational-organizational conditions influenced the Jewish school curriculum over the centuries, then my answer is decidedly yes, but in ways that may not parallel the German context. Jewish schooling in the land of Israel is very ancient. The Hebrew Bible, which dates back to around the tenth century BCE, emphasizes the responsibility of parents in transmitting Israelite narratives and customs to their children (e.g. Deut. 6:4–7; 20–25; Prov. 24:27–34; 27:23–27). However, it also alludes to schools established by priests and prophets in the centuries between the rise of the Davidic dynasty in the tenth century BCE ("Before Common/Current Era") until the destruction of the first Jerusalem Temple and Babylonian exile in the year 586 BCE (Judg. 17:10; Ps. 15: 19, 119; 78:1–4). The descendants of these exiles, who came to be called Jews since they hailed mostly from the ancient Israelite province of Judaea, returned to the land of Israel around 444 BCE (Alexander, 2001).

With the rebuilding of the Jerusalem Temple, worship moved gradually from the sacrificial cult to the recitation and study of sacred texts, until texts overtook sacrifice with the destruction of the second Temple by the Romans in the year 70 CE. The Hebrew Bible was canonized into what became known as Written Torah (Five Books

of Moses, Former and Latter Prophets, and Writings) around the second century BCE (Bickerman, 1949). In Hebrew, this text is sometimes referred to as "Mikra." A parallel tradition also emerged at this time that interpreted and applied Written Torah to changing circumstances. This Oral Torah was recorded in the second century CE in a legal code, independent of the biblical text that became known as the "Mishna" (Cohen 1987). This code organized Jewish life into 613 "Mitzvot" or divine commandments that are binding on all Jews from the age of thirteen. The case law of this oral tradition developed in the centuries that followed into what became known as "Talmud," although the term later came to refer to other forms of higher Jewish learning as well (Neusner, 1970).

Although there were competing Judean sects during the first century CE (Bickerman, 1948), according to rabbinic tradition the classical curriculum of Jewish schools was formally established when high priest Yehoshua ben Gamla appointed teachers of children for every village and town in ancient Israel (Babylonian Talmud, Bava Batra, 21a). The sages summarized this traditional curriculum by stating that a child is fit to study Mikra at five years of age, Mishna at ten, to observe Mitzvot at thirteen, and to study Talmud at fifteen (Mishna Avot 5:21). Ever since, scholars have interpreted these four terms—Mikra, Mishna, Mitzvot, and Talmud—to describe the content that is sufficiently worthwhile to merit transmission or transformation across the generations through education (Alexander & Glick, 2003). According to the most straightforward interpretation, that content includes the Hebrew Bible, especially the Five Books of Moses, the Mishnaic code of Jewish law, the observance of that law that becomes obligatory for a male at the age of thirteen, and the case law found in the Talmud. However, over the centuries, these categories became placeholders for the curriculum of Jewish schools as viewed from the vantage point of a variety of Jewish philosophies, theologies, and ideologies.

For example, followers of the twelfth century Jewish philosopher Moses Maimonides and other like-minded scholastics, include the rational contemplation of God as conceived by Aristotle as the highest form of "Talmud" (Twersky, 1972). By the same token, adherents to one or another interpretation of Jewish mystical traditions such as followers of various Sephardic and Hassidic sects may include the study of Cabbalistic texts and other contemplative, spiritual, or even magical practices under this heading, although they often delay exposure to the most sensitive mystical traditions until the age of forty (Scholem, 1995). This approach – Mikra as the elementary curriculum, Mishna as the content of secondary schooling, and debates over the meaning of Talmud at tertiary level – became the model for curricular subject matter in Jewish schooling for more than a millennium. Secular learning, as it later became known, what might be most closely compared to subject didactics in the contemporary European sense of the term, received little attention, except as it pertained to the practicalities of earning a living.

In anticipation of the emancipation of the Jews by Napoleon at the turn of the nineteenth century, Naftali Hertz Wiezel set the stage for a new, modern conception

of Jewish education in his acclaimed 1785 *Words of Peace and Truth*. Inspired by Kant's contemporary Moses Mendelson (1983), who held that the modern Jew should reserve religious observance for the private sphere, while reflecting neutral Enlightenment culture in the public sphere, Wiezel argued that the emerging modern Jewish schools should offer instruction in subject-matter drawn from both Jewish and non-Jewish society (Wiezel 1886). This served as the conceptual foundation for the two approaches to modern Jewish schooling that became the models for general and religious state schooling in Israel, the one committed to a secular, cultural interpretation of Jewish life, the other to Orthodoxy.

In the early nineteenth century, Samson Rafael Hirsch interpreted the rabbinic dictum, "It is good to combine the study of *Torah* with the ways of the world" (Mishna Avot 2:2): Students should study both the written and oral traditions of Mikra and Mishna, he proposed, along with content drawn from modern sources that he associated with the curriculum category of Talmud (Hirsch 1995). On this basis, dual curriculum schools emerged in German speaking lands in line with Neo- or Modern orthodoxy. This became the model for religious Zionists schools in pre-state Palestine and Religious State schools after the establishment of the state.

The *Alliance Israelite Universelle* followed suit in the late nineteenth century by establishing French-speaking Jewish schools in North Africa and the Middle East (Lasker, 1983), the school subjects of which were influenced by the French curriculum of the day. In a similar spirit, the Eastern European Jewish culture movement established Hebrew-speaking schools in the early twentieth century (Bar-El, 2010), the school subjects of which were heavily influenced by local national curricula, mostly Polish and German. Both of these movements promoted an enlightened secular humanistic interpretation of Judaism as the national culture of the Jewish people, articulated by the likes of Zionist ideologue Asher Ginsburg, who wrote under the pen name Ahad Ha'am (one of the people). They introduced science, humanities, and Jewish history into the curriculum.

This approach emerged into the educational streams established by various Zionist political parties in Palestine during Ottoman and British rule – Labor Zionist schools for the socialists, Hebrew culture schools for the cultural and political Zionists, and liberal Zionist schools for revisionists. It eventually became the model for Hebrew-speaking general state schools. That Hebrew became the language of instruction in all state-sponsored schools was a victory of the Jewish cultural movement, which set as one of its primary objectives the revival of Hebrew as a modern spoken language, rather than one reserved for study and prayer. However, it was also an achievement of linguist and grammarian Eliezer Ben Yehuda, the main driving force behind that revival, who published the first Modern Hebrew dictionary.

With the establishment of the State, there was a need to regularize the educational system within the framework of the Ministry of Education. The Knesset, Israel's parliament, accomplished this with the education law of 1953, which set the structure and goals of the educational system. The authors of this law initially conceived the general

school system as a common school for Israeli democracy that would incorporate all of the pre-state education streams. However, the needs of three groups required special treatment.

The religious Zionists required a dual track curriculum that included both secular and sacred studies in order to provide the education needed for Orthodox Jewish practice. The law accommodated for this by maintaining the pre-state religious Zionist stream, with its own governing council. Unlike Haredi Judaism, religious Zionism accepts the legitimacy of the State of Israel as a Jewish state. It follows Rabbi Abraham Isaac Kook, the first chief rabbi of the new Zionist community in Palestine, who held that the renewal of Jewish sovereignty in the land of Israel was a harbinger of divine redemption (Ravitzky, 1996).

Following classical rabbinic sources, however, Haredi Jews viewed this sort of messianism with suspicion. Only God can return Jewish sovereignty to Israel, in their view, so they consider the Zionist return a theological rebellion. Haredi leaders, therefore, seek to maintain independent control of ultra-Orthodox schools (Shahak & Mezvinsky, 2004). Finally, the Arab sector requires different linguistic, cultural, and religious demands, accommodated in a separate stream with its own governance. The 1953 education law also mandated that state-sponsored education advance the values of a Jewish and democratic state as set forth in Israel's Declaration of Independence, which enshrined the dialectics of Enlightenment in the educational system of the young state.

In sum, key personalities such as Naftali Hertz Wiezel, Samson Rafael Hirsch, Abraham Isaac Kook, Ahad Ha'am, and especially Eliezer Ben Yehuda, played significant roles in the emergence of broad ideological guidelines for the various subjects that Israeli schools would teach including the language of instruction. The content of secular (non-Jewish) subjects prior to the establishment of the state, however, interpreted by some to fall under the classic rabbinic category of "Talmud," were often influenced heavily by local national curricula, French, German, and Polish in particular. Similarly, the social-political circumstances of Enlightenment and Emancipation in Europe that precipitated the rise of modern Zionism and the Haredi resistance to it, along with the various secular and religious political parties that comprised the Zionist movement, exercised defining influence in the specific subjects that were eventually taught and the ideological narrative within which those subjects were interpreted. Prior to the establishment of the state, each party sponsored its own schools.

With the 1953 national education law, the humanistic-cultural streams combined into the state general educational system, while the religious Zionists created state religious schools. Under the joint supervision of the Ministry of Education, these educational streams shared a common secular curriculum in science, math, and language, both Hebrew and English, but diverged in their interpretations of Jewish subject matter. For example, although Hebrew Bible is a required subject in both streams, in general state school's Bible teaching follows a critical academic perspec-

tive, whereas in religious state schools traditional rabbinic commentary informs the Bible curriculum. Haredi schools, on the other hand, have remained independent of state control, teaching only traditional religious subjects.

2. Development and establishment of different subject didactics

My answer to whether there are formative periods in the establishment of school subjects in keeping with corresponding academic disciplines is also yes. Once again, however, Germany is quite different from the Israeli context, in which Enlightenment dialectics play a significant role. It will be useful here to distinguish between two sorts of Israeli educational scholarship concerning school subjects, which, as we will see presently, is heavily influenced by American educational research. One sort of scholarship, sometimes referred to as curriculum studies or curriculum theory, relates to the selection of instructional content in any given subject matter toward some social vision or end-in-view. A second scholarly concern, often called research on teaching or more recently learning science, addresses the teaching and learning of that subject matter, its pedagogy so to say. The term didactics in common Israeli and American parlance usually refers to the second of these concerns, but based on pedagogic traditions grounded more in ideology or the undocumented practice of teaching than in systematic empirical research. In the contemporary European context, however, the term didactics has come to combine these concerns, with an emphasis on the grounding pedagogic practice of the various disciplines in empirical research. That said, I address the emergence of scholarship about the selection of curriculum content from an Israeli perspective in this section of this/my chapter/my contribution, the aims this selection seeks to attain in section 3 and questions about research on teaching and learning in section 4.

I use the term "curriculum" in this context to denote what several leading American educational scholars call the formally announced content of instruction. This includes the explicit list of subjects to be taught in school for all grades, the published syllabus of any given subject matter for any given grade level, across the academic year and throughout the years of schooling, and the interaction among those syllabi throughout a youngster's education (Eisner, 1994; Goodlad, 1979). Used in this way, although the term can refer to content of a single lesson or a series of lessons on a narrow topic, it more often denotes a larger sequence of lessons in any given subject matter, throughout the school year and across the years of schooling. This is in contrast to other less formal aspects of learning and teaching sometimes called the implicit or hidden curriculum, that which is built into the culture or power structure of schooling, and the null curriculum, that which is not taught altogether (Eisner, 1994; Jackson, 1968).

State schools in Israel offer a centralized k-12 curriculum, in the relevant sense, culminating for those who matriculate at the end of the process in a Ministry administered exam. According to Israeli curriculum scholars Miriam Ben Peretz and Anat Zeidman (1986), the development of subject matter disciplines in this curriculum divides initially into three generations, up to the publication of their classic article in 1986. This established a nearly classical Hegelian historical dialectic between the two sides of the vision established by the 1953 education law, those inspired by Enlightenment ideas as opposed to those motivated by counter Enlightenment thought.

Enlightenment inspired curricula of this sort follow the epistemic traditions of natural and social science, communities of scholars discover knowledge found *outside of consciousness* and describe it in distinctive languages (Nikitina, 2005). Curricula that followed this view engage learners with the structures of academic disciplines, their methods of inquiry and rules of justification (Schwab, 1978). Studies of "personal epistemology" (Hofer & Pintrich, 2002; Khine, 2008) and "epistemic thinking" (Barzilai & Zohar, 2014) detail the skills necessary to achieve this goal. Curriculum content that follows counter Enlightenment thought, on the other hand, characteristically explores the *experiencing subject* through meaning and narrative generation (Green, 1971; Phenix, 1964), symbolic representation and its interpretation (Eisner, 1994; Gallagher, 1992), and social critique (Freire, 2000; 2005).

In the Israeli case, the counter Enlightenment side came first, since Zionism is itself a nationalist response to Enlightenment and Emancipation. It emphasized the cultivation of Jewish identity and affiliation, nationalist, religious, or a combination of the two. The Enlightenment response, on the other hand, focused on the educational requirements of a modern liberal democratic state. First came a pre-scientific counter Enlightenment phase, then an Enlightenment inspired scientific phase, followed by a counter Enlightenment motivated humanistic phase. During the years that followed, the back and forth between these dynamics continued.

The first generation of the Israeli curriculum lasted from 1948 until 1966. This period constitutes what Ben Peretz and Zeidman called a pre-scientific era. During this period, the Jewish nationalist narratives of pre-state Zionist ideological streams continued to dominate the schools, especially in primary (k-8) education. Secondary (9–12) education followed a European model, which distinguished between vocational and academic high schools, and within the latter, between tracks emphasizing the natural sciences versus those focused on the humanities. Governmental and formal academic supervision of the curriculum was in its infancy. Ministry of Education officials developed curriculum outlines, not materials, without reference to professional principles of curriculum design or evaluation but with a focus on transmitting knowledge as seen through the eyes of cultural heritage. Teachers created instructional materials and methods using a variety of textbooks at their disposal.

The second generation of Israeli curriculum transpired from 1966 until the late 1970s. Ben Peretz and Zeidman called this the scientific phase of the Israeli curriculum. During this period, teams of subject matter, pedagogy, and curriculum special-

ists developed instructional materials according to a "scientific" model, which conceived subject matter primarily in terms of the "structure of the disciplines." The role of teachers was to implement the intentions of these designers that were subjected to formal evaluation. In an attempt to unify the curriculum from the diverse ideological and theological narratives that dominated the pre-state and first generation eras, an Enlightenment inspired conception of objective knowledge became the focus of the curriculum in both the natural and human sciences, grounded in the academic disciplines as taught at university. This period culminated in an educational reform in 1969 greatly influenced by American educational thought and practice. Among other innovations, this reform replaced the two level model, k-8 primary and 9–12 secondary schools, with three levels, k-6 elementary school, 7–9 middle or junior high school, and 10–12 high school. It also eliminated the distinction between vocational and academic high schools in favor of an American style comprehensive high school.

The tight connection between school subject matter and the university-based academic disciplines emerged during this period, following Jerome Bruner's (1960) now classic *The Process of Education.* A Ministry of Education supervisor oversees each disciplined subject to a subject matter committee consisting of educators and professors of the discipline. The new Center for Curriculum development of the Ministry of Education invited Benjamin Bloom from the University of Chicago to serve as an adviser in 1959 and in 1960 a UNESCO funded delegation went to Chicago for a year of training with Bloom and his colleagues Joseph Schwab (1978) and Ralph Tyler (1949). Israel's first universities were founded in the nineteen twenties on the model of their German counterparts, which were the global leaders of higher learning at that time. However, the Hebrew University only established Israel's first research-oriented, professional school of education in 1950, when American higher education began to exert influence, with its emphasis on the demands of liberal democracy. It is not accidental that the first head of that school was the American Jewish educator and disciple of John Dewey, Alexander Dushkin (1975). This may be why American educational thought has exerted an outsized influence on Israeli curriculum design and educational research.

The third generation of the Israeli curricula starts around the late nineteen seventies, after the Ministry solicited advice from Elliot Eisner (1994), a counter Enlightenment, humanistically oriented disciple and critic of the Chicago Enlightenment curriculum theorists. Ben Peretz and Zeidman called this the "humanistic" curriculum era. It begins a counter-Enlightenment response to the Enlightenment inspired structure of the disciplines movement that prevailed in the previous era. Scholars, policy-makers, and practitioners came to view curriculum as the total experience of participants, learners as well as teachers, not only as academic subject matter. Perception of participants in the educational process became important in curriculum development, which became less structured. The personal implications of knowledge received greater emphasis. Teacher autonomy and expertise became important

curricular considerations. The nature of curriculum materials and implementation strategies changed accordingly. Curriculum materials became increasingly modular and showed less of a predetermined sequential structure. This period culminated in the early nineteen nineties with reforms of the matriculation exam recommended by a committee headed by Miriam Ben Peretz, proposed reforms to the Jewish studies curriculum in general state schools from a committee headed by Aliza Shinhar, and proposed reforms to citizenship education in all state schools from a committee headed by Mordecai Kremnitzer.

Attempts to implement these third generation reforms were often unsuccessful, in part due to the delicate dynamics of the Israeli many-partied parliamentary system, in which governments rarely last a full four year term. It is not in the political interest of each new Minister of Education to carry out the reforms of his or her predecessor. During the early years of the twenty first century, the discipline of curriculum studies that had guided the previous generations of Israeli curriculum development declined, in the United States as well as in Israel, but the dialectics of Enlightenment embedded in Israeli state education continued. Education Minister Limor Livnat attempted Enlightenment inspired neo-liberal curriculum reforms that sought to impose core math and language competencies on all sectors, including the ultra-Orthodox. By 2013, the counter Enlightenment reasserted itself, when Education Minister, Rabbi Shai Peron, introduced new reforms emphasizing meaningful learning. His successor, Naftali Bennet, revived Enlightenment inspired neo-liberal ideals, with an enhanced mathematics curriculum. Most recently, Dr. Miri Schlissel, chair of the pedagogy secretariat, which controls the curriculum, pursued somewhat of a synthesis in an OECD inspired interdisciplinary curriculum, especially in the arts and humanities.

In sum, much like the German case, the development of subject matter didactics in Israel, at least its curriculum content side, involved three influential factors: social and historical circumstances, relations between school subjects and university based academic disciplines, and the impact of key personalities. In terms of social historical circumstances, of particular relevance are the two revolutions of modernity that brought about the rise of modern Zionism and the dialectic between Enlightenment and counter Enlightenment embedded in the Zionist idea. Relations between school subjects and academic disciplines has evolved over the 75 years of Israel's existence following and back and forth between Enlightenment and counter Enlightenment inspired curriculum thought. Finally, especially impactful personalities include Alexander Dushkin, the first Director of the Hebrew University School of Education, who pioneered the influence of American educational research and practice in Israel, and American education scholar Benjamin Bloom, who advised the Ministry of Education in the early years of the state and facilitated the training of curriculum development professionals.

3. Goals, content, and competencies

In addition to the structure of the academic disciplines, that which Vollmer and Rothgangel (in this volume) call socio-cultural lifeworld contexts, also inform Israeli goals in choosing curriculum content. This is especially evident in the humanities and social sciences where tensions between Enlightenment and counter Enlightenment, democratic and Jewish, lie at the heart of the curriculum, where one understands Jewishness either as some version of orthodox religion or as modern secular national culture. In the natural sciences, however, the content of which is consistent in both general and religious state schools, the anthropology of the STEM disciplines also holds sway, in addition of course to the structure of the disciplines. What Rothgangel and Vollmer refer to as subject-based *praxis*, on the other hand, tends to exercise greater influence in relation to pedagogical questions concerning teaching and learning than aims, content, and competencies, which will be considered in section 4 (Rothgangel & Vollmer, 2020).

The Israeli version of the debate between education for knowledge and competencies, on the one hand, or for what Germans call Bildung and Anglo Americans liberal education, or more recently, character education, on the other, holds sway more in humanities education and social studies than in STEM subjects, where scientific competence reigns supreme. There is a close-knit community of science and math educators, primarily housed at the research universities and science and technology institutes, who interact with one another and exercise authority over the aims, content, and competencies of the STEM curriculum. The humanities and social studies curriculum, on the other hand, before and during the early years of the state, emphasized one interpretation or another of the Zionist Jewish narrative, a counter Enlightenment response to the nineteenth century European Emancipation of the Jews. This development challenged the traditional Jewish marriage between religious and political identity by allowing Jews to become citizens of the newly emerging nation state. As noted, the Zionist response to Emancipation doubted whether this new political entity would in fact accept the Jews and so redefined Jewishness in primarily counter Enlightenment political terms, as citizenship in a Jewish nation state. This required a narrative that characterized Jewishness as a national culture and a curriculum, religious or secular, that emphasized the presumed values of that culture.

The secular version of that narrative became intermingled with the very idea of statehood, the appreciation of which was among the highest values of the curriculum in all three state sponsored streams. In an effort to overcome the differences among the secular Zionist ideologies of the pre-state educational streams, as well as those among the streams that remained after the establishment of the state, this version of the Zionist narrative transformed into a form of liberal neutrality. Its distinctive voice as a Jewish narrative, consequently, became increasingly inarticulate over the years (Yehi-Shalom, 2020). In its place, the so-called objective knowledge of the academic

disciplines came to dominate the curriculum, and repeated efforts to reassert Jewish values in one form or another faltered.

Israeli Jewish secularists have tended to forfeit Judaism to the Orthodox. In contrast, Reform, Conservative, and to some extent Modern Orthodox Jews, who reside mostly in North America, together with a small contingent in Israel, have rigorously engaged Judaism with democratic values for nearly two centuries. Whereas liberal North American Jews interpreted Jewish life in keeping with the democratic values they found in the United States and Canada, ultra-Orthodox and Zionist Jews, both secular and religious, have too often colluded to delegitimize their Diaspora counterparts by refusing them full recognition. Hence, by virtue of their perceived inauthenticity, the conversation about democracy and Judaism in Israeli education tends to exclude those most engaged with negotiating this dialectic between Enlightenment and counter Enlightenment.

The religious Zionist narrative, on the other hand, has become increasingly strident, influenced by more extreme Haredi and nationalist pressure, which both strive to claim sole legitimacy over matters of Jewish law and identity. In the absence of a coherent liberal secular Jewish narrative, this account of Jewishness has become increasingly influential in the Jewish schools, with a corresponding critical response among Arab (Palestinian) citizens of Israel (Agbaria, 2011).

To reassert this Enlightenment inspired narrative of liberal Jewish neutrality, in 2019 the Ministry of Education announced that it would incorporate into the curriculum competencies articulated in the OECD Future of Education and Skills Project. The aim was to build a common understanding of the knowledge, skills, attitudes, and values students need in the 21st century. A move toward interdisciplinarity followed, especially in the humanistic disciplines, which has now stalled with the election a new extreme right-wing government. Although this right-leaning trend is most influential in humanities education and social studies, it may also come to influence science instruction as well, when it comes to theories about the origins of the universe, of life, and of humans that may conflict with some interpretations of the biblical creation narrative.

In sum, in addition to the structure of the academic disciplines, socio-cultural life worlds have played a significant role in determining the goals, content, and competencies of the formal Israeli humanities and social studies curriculum. This is especially evident in the dialectical tension between the Enlightenment inspired liberal democratic ethos of the state, on the one hand, and various counter Enlightenment influenced national and religious narratives, on the other. While the anthropology of the disciplines does influence STEM related subjects, where the content of the curriculum is the same in both general and religious state schools, subject based praxis tends to have greater influence over pedagogy than it does over curricular aims, content, and competencies.

4. Subject didactic research

Given the American influence on Israeli educational scholarship, it is not surprising that subject matter related educational research in Israel began from a positivist perspective that emphasized quantitative pedagogic principals independent of the disciplines, based on the psychology of learning and human development. However, as the academic disciplines came to dominate the curriculum, university study of those disciplines became increasingly important. Within the humanities and social sciences, this entailed a shift of emphasis from pedagogies grounded in the Zionist or religious narrative around to those rooted in the discovery, justification, and transmission of academic knowledge, including subject-based praxis. In disciplines such as Bible and Jewish thought, for example, becoming a chief subject matter supervisor in the Ministry of Education required an advanced degree in the discipline itself, not research on pedagogy of the discipline (subject matter didactics) or other related issues in educational scholarship. In this spirit, a study of an honors teacher education program in Jewish studies at the Hebrew University revealed that the students valued their studies in particular subject matter disciplines more than in generalized pedagogic knowledge (Shkedi, 1998; 2000).

As in the United States, two trends have challenged this marriage of quantitative research to academic disciplinarity that have greatly influenced Israeli educational research, practice, and policy, the rise and fall of curriculum studies and the qualitative revolution in educational research. During the second half of the last century, curriculum studies challenged this positivist hegemony by drawing on historical, sociological, philosophical, theological, and critical scholarship, and on practical experience. Among the most influential of these curriculum theorists was Joseph Schwab, a University of Chicago education professor whose student Seymour Fox headed the Hebrew University School of Education during the nineteen eighties. Fox influenced a generation of scholars who went on to teach at other Israeli universities. Schwab's work emphasized the practical in education, that is, the ways in which formal and informal curricula are actually developed and implemented in educational systems and schools. This process was eclectic, he argued, combining the perspectives of communities and teachers with knowledge of the subject matter and of the psychology of learning.

A paradigm shift in educational research methodologies accompanied a decline in the influence of this sort of curriculum thought. In addition to statistical generalization about pedagogic principles, qualitative research began drawing on the systematic analysis of observations, interviews, and material culture to understand what Philip Jackson (1968), also a Chicago professor, famously called "life in classrooms." The work of Lee Shulman (1987/2004) at Stanford University on what he called the wisdom of teaching practice is probably the most important influence within this genre for the present purpose. Shulman and his students, disciples of whom ended up at Israeli institutions, sought to understand what they called pedagogic content

knowledge, that is, what teachers know about the teaching of a particular subject such as math, biology, history, or literature. This tradition and its many offshoots inspired several generations of research on math and science education, and more recently on the teaching of history, literature, and Hebrew Bible (Ludmir-Maram, 2022). Bible is a required subject in the general state schools, taught from an academic cultural humanistic perspective (Yaniv, 2010). It is also required in religious state schools, taught from a traditional orthodox point of view (Shiprovitch, 2022).

The most recent innovation in Israeli educational research has come from the so-called learning sciences, which draws on research practice partnerships associated with educational technologies to refocus attention once again on student learning, this time in the form of empirically tested design principles that transcend the disciplines. A nationally funded Center of Research Excellence entitled *Links*: "Learning in a Networked Society" brought together researchers from across the Israeli academy to spearhead this innovation (Kali, Baram-Tsabari & Shejecter, 2019). As in our discussion of goals and content, these innovations have accompanied an interdisciplinary turn within the academic disciplines that has begun to influence the school curriculum (Kidron & Kali, 2015). This said, the recently elected hard right wing government aspires to return both nationalist and Orthodox religious narratives, which constitute their distinct account of what Berlin called positive liberty, to the heart of humanities and social studies instruction. This is accompanied by traditional subject based praxis, as opposed to didactics grounded in empirical evidence.

In sum, the empirical turn that has come to dominate German subject matter didactics has also influenced Israeli pedagogic research, although in ways that may not parallel the German case. Positivist research on teaching and learning replaced narrative and subject matter based pedagogies in the early days of Israeli educational research in the 1950s and 1960s. As the qualitative revolution in educational research made its way to Israel in the 1980s and 1990s, new forms of empirical didactic research began to take hold in research on science and math instruction as well as in scholarship on humanities education and social studies. Followed by the rise of the learning sciences, this has most recently be accompanied by a push to assert hard right nationalist and messianic versions of the Zionist narrative in the curriculum along with ultra-Orthodox accounts of Jewish religion that are not necessarily in sync with any interpretation of Zionism or with subject didactics grounded in empirical evidence.

5. Linking content and didactic research across subjects

Although curriculum content and didactic research are separate topics, the one relating to the substance taught, the other to research on that teaching, I will treat them here under one heading. This is because the interdisciplinary turn breaks down barriers, not only among the disciplines, but also between the study, practice, and

content of pedagogy. Among the hallmark innovations of the learning sciences, for example, are the ideas of design-based implementation research (DBIR) (Fishman, Penuel, Allen, Cheng, & Sabelli, 2013) and "research-practice-partnerships" (RPPs) (Friesen & Brown, 2023), in which decisions about what to teach, how to teach it, and how to study that teaching are shared by researchers and practitioners.

Within academic research in natural science, the interdisciplinary turn emerged to understand how the world works. This trickled into the schools through Enlightenment inspired educational thought which has become increasingly influential in the curriculum of many countries (Kliebard, 1975), especially Israel (Glick, 2022). Those that follow the counter Enlightenment view, however, have languished (Eisner, 1994) and, as was mentioned, the various Israeli educational reforms advocated within this perspective have failed to take hold (Zohar, 2021). Indeed, curricula following the second approach have become increasingly rare and studies of them are rarer still. This may be due, at least in part, to the fact that counter Enlightenment curriculum thought often positions itself as a critique or reconceptualization of its Enlightenment counterparts (Pinar, 1975).

Three well-known approaches to interdisciplinary teaching and learning follow from these two views of disciplinarity in the curriculum. The cognitive perspective is associated with Enlightenment ideals, while the counter Enlightenment trends provide inspiration to the sociocultural and critical orientations. A comprehensive study of interdisciplinarity in Israeli humanities education entitled "IDEAS: Interdisciplinary Educational Approaches in Secondary Schools," hypothesized that the interdisciplinary turn emerged, at least in part, out of a desire among practitioners to fill this gap among counter Enlightenment inspired curricula. This could be achieved, perhaps, by putting into practice sociocultural or critical reconceptualizations of cognitivist approaches to teaching and learning (Novis-Deutsch et al, forthcoming).

The *cognitive* approach to teaching and learning focuses primarily on understanding ways of thinking (Hirst, 2010). This view understands disciplinarity in terms of content and expertise. Schwab (1978) adopted a cognitive lens when he maintained that each discipline develops fundamental concepts: e.g., *tragedy* in literature and *number, measure, and probability* in science. Similarly, Wineburg (2001) identified professional historians' disciplinary ways of thinking and knowing by asking them to think aloud as they engaged with historical documents. When applied to interdisciplinary K-12 settings, adopting the cognitive approach often means focusing on students' reasoning. For instance, Karpudewan & Roth (2018) investigated student reasoning to show how students made increasingly *less* intuitive and *more* evidence-based decisions, which reflected an improvement in their cognitive competency. A key goal of interdisciplinary education, in this view, should be for learners to develop transferable skills (Pellegrino & Hilton, 2012) that bring knowledge, thinking, and values into conversation across disciplines.

The *sociocultural* approach frames the goal of interdisciplinary teaching and learning through what Josselson (2004) calls a "hermeneutics of faith," which aims

to restore meaning to a text or social situation. In this view, authentic disciplines are complex webs of human interaction that create knowledge and infuse it with meaning (Lave, 1991). Just as carpenters and cabinet-makers use chisels differently, historians and literary critics use language differently, depending on their disciplinary cultures (Brown et al., 1989). From a sociocultural perspective, successfully implementing interdisciplinary learning in a K-12 context would entail situating interdisciplinary knowledge in authentic settings. For instance, Fang et al. (2008) studied an interdisciplinary unit that invited learners to borrow books from a school library and read them with family members during the week, which situated them in an authentic sociocultural context and fused them with meaning.

In *critical* terms, interdisciplinary teaching and learning explores what Ricoeur (1977) called a "hermeneutic of suspicion," which entails decoding subversive or oppressive meanings that are disguised in texts or behaviors (Apple, 2004). Interdisciplinarity, in this view, marks an opportunity to unveil and undermine institutional power structures, to empower individuals to engage in activities previously considered illegitimate, and to redistribute power and resources in ways that were previously impossible (Fish, 1989). This is accomplished by criticizing prevailing regimes of meaning and practice in order to widen one's view and entertain alternative perspectives. In K-12 settings, this can translate into attempts to empower disempowered groups. This can be accomplished by releasing students from the dictates of the official disciplinary curriculum and inviting them to determine what and how to learn (Fitzpatrick et al., 2018), or by combining subjects in ways that ameliorate racial biases that are embedded in the official disciplinary curriculum (Lee et al., 2005).

The IDEAS study found that Israeli teachers were more concerned with practical than with theoretical matters and that creating a dialogue among disciplines depends upon disciplinary knowledge and skills. Israeli researchers of teaching and learning in specific subject matter areas such as math, science, and Bible – those who might be analogous to German specialists in subject didactic – are more prevalent among college and university faculty than among elementary or secondary school teachers. It also found that capacities for meaning-making, artistic representation and social critique require complementary cognitive skills. These include integrative complexity (Suedfeld & Tetlock, 2014), ontological and pluralistic reasoning (Berlin, 1969; Novis-Deutsch, 2018; Quine, 1969), epistemological negotiation (Welch, 2012), and divergent and convergent thinking (Olson et al., 2021). Finally, the study discovered that to accomplish interdisciplinary learning and teaching, at least in the humanities, both secular and religious, requires a social vision within which to interpret the artifacts upon which the arts and humanities focus their disciplined attention. Such a social vision may be comparable to the life-worlds, political conditions, and subject-subject relations identified in the German context. As mentioned, the cultural humanistic version of this narrative has become increasingly inarticulate in state general schools over the past several decades, often challenged by the ideologies of religious Zionism or ultra-Orthodoxy.

In sum, the IDEAS study did not find in the Israeli context, as Rothgangel and Vollmer did in Germany, that the subject didactics, the respective disciplines, subject didactics, educational studies as a field of inquiry, and empirical education research in specific subject area the requisite ingredients for interdisciplinary humanities education or the study thereof. However, the study did make four recommendations to the Ministry of Education should it seek to pursue interdisciplinary teaching and learning in the humanities These recommendations reflect some of Rothgangel & Vollmer's concerns to some degree.

(1) Interdisciplinary teaching and learning should combine cultivation of interdisciplinary skills, such as the capacity to consider alternative points of view, with a social vision that values such a capacity. This reflects Rothgangel & Vollmer's finding that subject didactics are a constituent ingredient of interdisciplinarity in education, to the extent that knowledge, skills, and values are essential to the didactics of any subject matter.

(2) Interdisciplinary teaching and learning cannot be separated from study of the disciplines themselves, whether before or after interdisciplinary lessons. This parallels the Rothgangel & Vollmer finding that the respective disciplines themselves must engage one another for interdisciplinary education to transpire.

(3) Interdisciplinary teaching and learning requires an institutional commitment that includes the allocation of resources necessary for structural change, including the allocation of teaching hours and compensation for professional development and curriculum innovation. This might be associated with the importance Rothgangel & Vollmer attribute to educational studies, at least those topics in educational studies devoted to researching school administration and the allocation of resources.

Finally, (4) interdisciplinary teaching and learning must address the extent to which teachers define their professional identities in terms of specific disciplines (i.e., as history, literature, language, or Bible teachers) and prepare them in both preservice and professional development settings to engage in interdisciplinary instruction. This echoes Rothgangel & Vollmer's concern with empirical educational research on specific topics, in this instance teacher education and teacher identity.

6. Conclusion

Although there are significant similarities between Israeli and German subject didactics, there are also some differences. When it comes to the historical development of school subjects, as in Germany, key personalities, socio-political circumstances, and educational organizations influenced the Israeli curriculum. Similarly, much like the German case, the development of subject matter didactics in Israel, at least as relating

to curriculum content, involved three influential factors: social and historical circum-stances, relations between school subjects and university based academic disciplines, and the impact of key personalities. However, in determining the goals, content, and competencies of the formal Israeli curriculum, although the structure of the academic disciplines and socio-cultural life worlds played a significant role in humanities, so-cial studies, and STEM curricula, life worlds played a less significant role in STEM, where the anthropology of the disciplines are more influential. Subject-based praxis has been more important in methods of instruction than in selection of curriculum content. Concerning the empirical turn in German subject didactics research, Israeli education has followed the American example. It moved from a primarily positivist orientation in the 1950s and 1960s, to embracing qualitative methodologies in the 1990s and early 2000s, to endorsing mixed methods in the decades that followed, Nevertheless, this could be affected by the recently elected right wing government, which appears to be less enamored with evidence based policy and practice than its predecessors. Finally, pertaining to interdisciplinarity in curriculum content and subject didactics research, although a leading Israeli study on the topic may not have found the four ingredients articulated by Rothgangel and Vollmer to be constituent of interdisciplinary education and didactic research, it did make recommendations that reflected some of the key concerns in each of the four categories.

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21. Why no Subject Didactics in England?

Brian Hudson

Introduction

I greatly appreciate the invitation by Helmut Vollmer and Martin Rothgangel to contribute to such a significant publication. To be able to present the situation regarding subject didactics as an academic discipline in England, or rather the lack of it, it is necessary to consider the national policy context and historical development of education in the country over a significant period. I have structured my contribution around three key questions. The first of these is "Why no pedagogy in England?" that was first raised by Brian Simon in his influential paper published over forty years ago (Simon, 1981). The original paper was reprinted twice (Simon, 1985 and 1994), and, in this contribution, I refer to Simon (1985). The second question is "Why no didactics in England?" which is inspired by the response from David Hamilton to Brian Simon in his paper "The Pedagogic Paradox (Why no didactics in England)?" (Hamilton, 1999). I consider the longer-term historical development and the influence of more recent European and international developments in discussing these two questions. Thirdly, I directly address the question of "Why no subject didactics in England?". In doing so, I discuss the way in which subject-specific education reflects a 'blind spot' on the part of policy makers, especially since 2010, and how its place in teacher education has become increasingly marginalised during this time.

In the discussion I reflect on the competing conceptions of both quality and professionalism between the academic community and policy makers over recent years and on an associated clash of values about the nature of higher education and its role in the professional education of teachers. Despite what may seem to be very infertile ground however, I outline some contemporary developments within the academic community in relation to subject-specific education that show promise for the future should there be the development of a more enlightened policy context. Furthermore, I draw a comparison with developments in Sweden where I have strong research ties. I do so by considering the nature of Educational Sciences, which have evolved over recent years, and which represent a policy direction that contrasts sharply with that in England. By comparing the two countries and their policies in this way, the educational consequences and implications for both become clear. Finally, I offer a summary overview of the current situation in England and reflect on the likely consequences should the direction of policy remain unchanged in future years. Through this process I hope that the topical areas and questions raised by the editors will be addressed fully.

Prior to developing an outline of the context and historical development, it is necessary to make some preliminary remarks about the organisation of education and associated research across the UK for an international readership. The situation has evolved over time and in 2023, England has a distinct school system and associated system of teacher education within the UK. However higher education and research funding are organised across the four nations (England, Northern Ireland, Scotland and Wales) as a UK-wide system. Further, in carrying out the research for this paper, I have noticed ambiguities in relation to the use of the terms "subject" and "discipline" and so I have chosen to refer to "academic disciplines" in higher education and "school subjects" at the level of school education.

21.1 Why no pedagogy in England?

In his opening, Simon (1985, p. 77) emphasises that he uses the term "pedagogy" in the sense of the "science of teaching". He explains that the title is meant to imply that no such science exists in England and that the term was generally shunned which certainly was the case at the time of writing. He argues that the contrast with other European countries is striking with the term having an "honoured place" which he attributes the influence of the work of Comenius in the seventeenth century that was developed and elaborated by Pestalozzi and Herbart in later years.

He also draws attention to the work of Alexander Bain published over a century earlier entitled "Education as a Science" (Bain, 1879) and comments on how "less and less has been heard of this claim" (ibid) since that time. Bain was Professor of Logic at the University of Aberdeen and in the Preface to his book he says that he has "surveyed the Teaching Art, as far as possible, from a scientific point of view" (ibid, p. v). He continues by arguing that "the scientific treatment of any art consists partly in applying the principles of the several sciences involved" (ibid, p. 1). In discussing education, he quotes from the definition embodied in the ideal of the founders of the Prussian National System as being concerned with "the harmonious and equable evolution of the human powers" (ibid, p. 1). He (ibid, p. 77) notes that the most striking aspect of thinking and discussion at that time about education in England was its eclectic character, reflecting deep confusion of thought, and of aims and purposes, relating to learning and teaching – to pedagogy. With reference to what he describes as the "Schools Council approach" he argues that this reflected "a pluralism run wild – a mass of disparate projects". He puts this down to the concept of pedagogy as a science of teaching embodying both curriculum and pedagogy as "being alien to our experience and way of thinking" (ibid, p. 78). In considering the reasons for this situation he argues that among them was the widespread acceptance of the unresolved dichotomies between so called *progressive* and *traditional* approaches and *child-centred* versus *subject-centred* approaches which will resonate

with many involved in education in England at this time, especially since the election of the Conservative led government in 2010.

In considering the reasons for the lack of interest in the development of pedagogy in England, Simon starts from the period in the late 19th century around the time in the lead up to the 1870 Education Act. According to the UK Parliament Living Heritage website[1] this "stands as the very first piece of legislation to deal specifically with the provision of elementary school education in England and Wales … on a national scale". Prior to the act there was no national system of education with only a small minority of children receiving any education[2]. The schools that did exist were fee paying Grammar Schools, Charity Schools and the Public Schools of which the most pre-eminent were Eton, Harrow and Westminster and financially out of reach to all but wealthy members of the ruling class. In 1869, the National Education League had been established to campaign for free, compulsory and non-religious education for all children. The Act allowed for the voluntary schools to continue and established a system of "School Boards" to build and manage new schools in areas of need. The boards were locally elected bodies and were funded from the local taxes or "rates". In contrast to the voluntary schools, religious education in these schools was to be non-denominational. A separate Act extended similar provisions to Scotland in 1872.

Simon (ibid, p. 79) highlights the way in which the public schools had developed a system for serving the Victorian upper middle classes and had also played a major role in the symbiosis of aristocracy and bourgeoisie which characterised the late nineteenth century. He also emphasises the way in which *socialisation* was a major function of these schools at the time with little focus on intellectual development. Rather the formation of character, "specifically the qualities involved in the concept of 'manliness'" (ibid, p. 80) was seen as more important, "especially in the conditions of developing imperialism" (ibid, p. 80). He argues further that

> "The (historical) denigration of the value of professional training by the public schools, then, falls into place; it simply did not appear as relevant to the schoolmasters' profession … And this, of course, implies disdain for the concept of pedagogy – or of a science of teaching – since the function of professional training is, in theory, to lay the basis in the science or art of teaching." (ibid, p. 81)

In contrast, Simon (ibid, p. 82) draws attention to the way in which there was a "serious attempt to integrate theoretical knowledge with the practice of education" by the advanced School Boards in the main industrial cities of the time which were concentrated in the North of England. He discusses the way in which there was an indigenous growth within the system of elementary education which reached its height

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1 https://www.parliament.uk/about/living-heritage/transformingsociety/livinglearning/school/overview/1870educationact/

2 https://www.parliament.uk/about/living-heritage/transformingsociety/livinglearning/school/overview/before19thcentury/

as the new school system became of age (ibid, p. 82) in the last decade of the nineteenth century. He argues that this is a relevant phenomenon that is worth serious attention for its lessons today. There was a parallel development of training colleges, pupil-teacher centres and technical institutions of various kinds some of which were developed in cooperation with the Technical Education Boards that were established after 1888. Through these developments there was the start of a cohesive system of education from infant school through to higher education. It was during this time that Bain's (1879) book "Education as a Science" was published. It was reprinted six times in the 1880s and a further ten times before the turn of the century. Simon points out (ibid, p. 83) how, through the examination of several of the many student-teacher manuals that proliferated around this time, inspiration was drawn from the work of Bain in terms of both theoretical issues and the practice of teaching. Bain was seen as the last of the classic line of associationists in the field of psychology and based his work on a view of education as being "concerned with acquired capacities and functions … human change and development" (ibid, p. 84).

Subsequently Simon (ibid, p. 85) asks "What happened? Why was this embryo pedagogy not systematically developed? What went wrong?" He refers to the administrative and legislative events of 1899 to 1904 as being "almost traumatic" in their effects in stopping the organic growth of the elementary system. The UK Parliament Living Heritage website presents a quite anodyne account of the changes during 1902–14[3] which stresses the fact that by the 1890s there were over 2500 new school boards and around 14,000 committees of management for individual voluntary schools. This dual system was seen to be "uneven in administrative terms" and voluntary schools were seen to be at a disadvantage since their funding came from central government grants rather than from local rates. Reference is made to the radical reorganisation of the administration of education at the local level and the abolition of the school boards in England and Wales. Local education authorities were given the responsibility for all elementary schools under the control of the county and county borough councils that had been established in 1888. The school boards remained in Scotland until 1918 at which time they were replaced by elected county authorities and then by the county councils in 1929. Regarding secondary education, the act made significant provision for secondary and technical education with councils encouraged to subsidise existing grammar schools and to provide free places for working-class children. They were also given powers to set up new secondary grammar schools, but the expansion of secondary education was slow to develop, and these schools were seen to cater mainly for the middle classes.

However, Simon is much less anodyne in his description of these changes referring to a "deeply Conservative government in the period 1899–1904" (ibid, p. 83) and

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3 https://www.parliament.uk/about/living-heritage/transformingsociety/livinglearning/school/overview/reform1902-14/

to the confinement of "elementary education within precise limits, setting up a system of 'secondary' schooling parallel to, but quite separate from, the elementary system." He discusses this period in greater detail in his book "Education and the Labour Movement 1870–1920" (Simon, 1974) and in doing so draws attention to the associated long and bitter political struggle. He (ibid, p. 191) describes "the undermining of the School Boards" by the Tory Party, with Liberal Unionist support, over a period of ten years from 1895 and how the government resorted to a series of administrative means designed to prepare the ground for legislation. In a significant judgement on a case brought by a School of Art in London of unfair competition against the London School Board in June 1899 (ibid, p. 193) the district auditor disallowed expenditure from the rates by the London School Board towards the running of science and art school or classes (ibid, p. 194). He explains how this was the famous Cockerton judgement which put the whole future of advanced, or secondary, teaching fostered by the School Boards in the melting pot. In turn this aroused widespread opposition from bodies such as the National Union of Teachers (NUT) and the Trades Union Congress (TUC). An example of this was the opposition expressed at the NUT conference in 1901 with reference to expressions of "conspiracy against the advanced instruction of the working classes" (ibid, p. 209) and the "degradation of education for important sections of the community" (ibid, p. 210). The headteacher of Manchester Central School is quoted as saying that "No system of scholarships from elementary to secondary schools could be devised which would be at all equal to the present system" (ibid, p. 210). In the same year the report from the Parliamentary Committee of the TUC summarised the standpoint of the Labour movement which referred to "the greatest mischief" being done to the education of the industrial classes (ibid, p. 211). It called for the establishment of freely and democratically elected education authorities in every district. In June 1901, the TUC along with the local trades councils, trade union branches and co-operative societies took part in a conference of "Progressive Educationists" involving nearly 2000 delegates which called for the "public management of all schools receiving money from public funds, the need for popularly elected authorities and for the legalisation of advanced work" (ibid, p. 212).

In his chapter "The Balfour Act and its Aftermath" Simon notes that following the election of October 1900, the Tories were returned with a massive majority (134 over both the Liberals and Irish) (ibid, p. 208). He continues by stating that all the conditions were now in place for a radical reorganisation of education that had been sought by the Church and the Tory leadership over several years and writes that:

> "Repeated appeals by the London School Board against the Cockerton judgement had failed so that the entire structure of advanced teaching by the School Boards was now stigmatised as illegal." (ibid, p. 208)

Emphasis is placed by Simon on the importance of grasping the character of the Bill as it was originally introduced, because it is only in the light of this that contemporary attitudes can be assessed. Also, he stresses the importance of recognising that the Bill

did not appear as a great charter for secondary education – "though it has since often been so described; if anything, the contrary was the case". (ibid, p. 220). A particular feature of the handling of the parliamentary process for the passage of Bill through the House of Commons in 1902 was the way in which it was steered by A. J. Balfour, initially in his role as First Lord to the Treasury, and subsequently as Prime Minister which he became in the summer of 1901.

There was strong resistance to the Bill outside parliament also as a movement of intense opposition which rose to a climax in the autumn of 1901 but which only finally faded away a decade later (ibid, p. 221). The campaign against the Bill was led by the secretary of the Northern Counties Education League the Rev. J. Hirst Hollowell and is documented by Evans and Claridge (1911) in his biography that focuses on his role in the "Movement for Civic Control in Education". Three days after the introduction of the Bill, the Northern Counties Education League met in Manchester and declared the proposals to be "bad both in principle and machinery" (ibid, p. 221). There followed a series of meetings and demonstrations in the industrial centres culminating in "colossal turn-out on Woodhouse Moor outside Leeds" in the autumn involving an estimated 70,000-100,000 people and a procession through the centre of Leeds that took two hours.

The aftermath of the abolition of the School Boards also had a profound impact on the associated system of teacher education that had grown up alongside the elementary school system in the form of teacher-pupil centres. They had provided secondary education for intending teachers "with considerable success" (ibid, p. 244) in especially designed buildings, with assembly halls, laboratories, art rooms, and an experienced staff but their position became anomalous. An example is given of the Castleford School Board application of May 1901 for permission to build a new pupil-teacher centre. Castleford is a town in the city of Wakefield, West Yorkshire southeast of Leeds. The senior examiner at the national Board is quoted as saying that "If we allow small towns like Castleford, with a population of 14,000 to build what is practically a large secondary school at a cost of many thousands of pounds … what will be the effect in a year, or when Boards all over the country have indulged in similar undefined projects?" (ibid, p. 245). In a footnote (ibid, p. 245) and distasteful example of class prejudice it is noted that the Board of Education wanted elementary school teachers to be educated at secondary schools where they would come under "the influence of secondary teachers rather than the 'uncultured' ex-elementary school teachers at the centres".

In March 1902, the Chief Inspector of Schools noted that "The Castleford School Board have been prevented from building a pupil-teacher centre by Whitehall" (ibid, p. 246). Not only were School Boards denied permission to build new centres but because of the Act, many existing centres were closed between 1904 and 1907 with their pupils being transferred to secondary schools. Simon (1985, p. 86) writes that the "social-disciplinary ('containment') function of education was now especially emphasised" because of the changes brought about by the Balfour Act and concludes that

the "soil required to nurture a science of education no longer existed". However, on a more positive note he describes how the new local authority-controlled systems that emerged because of the Act created a new situation for developments in the theory and practice of education during the period 1900–1914. He argues that this system "insistently required a pedagogy – the development of effective pedagogical means" (ibid, p. 86). Further he notes that there was a renewed concern for the development of a relevant pedagogy and that consequently there was "great interest in, almost the discovery of (ibid, p. 86) the work of Herbart, and of the Prussian educators, who had developed Herbartianism into a system" (ibid, p. 86).

Herbart's ideas began to make a serious impact in Britain from the turn of the century and his work reached a wider audience with the publication of his work in 1908 as "The Science of Education: Its General Principles Deduced from Its Aim, and the Aesthetic Revelation of the World" by the publisher D. C. Heath & Co in Boston, USA (Herbart, 1908). This version included a Preface by Oscar Browning (ibid, p. v) who was a Fellow of King's College, Cambridge and Principal of the Cambridge University Day Training College and who described the training of teachers in schools other than elementary as being in a very peculiar position. He notes that nearly fifteen years earlier the Committee of the Head-Masters' Conference took the matter in hand and requested the Universities of Oxford and Cambridge to prepare a scheme of lectures and examinations for the purpose. Oxford had declined to take any steps, but Cambridge established such a programme. However, he draws attention to the fact that few "public schoolmasters" had submitted themselves to training which was in sharp contrast to the five training colleges for women in direct connection with the examinations of the Teachers' Training Syndicate.

By the first decade of the twentieth century most universities were developing their departments of education with the appointment of chairs in education across the country. Several of these new professors of education "pronounced themselves as Herbartians" (ibid, p. .87). These included Joseph John Findlay who held the Sarah Fielden Chair of Education at Owens College, later the University of Manchester, from 1903 to 1925 – see Brooks (1992); John Adams who was the first Professor of Education at the University of London and who wrote a book entitled "Herbartian Psychology Applied to Education" – see Ballard and Curthoys (2007) and John William Adamson who was Professor of Education at King's College London. In 1900 a Board of Studies in Pedagogy was formed of which Adamson was appointed secretary, later chairman (Barnard, 1962, p. 21–22). Further, in 1911 the University established a Higher Diploma in Pedagogy which was replaced in 1915 by the M.A. in Education. Simon describes this period as "a brief new flowering of pedagogy – a serious concern with the theory and practice of education" (ibid, p. 87). However, this development was only partial as it was only concerned with secondary schools and "it did not, and could not, persist in the circumstances that developed following the First World War" (ibid, p. 87).

Significant reforms of the school system in England, Wales and Norther Ireland were introduced following the Second World War in 1944 followed by a similar Act for Scotland in 1945. The Act made provision for free universal secondary education up to 15 years of age and required locally elected Local Education Authorities (LEAs) to submit plans for the reorganisation of secondary schooling in their areas. This established for the first time the principle of civic control in public education that had been campaigned for by the Northern Counties Education League, amongst others, since the 1902 Balfour Act. Most LEAs established a tripartite system based on grammar, secondary modern and technical schools. Children were to be selected based on an examination at the age of 11, which became known as the "11 plus". The next major reform to the system came following the Labour Party's election victory in 1964. According to the Cabinet Papers on the National Archives[4] the Cabinet eliminated the "11-plus" examination and established a comprehensive secondary system to end separation. LEAs were requested to submit plans for the reorganisation of secondary schools along comprehensive lines. The implementation of this policy was strongly resisted by some LEAs and at the present time there are still 163 grammar schools in England as documented on the UK Parliament House of Commons website[5]. In 1988 there was a further significant development brought about by the Conservative Government through the 1988 Education Reform Act that enabled schools to opt out of LEA control and which marked the beginning of the erosion of civic control in education that had been so fiercely fought for by the Northern Counties Education League at the start of the century.

However it was against this background that Simon made his call for a revitalised pedagogy based on a "new situation in terms of educational studies – of, to use Bain's term, 'systematic (educational) knowledge'" (Simon, 1985, p. 94). Simon's paper was well timed and is recalled in her paper "Defining Pedagogy" by Murphy (1996) as one of the founding papers in the re-emergence of pedagogy in England. By emphasising the concept of pedagogy, it was seen to refocus and problematise the study of teaching and learning alongside the creation of a national curriculum for England and Wales in 1988. The central question raised by Simon is revisited twenty years later by Alexander (2004) in his paper "Still no pedagogy? Principle, pragmatism and compliance in primary education". In doing so he raises a very significant point regarding how the word "pedagogy" is conceptualised. Despite more frequent usage of the term since 1981, he argues that it "still does not enjoy widespread currency in England" (ibid, p. 9). He points out that there is a spectrum of definitions from the societally broad to the procedurally narrow and gives an example of a broad definition as Bernstein's (1990) view of pedagogy as "a 'cultural relay' and located within his grand theory of social structure and reproduction." (ibid, p. 9). In contrast however

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4   https://www.nationalarchives.gov.uk/cabinetpapers/themes/voluntary-comprehensive-schools.htm

5   https://commonslibrary.parliament.uk/research-briefings/sn01398/

he notes that, in England the term pedagogy is commonly used in a more restricted sense, to equate with the practice of teaching.

In contrast with countries in Continental Europe, Pedagogy has not developed along the lines of a science of teaching, as envisaged by Simon, into a distinct academic discipline despite its re-emergence in a more procedurally narrow way as discussed earlier. However, it has developed into a recognised research sub-area of Education as classified by the UK Economic and Social Research Council (ESRC). Within the Joint Electronic Submission system (Je-S)[6] of the UK research councils, Education is sub-divided into three levels and Pedagogy is listed at the third level of the tree diagram alongside Curriculum under "Elements of Education". Finally, regarding this question, Hamilton (1999) argues that Simon's "historical preamble also begs the parallel question of 'Why no didactics in England?'" and accordingly this is the question that is considered next.

21.2   Why no didactics in England?

In his paper Hamilton (1999, p. 135) discusses the widespread negative connotations associated with the word "didactics" at that time "in the Anglo-American mind". He quotes from the definition in the Oxford English Dictionary which refers to formalist educational practices that combine "dogma" with "dullness" and "conjures up ghosts of an unattractive educational past" (ibid). In contrast he draws attention to the way in which the term "pedagogy" re-entered the Anglo-American educational lexicon after 1970, after having lain dormant since the First World War. He argues that fresh meanings arose in this revival that "paradoxically, have hindered transatlantic dialogue" (ibid). The reason given for this is that the Anglo-American usage of the term "pedagogy" has mirrored the mainland European usage of "didactics" and that "only their language divides them" (ibid). His article coincides with a change in the name of the journal from "Curriculum Studies" to "Pedagogy, Culture and Society" arguing that Anglo-American conceptions had become limiting. At that time Hamilton was professor in the Department of Pedagogik at Umeå University in Sweden and editor of "Curriculum Studies" (not to be confused with the "Journal of Curriculum Studies"). He emphasises the way in which curriculum theorising had become atrophied since the establishment of the journal in 1993. Curriculum was seen to have lost touch with the deeper questions that "for centuries have animated pedagogy and didactics" (ibid, p. 136) becoming reduced to questions about instructional content and classroom delivery. Furthermore, he argues that the sense of a curriculum as being related to human formation had become marginalised by the short-term question "What should they know" rather than "What should they become?"

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6   https://je-s.rcuk.ac.uk

In the subsequent discussion, Hamilton traces the historical development of the modern conception of didactics to "the methodisation of doctrinal delivery" (ibid, p. 142) and the work of Wolfgang Ratke (1571–1635). It is argued that Ratke's approach to didactics projected an active view of instruction and a passive view of learning. Citing others, he summarises this approach as "leaving young learners to sit still, listen and be silent" and concludes that "such notions are the origin of the aura of 'dogma' and 'dullness' that … still suffuse English-language understandings of didactics" (ibid, p. 142).

Hamilton's paper draws on the review by Gundem (1998) "Understanding European Didactics: an overview" and on her work in relation to the influence of the work of Herbart in the following:

The most important contribution of Herbart, and to some degree the Herbartians, was to extract didactics from general educational theory, turning it into a discipline on its own, dealing with instruction under the conditions of schooling as distinct from other instructional settings. (Gundem, 1998, p. 23).

Considering "Didactic Analysis" with reference to the influence of Wilhelm Dilthey (1833–1911), Hamilton notes how a new generation of German educationalists took a fresh look at educational theory. As a result, didactics was re-invented as a human science (Geisteswissenschaft) distinct from natural science (Naturwissenschaft). Consequently, educational thought and practice were seen to be built upon "an analysis of the lived experience of practitioners, an awareness of the historicity of practice, and an anticipation of the life-worlds of future practitioners (cf. 'what should they become')" (ibid, p. 145).

More recent European and international influences in relation to pedagogy and didactics

A significant contribution to the internationalisation of this field had been made one year earlier with the publication of "Didaktik and/or Curriculum: An International Dialogue" edited by Gundem and Hopmann (1998) to which Hamilton was also a contributor. This was followed soon after by the contribution from Hopmann and Riquarts (2000) which focussed on starting an international dialogue between the Didaktik and curriculum traditions. The latter was published in the influential book by Westbury, Hopmann and Riquarts (2000) "Teaching as a Reflective Practice: The German Didaktik Tradition".

A further significant initiative that sought to improve the international dialogue in the field of education research around this time was the establishment of the annual European Conference on Educational Research (ECER) under the auspices of the European Educational Research Association (EERA). A joint conference of EERA and the British Educational Research Association (BERA) marked the first full conference in this annual programme of ECER conferences at the University of Bath in 1995. One of the early outcomes of this collaboration was the success-

ful application for the funding of the Thematic Network for Teacher Education in Europe (TNTEE). The network was supported by the European Commission from 1996 to 1999 as part of the Socrates-Erasmus Programme (Action 1) with the aim of enhancing the European dimension of university studies. Its main objective was to establish a flexible multilingual transnational forum for the development of Teacher Education in Europe by linking together as many universities and other institutions as possible. Project partners included the British Educational Research Association (BERA) and the UK Universities Council for the Education (UCET) alongside other national research associations within the European Educational Research Association (EERA). The network was launched through a TNTEE-sponsored symposium within the Teacher Education Research Network at the European Conference on Educational Research (ECER) in September 1997 at the University of Frankfurt. Amongst the outputs of the network was a publication arising from Subnetwork E: "*Didaktik/ Fachdidaktik as the Science(-s) of the Teaching Profession?*" (Hudson et al., 1999).

One impact of the latter publication was the symposium organised by the European Curriculum Network (ECUNET) at the ECER 2000 Conference in Edinburgh entitled "Didaktik: An International Perspective". In turn this led to the publication by Hudson (2002) which contributed to discussions within EERA regarding the establishment of a network on Didactics in the following years. A working group was formed following the ECER 2003 conference in Hamburg as an initiative of the then President Ingrid Gogolin and despite some internal resistance at the level of the EERA Council, the network on Didactics – Learning and Teaching was proposed at the Annual General Assembly of EERA in Dublin in 2005. Perhaps reflecting this resistance, quite extraordinarily the network was only given provisional approval, but nevertheless the call for proposals received a strong response for the conference in Geneva in 2006. Accordingly, the network was formally established at the Annual General Assembly of the ECER 2006 conference following a successful programme of papers and symposia. The papers from the Opening Symposium were subsequently published in Hudson and Schneuwly (2007). A collection of papers from the early years of the network was compiled subsequently in the publication "Beyond Fragmentation: Didactics, Learning and Teaching in Europe" (Hudson and Meyer, 2011). The book demonstrated both the need for and the success of the network in finding common ground and in advancing research in the field. Since that time the network has continued to be an important international meeting ground for researchers in the field.

However, despite the increased level of international dialogue Hamilton's observation that the Anglo-American usage of the term "pedagogy" has mirrored the mainland European usage of "didactics" remains to be the case in my own experience. Didactics does not exist as an academic discipline in England nor is it recognised as a research area within the field of Education although the term has entered the discourse of the academic community and is increasingly the topic of contemporary

debates as outlined below. Accordingly in the next section I address the third question "Why no subject didactics in England?"

21.3   Why no subject didactics in England?

In discussing this third question, I begin by considering the place of school subjects in Education and teacher education in England. Regarding areas of study in higher education, these are defined by the Quality Assurance Agency for Higher Education (QAA) through their "Subject Benchmark Statements"[7] . The use of the term "subject" in this context is rather ambiguous as it does in fact relate to the "academic discipline" in higher education. The Benchmark Statements describe the nature of study and the academic standards expected of graduates in specific subject areas and show what graduates might reasonably be expected to know, do and understand at the end of their studies. The nature and extent of Education is described in the Subject Benchmark Statement for Education Studies (QAA, 2019, p. 4). It is stated that "education studies has evolved from its origins in teacher education to a subject in its own right" and that it involves differing theoretical models. Further it may be seen as a "subject" defined by its curriculum content and "drawing selectively upon the methods of the contributory areas of psychology, sociology, philosophy, history and economics". At the same time it may also be regarded as a "discipline with its own academic community, its own distinctive discourse and methods of enquiry". Of note, there is no reference to pedagogy within this document and nor is there any reference to subject didactics. However, there is a reference to "subject studies" in section 3 (ibid, p. 5) in which it states that "Education studies is a distinctive subject in its own right as well as a partner in a number of joint honours courses. Thus, students combine education studies with sports science, English, drama, religious studies, geography and similar subjects". It is also stated that no judgement is made about how much "subject knowledge" and understanding may be required in a joint honours course (ibid, p. 9). Furthermore, where students study Education Studies as a part of a degree course, it is up to higher education providers to clarify the extent to which the benchmark standards should be met.

The origin of the development of Educational Studies is documented by Judges et al. (1952) in the first issue of the British Journal of Educational Studies. They note how the journal resulted from a conference of the Standing Conference on Studies in Education (SCSE) on Wednesday 19th December 1951 organised by Professors of Education and Directors of Institutes of Education throughout Great Britain and Northern Ireland. It was called to "discuss the problems raised by the growth of educational research during the last few decades." They note further that "it is generally

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7   https://www.qaa.ac.uk/the-quality-code/subject-benchmark-statements

felt that British studies in the various fields of education – philosophical, historical, social, psychological and <u>pedagogic</u> [underlining added] – need to be better organised and better known." It is interesting to note the reference to pedagogy at the start of the conference but there was no further mention of it afterwards. In fact, this was a decisive moment in time that marked the beginning of the "Disciplines of Education" model discussed by Furlong and Whitty (2017, p. 21). At its heart was the study of the sociology, psychology, philosophy, and history of education that were collectively referred to as the "Foundation Disciplines". This approach was advanced under the influence of Richard Peters and Paul Hirst who led the debate on the search for 'degree worthiness' as initial teacher education moved out of the old teachers' college system into the mainstream higher education system. It is noted how the Bachelor of Education (BEd) degrees that replaced the old Teachers' Certificate in the 1970s had a common structure across all validating universities in the UK based on the foundation disciplines. This approach was also reflected in the way in which the Postgraduate Certificate in Education (PGCE) was structured at that time. Furlong and Whitty (ibid) continue by outlining some of the difficulties with this approach noting that each specific discipline can only provide exploration from its own theoretical perspective, and it is difficult to see how they combine. This tension is seen to arise from the *multidi*sciplinary rather than *inter*disciplinary nature of this approach. A second tension related to practice is identified: "Although there is a general 'orientation' to the world of practice, how links are achieved often remains problematic." (ibid, p. 23). The difficulties in combining these perspectives and in linking theory with practice was very apparent to me as a PGCE student and beginning teacher in Manchester comprehensive schools around that time. Furlong and Whitty (ibid) conclude that the failure to confront some of the associated issues "led growing numbers of governments around the world to question the utility of the (foundation) discipline-led approach". They also point to the move towards a more competency-based conception of teacher education in England, parts of the USA and Australia. Such an approach is founded on a narrowly conceived view of competence based on an analysis of the practical skills that teachers need to develop such that the professional knowledge of teachers becomes fragmented and then mandated as "standards" imposed by the state.

The growing tensions in relations between policy makers and the Education academic community in England during the period of the New Labour governments from 1997 to 2010 are documented by Alexander (2004). He quotes Andrew Adonis, who was then the Prime Minister's principal Education Adviser, from a paper concerning university faculties and departments of education as saying: "We have *imposed* a new national curriculum for initial teacher training, setting out the standards and content of training courses, which all providers *must* follow' (Adonis, 2001, p. 14, my italics, his verbs)". The standards were overseen by the Teacher Training Agency based on a narrowly conceived *teacher as technician* model as the title of the agency implied. The centralisation of decision making, and the marginalisation of

the academic community in Education accelerated following the changes initiated in 2010 by Michael Gove as Secretary of State for Education with Dominic Cummings as his adviser. During recent years there has been the introduction Teachers' Standards[8], the Early Career Framework (ECF)[9] described as a framework of standards to help early career teachers succeed at the start of their careers and the Initial Teacher Training (ITT): Core Content Framework (CCF)[10] expressed as a framework to support trainee teacher development. The Teachers' Standards were introduced in 2011 and are structured around Teaching and Personal and Professional Conduct and refer to the need for teachers to have strong subject knowledge e.g. "A teacher must demonstrate good subject and curriculum knowledge". There is no reference to pedagogy in this document. The ECF was published in January 2019 and is structured around the Teachers' Standards. Reference is made to pedagogy in this document but in a highly restricted and simplistic way. It is stated (see p. 5) that the ECF has been designed to support early career development in the five core areas of "behaviour management, pedagogy, curriculum, assessment and professional behaviours". It continues by stating that "pedagogy was thought to be encompassed by How Pupils Learn, Classroom Practice and Adaptive Teaching" the latter three categories being Standards 2, 4 and 5 respectively. In a peculiar scheduling of the workflow by the Department for Education, the CCF for Initial Teacher Training was published in November 2019 after the ECF for early career teachers and accordingly "it had to be retrofitted to the content of the ECF to ensure that there was continuity between them" Hordern and Brooks (2023, p. 3). As a result, the two documents are almost identical, both being structured around the Teachers' Standards and the five core areas. In their critique of the CCF, Hordern and Brooks (ibid) discuss the consequences of the assertion in the document that it defines the "minimum entitlement of all trainee teachers". They argue that whenever there are constraints of time and the need to prioritise which content to cover that the "default will be to cover the minimum entitlement" only. Subsequently in a highly controversial move by the Department for Education, the CCF was used as the basis for a so called "Market Review" of Initial Teacher Training. This was a desk-based accreditation process that raised serious concerns regarding its rigor, transparency, reliability and validity. At the outset the process led to some higher education institutions considering their future involvement in initial teacher education altogether (Russell Group, 2021). At the same time, it was announced a new national Institute of Teaching (NIoT)[11] would be established described as becoming

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8   https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file / 1040274 / Teachers__Standards_Dec_2021.pdf

9   https://www.gov.uk/government/publications/early-career-framework

10 https://www.gov.uk/government/publications/initial-teacher-training-itt-core-content-framework

11 https://www.gov.uk/government/news/new-institute-of-teaching-set-to-be-established

"England's flagship teacher training and development provider, showcasing exemplary delivery of the Government's ambitious reforms through the new ITT Core Content Framework and Early Career Framework". The institute has been established by the School-Led Development Trust which has been formed by four of the largest Multi-Academy Trusts. According to its chair and Chief Executive Officer[12] until now there has been no school-led organisation offering "the 'golden thread' of professional development from initial teacher training through to national qualifications for executive leadership" along with university status and degree-awarding powers. It is modelled on the Relay Graduate School of Education[13] which is a private graduate school in New York City that was established in 2011 and has since expanded across the USA. Rather confusingly a "new" Institute for Teaching (IFT) was previously announced[14] in 2017 which was the subject of critique by Ellis et al. (2019) who use it as an example of "policy entrepreneurship, capitalising on a travelling policy idea to create a market for its provision of 'practice'-based teacher education programmes". They show how the IFT "rhetorically constructed its policy window using typical neo-liberal, reformist explanatory frames, allowing them to present themselves as disruptive innovators capable of solving societal challenges". Although apparently sophisticated in presentation and rhetorically adept, they argue that, ultimately, the IFT's rhetoric is instead sophistic, presenting fallacious arguments in plausible ways about complex educational and social problems.

In discussing the competences and standards approach, Furlong and Whitty (ibid, p. 30) refer to the work of Bernstein who coined the term 'generic mode' to describe a particular form of knowledge that is constructed and distributed outside and independently of disciplinary traditions as reflected in the CCF. They write that "generics can therefore be seen to sit directly in opposition to disciplinary cultures and practices". They note that in the case of England, where the focus on practical skills has been especially strong that the competences and standards approach has effectively squeezed out any substantial references to disciplinary-based knowledge. They argue further (ibid, p. 31) that "the standards become the curriculum, which is explicitly intended to integrate (highly selective) elements of theoretical knowledge and practical skill". Accordingly, in the process of opposing the "foundation disciplines" approach of the academic community in Education, policy makers in England over recent years have also effectively squeezed out any substantial reference to the study of school subjects.

Regarding subject knowledge, this is seen merely in terms of knowledge of the academic discipline that student teachers bring with them and there is no recognition given to the field of subject didactics or subject-specific education. Consequently, school subjects become merely a normative aspect of schooling and as argued by Goodson and Marsh (1996, p. 1) are treated as 'taken for granted givens' which is clearly the case on

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12 https://schoolsweek.co.uk/why-does-the-system-need-a-national-institute-of-teaching/
13 https://www.relay.edu
14 https://www.gov.uk/government/news/justine-greening-launches-new-institute-for-teaching

the part of those responsible for producing the CCF. Strong criticism of the CCF has come from the Historical Association amongst others in written evidence to a recent Parliamentary Inquiry into teacher recruitment and retention[15]. The ECF and CCF are described as being "not fit for purpose" and the submission continues as follows:

The generic nature of the Core Content Framework discourages subject-specific teacher education. This is a profound problem, as much at primary as at secondary level, especially given the new emphasis placed by the current inspection framework on the quality of the curriculum offered to young people. Teacher training should not and must not be separated from subject.

The submission continues by stating that the CCF is not even adequate on its own generic terms and highlights the way in which Standard 2 on 'How Pupils Learn' reduces the process of learning to memorisation. It is noted that there is a rather odd selection of some elements of cognitive science learning theory with no mention of metacognition as one the core elements. Similar criticism is made by the Council for Subject Associations (CfSA)[16] which describes itself as the joint voice for 30+ Subject Associations. Its submission argues that the CCF does not fully cover the complexities of teaching and rather it presents a series of interventions without contextualisation or ambition. It also points out that it draws on a narrow research evidence base that misses out important research in subject pedagogy.

Accordingly in response to the key question "Why no subject didactics in England" it can be seen that subject didactics has not developed as an academic discipline in its own right as is the case in Germany, France and Scandinavia for example. In its place research in subject-specific education, including pedagogy, has developed through the support of Higher Education Institutions (HEIs). However, the more recent changes made since 2010 have marginalised established HEIs and in the process of pushing the generic mode to its limits have marginalised subject-specific teacher education even further. Soon after submitting this chapter a very significant book was published, edited by Ellis (2024), entitled "Teacher Education in Crisis: The State, the Market and the Universities in England", which gives a much more detailed account of the recent policy context in England.

21.4 Discussion

In their discussion of these recent changes Hordern and Brooks (2023, p. 1) note how not only the reforms to Initial Teacher Education (ITE) but also those to the school curriculum and school governance in England have all involved "a centralisation of power in the hands of the DfE … combined with considerable complexity, tension

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15 https://committees.parliament.uk/writtenevidence/120249/pdf/
16 https://committees.parliament.uk/writtenevidence/120461/pdf/

and disruption". Central to the changes to school governance has been the erosion of civic control in education through the increasing marginalisation of the role of the Local Education Authorities (LEAs). In their place the policy since 2010 has been the promotion of large Multi-Academy Trusts (MATs) involving chains of schools organised in much the same way as supermarket chains, the Boards of which may have little or no connection to the communities served by their schools. At the heart of the tension between the Education academic community and policy makers is a clash of mindsets about the nature of teaching. For example, Mutton et al. (2017) express this tension in terms of competing conceptions of both quality and professionalism by drawing on the distinctions made by Sachs (2001) between "democratic" and "managerial" forms of professionalism. The former is seen to emerge from the profession itself and thus "acknowledges the scope for judgement in complex situations, underpinned by expert knowledge" Mutton et al. (2017, p. 22) whilst the latter is driven by an overriding emphasis on accountability and effectiveness. This clash of mindsets can also be seen in the terms used by Hoyle (1974) on a spectrum that ranges from a "restricted" technicist view to an "extended" professional view of the nature of teaching. The restricted view is based on a conception of an effective teacher that is largely defined in terms of technical skills. In contrast a teacher at the extended end of the spectrum is seen as the kind of professional who is not only highly proficient in the classroom but is also "reflective and enquiring not only about teaching and learning, but also about those wider issues which set the context for what should be taught and why" (Donaldson, 2011). This last quotation is taken from the report on the review of teacher education "Teaching Scotland's Future: Report of a review of teacher education in Scotland" which was published in January 2011 in which the importance of redefining and strengthening 'extended professionalism' is emphasised (ibid, p. 15). In sharp contrast just a few weeks earlier in November 2010, the incoming Secretary of State for Education of the Conservative led UK government, Michael Gove gave a speech[17] to the National College Annual Conference in which he asserted that that teaching is merely "a craft that is best learnt as an apprentice observing a master craftsman or woman". In elaborating on this restricted view, he declared that "watching others, and being rigorously observed yourself as you develop, is the best route to acquiring mastery in the classroom". This relationship between craft and profession is a central focus of the work of Shulman (1986) who argues convincingly that what distinguishes craft from profession is the indeterminacy of rules when applied to particular cases. He continues by arguing that the professional holds knowledge, not only of how i.e., the capacity for skilled performance but of what and why. The teacher is seen to be in command not only of procedure but also of content and rationale, and capable of explaining why something is done. Such ex-

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17 https://www.gov.uk/government/speeches/michael-gove-to-the-national-college-annual-conference-birmingham

tended professionalism involves the capability of reflection leading to self-knowledge and "the metacognitive awareness that distinguishes draftsman from architect, book-keeper from auditor" (ibid, p. 13). Furthermore, a professional is capable not only of practicing and understanding his or her craft, but also of communicating the reasons for professional decisions and actions to others.

The speech by the UK Secretary of State for Education in 2010 marked a sharp divergence in policy direction between England and Scotland and an acceleration in England of the process of change towards a "school-led education system" based on a restricted view of professionalism. The view of teaching as merely a craft also reflects a clash of values not only about the nature of teaching as a profession but also about the nature of higher education and its role in the professional education of teachers. Moreover, it ignores the complex nature of professional knowledge and the ways that it is developed in practice. Our recent discussion of the nature of teachers' "powerful professional knowledge" (Stolare et al., 2022) highlights the ways in which teachers' professional knowledge emerges as "förtrogenhetskunskap" (in Swedish), generally directly translated as "familiarity knowledge" which is related to Polyani's (1966) concept of "tacit knowledge". What is more, this can be considered as a form of "knowledge by acquaintance" as discussed by Winch (2013). In relation to the teaching of school subjects, such knowledge is developed in teacher education through collaboration in communities of inquiry and through dialogue in open collective networks (Huberman, 1995) together with accomplished academic specialists in the scholarship of subject-specific education. Experience of practice is a necessary but insufficient element in the professional preparation of beginning teachers. Rather it is the interplay between experience and reflection on the significance of content for students in combination with the interactive relationship between theory and practice that forms the basis for reflected decisions for planning teaching and learning. From the perspective of teaching school subjects, this familiarity knowledge can be described as Subject-Specific Educational Content Knowledge (SSECK) (Stolare et al., 2022; Hudson et al., 2023) given that the didactic dimension should be understood as an integral and inseparable part of teachers' content knowledge (ibid, p. 232). Teachers develop knowledge that allows them to evaluate and decide how to act in a specific situation. In teacher education – initial teacher education as well as continuing professional development – 'familiarity knowledge' can be related to the Bildung, meaning that teachers' knowledge base consists of an almost embodied specific understanding of the subject and its linked discipline(s), enabling them to transform the content knowledge and having the methods to do so. Teachers' selection and transformation of content are made in relation to an experience of practice that helps them momentarily adapt to the specific teaching situation.

21.4.1 Contemporary developments in the academic community in relation to subject didactics

Despite what may seem to be very infertile ground there is now growing interest within the academic community in the traditions of didactics in mainland Europe and several recent developments are of significance involving mainly the University College London and its Institute of Education. Firstly, it was the publication in 2018 of the "Special Issue on Knowledge and Subject Specialist Teaching" of the *London Review of Education* which was edited by David Lambert[18]. In his editorial, Lambert (2018) emphasises the potential of subject didactics, with reference to Hudson (2016 and 2018), to redressing the "blind spot" of more generic approaches to research in schools that might inform teaching. He also draws attention to the partnership between the (then) Subject Specialism Research Group (SSRG) at the Institute of Education, the ROSE (Research on Subject-specific Education) group at Karlstad University and the HuSoEd in Helsinki (Research Community for Humanities and Social Sciences Education). The Special Issue also includes the position paper of the ROSE group by Gericke et al. (2018).

Soon after publication of this Special Issue the application to the Swedish Research Council for the funding of the KOSS[19] (Knowledge and Quality across Schools and Teacher Education) network was approved for a three-year period from 2019 to 2021. The application was made by the ROSE group in Karlstad together with the other two groups in London and Helsinki. Due to the restrictions of the pandemic the duration of the network was extended to the end of 2023. The network has met either face to face or through online webinars organised in turn by each of the project partners on a termly basis since the beginning of 2019. Activities of the KOSS network have included conference symposia and presentations and in addition two books were published in 2022 by Bloomsbury Academic (Hudson et al., 2022a, 2022b). Furthermore, an updated version of the ROSE position paper was published in Hudson et al. (2023) which outlines the development of a comparative research framework in subject didactics and applies this in the process of analysing the transformations from academic disciplines across different school subjects. In this context we use the term comparative to refer to the way in which the research framework enables us to compare different subjects and the ways in which knowledge is transformed into knowledge to be taught and learned at the boundary between different school subjects and their associated academic disciplines. A further aspect of the comparative dimension is the way in which the framework draws on concepts from both the tradition of curriculum and that of didactics.

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18 https://uclpress.scienceopen.com/journal-issue?id=76f3d80a-0858-4632-949c-51f727a81097

19 https://www.kau.se/en/rose/external-relations/knowledge-and-quality-across-school-subjects-and-teacher-education-koss

Subsequently the SSRG at the Institute of Education was renamed as the Curriculum Subject Specialism Research Group (CSSRG)[20] following the retirement of David Lambert and the appointment of Zongyi Deng as professor in the Department of Curriculum, Pedagogy and Assessment. He brings with him an interest in developing "powerful curriculum theory" constructed from the perspective of the tradition of Didaktik combined with considerations of Joseph Schwab's model of curriculum planning as exemplified in Deng (2021). Through these developments the concepts of Didaktik and subject didactics have been carefully cultivated, though the policy climate is harsh, and the green shoots are quite fragile.

21.4.2 Comparison with developments in Sweden

In this section, I reflect further on the nature of Educational Sciences by drawing a comparison with developments in Sweden over recent years. With regard to courses of study in higher education both Pedagogik and Didaktik have a long history as academic disciplines in higher education in Sweden. In her discussion of teacher education and research in Sweden, Erixon Arreman (2008, p. 159) notes that Pedagogik was constituted as a discipline in higher education in 1907, particularly for the purpose of primary teacher education. Furthermore, she notes how Didaktik emerged as a "dominant trend" in the 1980s and how it was primarily concerned with subject teaching or "content related educational research". Erixon Arreman also describes the creation of Educational Work (Pedagogiskt arbete), a new research discipline as a result of a major reform in 2000. This development was intended to support "close to practice research" and to provide teachers and teacher educators with expanded opportunities to pursue doctoral studies which had previously been very limited. At the same time governmental funding was granted for the establishment of national postgraduate schools in educational work. Erixon Arreman notes how an important feature of this was that "colleges unable to run postgraduate programmes were able to participate in the national network, eight universities and colleges in all" (ibid, p. 161). This development took place in parallel with the establishment of national doctoral schools in a range of subject didactics (Ämnesdidaktik) and to the establishment of subject didactics as higher education discipline positioned between academic disciplines and the Educational Sciences.

A further development from this reform was the establishment of the Committee of Educational Sciences of the Swedish Research Council[21]. Taking the KOSS network as an example, this is funded as a network in Ämnesdidaktik / Subject Didactics through an application to the Committee of Educational Sciences of the Swedish

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20 https://www.ucl.ac.uk/ioe/departments-and-centres/departments/curriculum-pedagogy-and-assessment/curriculum-subject-specialism-research-group

21 https://www.vr.se/english/about-us/organisation/scientific-councils-councils-and-committees/committee-for-educational-sciences.html

Research Council. Subject Didactics is one of five categories at the top level of the Thematic Classification of the research areas under Educational Sciences, the others being "Education Policy, Education Systems and Organisation of Education", "Social Aspects of Education", "Learning and Communication" and "Professions and Professional Education". Each top-level category is subdivided at the second level with Subject Didactics divided into four broad subject-specific categories (aesthetic and practical subjects; humanities and social sciences; mathematics, natural sciences and technology and Swedish language including literacy) and a fifth that focusses on cross-subject didactics more widely.

Educational Sciences as a whole is conceived of as a broad and complex area of study, as discussed in the "Forskningsöversikt 2023 Utbildningsvetenskap" (Research Overview 2023 Educational Science) of the Swedish Research Council. The main part of this report (Swedish Research Council, 2023) is in Swedish and includes the pictorial overview as illustrated in Figure 1.
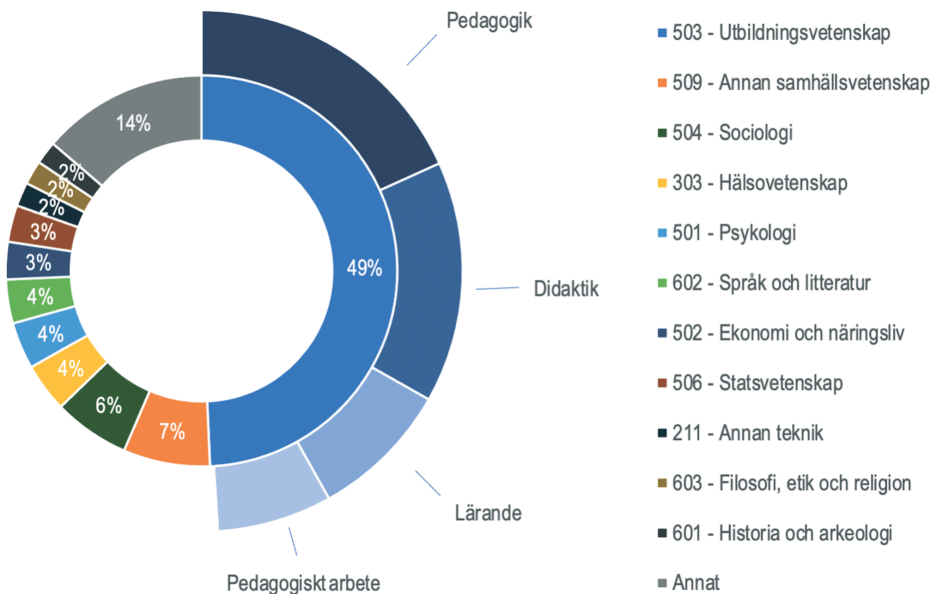
Figure 1: Mapping Educational Sciences in Sweden (Swedish Research Council, 2023)

The entire circle represents contributions from various disciplines to the Educational Sciences. At 49 % Educational Science (503) appears as a discipline is the largest category comprising the disciplines of Pedagogik, Didaktik, Learning and Pedagogical Work. However, 51 % of contributions are from other disciplines for reasons that are not entirely clear. Given that subject didactics are generally co-located with their academic disciplines in Sweden rather than in separate departments of Education it is likely that a significant proportion of the 51 % come from a range of subject didactics in addition to philosophical, sociological, historical and psychological studies in the field.

In the Research Overview for 2019 (Swedish Research Council, 2019, p. 14) it is stated that some aspects of subject-didactic research have developed strongly as a result of the establishment of the Committee for Educational Sciences. It is pointed out that major investment in graduate schools has contributed to the development of research within subjects such as mathematics didactics, Swedish didactics (reading and writing) and research relating to pre-school. Moreover, the report recognises that "subject didactics within certain areas, such as natural sciences, mathematics, Swedish and English have been strengthened considerably over the last decade" and that subject didactics now constitutes a significant part of Swedish educational sciences research. Accordingly, the example of Sweden is of a process of policy development in relation to teacher education that can be seen as reflective of the development of "extended professionalism" in teaching and as such contrasts sharply with the policy landscape and direction of travel in England over recent years.

20.4.3   Summarizing developments and considering the consequences of the current policy direction in England

In summary, the English education system continues to be impacted by the unresolved dichotomies between so called *progressive* and *traditional* approaches and *child-centred* versus *subject-centred* approaches that first played out during the Victorian era culminating in the Balfour Act of 1902. The attitudes and values of the public schoolmasters of that time who reflected a disdain for the concept of pedagogy were very influential as were the vested interests of the churches. This was in the lead up to the abolition of the School Boards and the confinement of the Elementary schools within precise limits. In turn the associated system of teacher education was dismantled abruptly soon after through the closure of the teacher-pupil centres that had developed over the previous thirty years. At the present time the acceleration in the process of change in England has involved the rapid development and imposition of the ITT Core Content Framework followed by the ITT Market Review within the last four years.

The market review resulted in twelve major providers (> 100 students) not gaining accreditation of which ten were led by higher education institutions (universities or colleges of higher education). The options for those providers not accredited were to partner with one of the accredited providers or to withdraw provision entirely. One outcome of the process is that large parts of the country have been left without any provision whatsoever. In its report on the process, the Education Policy Institute[22] analysis shows that the provision concerns the initial "training" for 4,491 students which is 16 % of the total and that the North East, East and South West of the country have been impacted more severely than elsewhere.

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22 https://epi.org.uk/publications-and-research/the-reaccreditation-of-itt-providers-implications-for-stem-subjects/

Subsequently seven of the universities that lost their accreditation have been inspected by the Government inspection agency Ofsted and all rated as "Good" or "Outstanding" (on a 4-point grading scale of Outstanding-Good-Requires Improvement-Inadequate). Furthermore, six out of the nineteen accredited providers which had been inspected during the same period were rated as "Inadequate" or "Requires Improvement". That two arms of government could reach such contrasting verdicts on the quality of provision raises serious questions concerning the reliability and validity of the market review and the relation between Ofsted and the Department for Education. This situation has led to Vice-Chancellor of the University of Greenwich writing to the Secretary of State and the Education Select Committee and to issuing a press release on 27th July 2023[23]. In this public communication the University points out that it has been a provider of teacher training for 120 years and highlights the fact that the removal of accreditation will create more barriers to getting the "best and brightest students into teaching at a time where the country is struggling to recruit and retain educators." In addition, it states that this decision will have a severe impact by putting even more pressure on schools struggling to recruit new teachers. The university asks for a "fair and equitable process that allows long established, independently assessed universities" to continue training the teachers of the future, and to be allowed to play its part in addressing the current teacher recruitment and retention crisis. It also asks for a review of the accreditation process and a chance to be reinstated at the earliest opportunity. The brutality of the ITT Market Review process and its severe impact is reminiscent of that of the Balfour Act on the associated system of teacher education over a century ago.

On the question of future policy direction, the report on the ITT market review of July 2021[24] makes it clear in its conclusion (p 35) that the long-term goal is "an ITT market … which is open to new, high-quality providers with a track record in training and development." It would seem that a major aim of the ITT market review was to create space in the "marketplace" for the National Institute of Teaching which is tightly structured in terms of its programmes around the Core Content Framework and Early Career Framework. Accordingly, without a significant change in the direction of policy under a more enlightened administration, the marginalisation of the established Higher Education Institutions and the 'blind spot' on the part of policy makers in relation to the study of subject-specific teacher education looks set to continue.

23 https://www.gre.ac.uk/articles/public-relations/university-formally-writes-to-secretary-of-state-for-education-after-good-ofsted-rating
24 https://www.gov.uk/government/publications/initial-teacher-training-itt-market-review-report

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22. General Subject Didactics

Looking Back – Looking Ahead

Helmut Johannes Vollmer and Martin Rothgangel

At this point, at the end of the book, we want to look back once more on what our concerns and intentions were and how we tried to reach our goals. We wanted to develop a Theory of Subject-Matter Didactics, at least a basic outline of it, through establishing a meta-theoretical level of General Subject Didactics. In our project ("General Subject Didactics as a Theory of Subject-Matter Didactics") we based ourselves on a rich empirical grounding through acts of comparing and generalizing, leading to the identification and description of important substantial dimensions of the construct of General Subject Didactics, complementing it by qualifying the more philosophical-theoretical top-down reflections on structure, purpose and aims of subject didactics.

After outlining how to define General Subject Didactics in a first attempt, we then showed how we planned and proceeded in order to arrive at that level through a double movement of top-down and bottom-up procedures. This meant first to formulate top-down assumptions or hypotheses and then to work the other way around in a bottom-up manner, screening and interpreting the actual data provided by the individual subject didactics themselves (with two authentic subject-didactic sample reports included) on six relevant dimensions agreed upon in advance. The presentation of the results of this comparative analysis covered a large portion of the book, namely Chapters 5–14.

In order to relate our procedures as well as the many and complex results of our empirical study to the reflections and discourses in other educational settings (with a focus on subject didactics), we invited four educational experts to respond to both and to comment on our findings from their own experience, background and point of view. These contributions by the four experts were also published in full length (Chapters 18–21), leading to amazing insights of similarities, of common points as well as of differences plus additions and relativizing observations in some cases. In the following we will comment some more on those expert contributions, without going into detail. After that, we will look ahead and reflect on how to intensify the international dialogue on subject didactics, including the concept of General Subject Didactics. Getting to know the didactic landscape better, in Europe as well as beyond, will be one of our goals – striving for cross-national exchange and co-operation will be another one.

22.1 Some comments on the responses by the international experts

The four external responses to our empirical findings on subject didactics in Germany are of great complexity, of great depth in reflection and of great value. It proved absolutely right to widen the scope of our analysis right from the start and open it to a cross-national discussion. These responses by international experts in the field, that we had invited, are documents of high relevance and quality; they contribute enormously to the understanding and structuring the extended field of didactics and of subject didactics in particular.

All in all, it is surprising how much the results could be "matched", either in relative agreement with one another or in some sort of critical opposition to one another. This was true for the evaluation of different didactic cultures as a whole as much as for the many different philosophical and research issues addressed. We would like to thank the four experts at this point for having accepted this difficult task of comparing and relating their own critical knowledge to ours – the richness of results and the projective insights into the dynamics of the field speak for themselves, as the readers can easily check and find out on their own.

By confronting our results from the German-speaking context with views and questions from the outside, the experts were able to relativize some of our findings or put them into a different perspective or demand further scrutiny and possible re-interpretation of some data. Generally speaking, the educational system of schooling and the research approaches of subject didactics seem to be highly specific indeed and not always easy to understand for others. But even within academia itself there are certain peculiarities to be observed: as an example the distinction between "educational sciences" and "Empirical Educational Research" as two reference disciplines of subject didactics was mentioned, which cannot really be followed by outsiders (Schneuwly, this volume). Also, additional or country-specific aspects came into play which were not identified or mentioned in the German data-base or which were assigned differing degrees of relevance in one educational setting or the other.

1. As an example one could mention the fact that *in the Francophone culture* the influential role of psychology (e.g. Piaget) and of sociology (e.g. Bourdieu) as a reference science for subject didactics is much stronger than in Germany (cf. *Schneuwly, in this volume*). Another striking difference is seen in the establishment of school subjects and their content, status, and place in the system as constantly changing. In this context Schneuwly points out that the main conditioning factor (not even mentioned in our list) are "the transformations of the school system as a whole, for instance the massification of secondary schools in the 1960s (this is related to importance of type of school). These transformations are considered as absolutely central for Subject-Matter Didactics. The other factors (didactic, scientific, international impulses) are clearly subordinated to this

central factor of the constant change of the school system as a whole" (ibid.). Similarly, the relative autonomy of schools in defining and developing "teachable" content of their own is almost unknown in the German context, where the influence of the related academic sciences as primary sources for content definition and selection is much stronger, almost dominant in many cases. Finally, according to Schneuwly, the attitude towards competences as goals of subject teaching and learning is much more critical in the French-speaking countries (though shared by some scholars in Germany). Competence orientation in general is seen as dominated by economic interests which is qualified as too narrow: "Goals of school disciplines cannot be discussed without Bildung" (ibid.). It is remarkable that the German notion of Bildung is taken up without hesitation/, but we hear/read little about its precise definition and use in the Francophone discourse.

2. In her reflective contribution, Ellen Krogh demonstrates that the situation of didactics and of subject didactics (called "disciplinary didactics") and the academic discourse about them in Denmark and in Scandinavia as a whole is quite similar to that in Germany, with less empirical research, however. The influence of the academic sciences for the teaching of school subjects seems to be rather strong, hence the preference for the term 'disciplinary didactics', which also mirrors the fact that *fag* in Danish does not only relate to school subjects, but also to the content structure of higher education and beyond. On the other hand, Krogh outlines specific developments towards comparative (subject) didactics in the Northern European countries, based on a joint conference series. The criteria for comparison, however, are not spelled out explicitly. We also see a strong connection between the research on disciplinary didactics and teacher education.

    On the theoretical level, Krogh reports about the thinking of a Danish music didactician (Frede V. Nielsen) who designed several decades ago a common perspective for all subject didactics and later designed an analytical approach to comparative subject didactics as a research area. In addition, Krogh introduces a new (fifth) reference science for subject didactics, called "semiotic communication theory", based on the theoretical work of Sigmund Ongstad (e.g. 2006, 2021). It remains to be clarified whether this new discipline can be traced down within other European didactic spaces.

3. Hanan Alexander's contribution impressively illustrates the complexity and at the same time the fruitfulness of the international dialogue on subject didactics. Three aspects can be highlighted on the basis of his insightful remarks: First, the respective national context has to be taken into account. Accordingly, Alexander's article begins with the following words: "To answer the questions posed, it is important to realize that there are currently four streams of education in Israel each with its own schools. There are state general schools, primarily for secular Jews; state religious schools, primarily for religious (orthodox) Zionist and na-

tionalist Jews; state Arab sector schools, for Muslims, Christians, and Druze; and independent Haredi schools, for ultra-Orthodox Mizrachi and Ashkenazi Jews, both Hassidic and non-Hassidic" (p. 337). Secondly, the example of Israel shows that international knowledge transfer has to be taken into account, i.e. in this particular case the important influence of American educational thinking and research. Finally, the following quotation from Alexander suggests that certain factors can be identified which seem to shape subject didactic research in general, regardless of any country-specific characteristics: "Similarly, much like the German case, the development of subject matter didactics in Israel, at least as relating to curriculum content, involved three influential factors: social and historical circumstances, relations between school subjects and university based academic disciplines, and the impact of key personalities."

4. Comparable to Hanan Alexander's contribution, Brian Hudson's impressive remarks also show how much educational sciences are influenced by national contexts and especially by the respective educational policies of a country. Hudson concisely describes the specifically English character of the educational sciences on the basis of three headings "Why no pedagogy in England?", "Why no didactics in England?", and "Why no subject didactics in England?". At the same time, comparable to Israel, Brian Hudson also highlights the international influence on educational sciences: While at the beginning of the 20th century this was especially Herbart's work "The Science of Education", which was temporarily influential, in more recent times a certain opening happened towards an international research dialogue on subject specialism in teaching and learning., mainly with colleagues from Sweden and their KOSS network (*Knowledge and Quality across School Subjects and Teacher Education*). It is sobering to see, however, that the majority of colleagues in England and Great Britain is not affected by these new developments. Hudson comes to the following conclusion at the end: "In summary, the English education system continues to be impacted by the unresolved dichotomies between so called *progressive* and *traditional* approaches and *child-centred* versus *subject-centred* approaches that first played out during the Victorian era culminating in the Balfour Act of 1902." His following statement, on the other hand, gives/inspires hope: "Despite what may seem to be very infertile ground there is now growing interest within the academic community in the traditions of didactics in mainland Europe and several recent developments are of significance involving mainly the University College London and its Institute of Education."

It is worth stressing that our overall approach towards developing a General Subject Didactics as an integrated meta-theory of subject-matter didactics was not questioned anywhere – all the opposite, the uniqueness of our approach, the number of subject didactics participating and the richness of data included were highly welcome and acknowledged, also the evidence-based nature of our theory-building. None of

the expert contributions has reported about General Subject Didactics as a topic in their own setting so far and discussions about it yet, at least not in the way it is done in our own project and specifically in this book (but see the work of Nielsen, dealt with in Krogh, this volume). This is something to build upon in the future, within follow-up studies, perhaps even larger and more international, comparative ones on subject didactics and their institutionalization in different countries or regions.

We cannot list here all the further points which came up and were formulated within the four responses, either as similarities, commonalities or as differences. Rather, we have to leave it to the reader to find out more about the many different aspects mentioned in the four impressive articles (see Chapters 18–21) and their important contribution for the purpose of this book.

22.2 Ongoing discourse on the European and international level

Within the last three years, a number of other important publications appeared in which the international dialogue between Didactics and Curriculum is portrayed as "ongoing". In continuation of what had already been started and attempted more than 20 years ago, this discourse is being picked up and led into a new phase, well documented and illustrated in its different facets (e.g. Krogh, Qvartrup & Graf, 2021). Also, a thematic issue of the *Journal of Curriculum Studies* (Volume 53, Number 2, April 2021) was specifically devoted to the topic "Towards Powerful Educational Knowledge: Perspectives from Educational Foundations, Curriculum Theory and Didaktik", bringing different arguments and traditions into contact, without really confronting them with one another. That has yet to follow, as a matter of fact, it has started already, fortunately so (cf. for example, Muller 2022). In addition and most recently, a book appeared on the market which deals with "Didactics in a Changing World" (Ligozat, Klette & Almquist, 2023), focusing on "European Perspectives on Teaching, Learning and the Curriculum" (sub-title). The editors of this volume acknowledge the existence of several approaches for "*comparative studies in didactics*" (italics in the original) as concrete ways to overcome the fragmentation and even speak of a "complex but rich field of research in Didactics in Europe" (Ligozat, Klette & Almquist, 2023, p. 6). As far as we can see, this is the first time that Didactics and Europe are linked so clearly geographically and defined as a (common) research field. Whether this is also meant conceptually in a larger, overarching, general sense, at least by implication, remains open at this point.

Parallel to these important and stimulating publications there are a number of research groups focusing on didactic and increasingly subject didactic issues, some of them already operating for longer, others acting more recently. But there is little systematic contact between these groups as yet. In this context, national platforms or

associations devoted to subject didactics could play a particularly important role in the future, e.g. the *Gesellschaft für Fachdidaktik (GFD)* in Germany, the *Association pour des Recherches Comparatistes en Didactique (ARCD)* in France, the Austrain Association for *Fachdidaktik (ÖGFD)* or the *Konferenz Fachdidaktiken Schweiz (KO-FADIS)/La Conférence faîtière des didactiques des disciplines en Suisse* (*COFADIS*). Within these national umbrella organizations the individual subject didactics already come into closer contact with one another, exchange about common issues or specific challenges, develop joint research frameworks, if not thematic content agendas and even work on joint projects together (as in the case of our example).[1] But also more regional research initiatives can have a big impact, because they often relate two or more different individual subject didactics to one another and thus do comparisons in didactics in the widest sense. As a research field, comparative didactics has been developed in France (cf. the national platform of the *ARCD* already mentioned and more specifically the *Groupe de Recherche en Didactique Comparée (GREDIC)* in Geneva, with its long list of publications, or the network *Knowledge and Quality across School Subjects and Teacher Education* (*KOSS),* hosted in Karlstad, Sweden; cf. Hudson et al., 2022a, 2022b). This field is spreading to other parts of continental Europe (cf. for example Ligozat, Amade-Escot & Östman, 2015; Östman, Öhman, Lundqvist & Lidar, 2015; Almquist, Lidar & Olin, 2023, or the newer activities of the *Curriculum Subject Specialism Research Group (CSSRG)* at the Institute of Education in London. A more systematic look at comparative didactics in Europe was recently presented by Ligozat, 2023; cf. also Hudson et al., 2023). In this situation our own comparative approach heading towards the development of a General Subject Didactics adds another dimension of comparison, though on a meta-level of observation and analysis, as shown throughout this book.[2] In comparison to other comparative approaches both the strengths and the limitations of General Subject Didactics become obvious. By operating on a meta-theoretical (third) level of observation and comparison, its specific advantages lie in a systematic self-reflection and self-assurance of subject-didactic research. This in turn can contribute to stimulate, orient and optimize research in subject didactics itself on the second level.[3] At the same time,

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1 In his contribution, Schneuwly (this volume) reports about an initiative of the *Centre de competence roman den didactique* in the French-speaking Western part of Switzerland to develop something like a research agenda by defining common research content for all subject didactics. The resulting proposal is a rather normative scheme, but it serves the purpose of giving an overview of the vastness of the field and its complexity. Among other things it is particularly suitable for orienting young emergent researchers working in the different areas of subject didactics to develop a concept of the whole and the relationships underlying it.

2 In another context we will deal more systematically with the notion of *comparison*, with different approaches, types and theories of comparison in subject didactics within the European setting and with different frameworks and conditions for a comparative analysis of subject-didactic research (Vollmer, in progress).

3 Muller (2022) rightly underlines the significance of top-down and bottom-up approaches as one of the basic features of General Subject Didactics. In our English-speaking publications so far

this also marks the limits of General Subject Didactics, because a possible vision of education and especially of school education and thus a normative orientation for subject-matter teaching and learning (on the first level of classroom activities) cannot be formulated directly. Rather, such an orientation can only be expressed indirectly and mediated through subject-didactic research itself. General Subject Didactics can note and register, however, whether there are approaches existing and research being done on this topic and if so, which ones. So it requires a complementation by other comparative approaches and research activities within subject didactics, which operate on the second level and are therefore closer to everyday practice.

Overall, it is quite remarkable how much didactics as a concept, but also that of subject didactics has already spread, at least over continental Europe, and how widely it is accepted as a relevant theory for the study of specialized, content-specific teaching and learning. The terms and the concepts are used with some variation nationally or regionally, however. And sometimes the notion of Didaktik/didactics covers and includes also subject didactics by implication. Meanwhile, subject didactics are the explicit focus of international publications (cf. Hudson et al., 2022a, 2022b) and a privileged topic of international conferences (see for example the KOSS meeting at the University of Trier in May 2024).[4] So the need, the usefulness and the acceptance of subject didactics as a separate academic discipline of its own can hardly be questioned or doubted any more, all the opposite: the dynamics of this development is clearly supportive and moving in that direction. All the more is it noticeable that Anglo-Saxon concepts such as *education* or *pedagogy* (or even Pedagogical Content Knowledge by Shulman and his disciples) are less used in European educational contexts, partly because those concepts are too narrow and imprecise, partly because they do not offer the same level of sophistication in theoretical terms: so more and more notions such as subject-didactic research, subject-didactic awareness or subject-didactic thinking are introduced (the latter one as a goal in the education of future teachers with a subject-specialist orientation; cf. Volllmer & Klette, 2023).

As demonstrated throughout this volume, the discourse in mainland Europe is very much alive and increasingly vivid, mainly within the different educational spaces, but also to some extent between them or at least between different scholars and representatives from different backgrounds. The ECER Network 27 has held unto the title of Didactics: Learning and Teaching for long, till this very day, probably

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we have put the emphasis mainly on the empirical bottom-up processes, however. We hope that this book will demonstrate clearly that theoretical top-down reflections are of equal importance as the bottom-up approaches (see Chapters 3 and 4 as well as Chapter 15, therein especially the example of research formats in section 15.1). Generally speaking, it is the case that General Subject Didactics can be characterized as an ongoing interaction and interplay of top-down and bottom-up movements (see also Pierce (1977) concerning the logic of abduction).

4 "*Transnational and Interdisciplinary Perspectives on Subject Didactics*", May 14–16, 2024, University of Trier, Germany. This conference will be one of the first academic events specifically devoted to subject didactics in a larger international context.

including subject didactics, at least mentally. On the other hand, subject didactic issues and theory are more and more topicalized, though often not easily recognized or named as such. Yet there is too little known about each other, about national or regional activities in some detail, about the different variations and initiatives and their concrete orientation and research practices, in spite of increasing publications activities. Therefore, it is high time to intensify the discourse on subject didactics as a theory, on the different (versions of) subject didactics in Europe and their relationship to Anglo-American approaches and philosophies of education.

If this is not the case already, we strongly recommend that the different groups of researchers involved in didactic and particularly in subject didactic research get organized in their respective communities and countries, e.g. in the form of cross-curricular and cross-disciplinary research groups or even as associations on a national level, comprising the different subject didactics which already exist locally or regionally. And that they make themselves known publicly, freely exchanging within the academic communities and publishing their thoughts, their didactic approaches, in research as much as in practice, and their research findings, as far as they are available already. The channels for publication have somewhat improved, fortunately so, with a number of journals dedicated to the topic, and more and more international conferences in which especially subject didactic research is appreciated and can be presented.

22.3   Future exchange and cooperation

In the recent past, first co-operations between national associations have already begun, at least on the level of joint conferences and publications. For example, the German "Association for *Fachdidaktik*" (GFD) has held one of its bi-annual thematic congresses together with the German-speaking part of the Swiss association "Konferenz Fachdidaktiken Schweiz" (KOFADIS) in 2017 at the *Pädagogische Hochschule* (University of Education) in Freiburg/Breisgau on the topic of Research in Teacher Education. The joint publication with contributions from that conference appeared two years later in 2019 (Christophel, Hemmer, Korneck, Leuders & Labudde (eds.), 2019). Another joint venture took place in 2022 when the German and the Austrian Associations for *Fachdidaktik* together organized a large congress in Vienna, this time with the following title: "Transfer of Research and Research on Transfer in Subject-Matter Didactics". A selection of papers from this conference appeared fairly quickly as a thematic issue in the Vienna-based international English language journal "*Research in Subject-Matter Teaching and Learning*" (RISTAL, Volume 5, (2022), published online: 03 Jan 2023; see ristal.org).

Our own project is meant to stimulate further exchange and cooperation in the future. Its contribution to the construction of a theory of subject didactics could have a positive, stimulating effect on other research groups or organizations, thinking in

the same direction: either to react and respond to our own approach and findings, or to consider and study in their own region and country, what the different local didactic approaches are and what theoretical insights they are based on. In that context we hope particularly, that there will be either parallel or follow-up studies to the one presented here, with the goal of finding out what the relationship between different subject didactics is, what their commonalities and their specific differences are, identifying their unique features as well as their generalized, common ground and perspective (in the sense of General Subject Didactics). But even if this type of research might take some time before it spreads further, we strongly recommend that researchers all over Europe (including the ones interested from the UK) get together in cooperative projects, independent of whether they already formed (comparative) research groups or national cross-disciplinary organizations for the promotion of didactics and subject didactics in particular. Such cooperative projects across borderlines with the goal of unfolding more of General Subject Didactics could be the test of "eating the pudding". Through those joint research projects we might be able to learn more and in detail from one another: about the respective state of individual subject-didactic disciplines, about their research mentality/minds at work, about the specific conditions and reasoning backgrounds of colleagues as well as some practical and above all theoretical concerns and projections involved. And in doing so we will also learn how to communicate better and exchange successfully across languages, cross-nationally.

Certainly will the *European Educational Research Association (EERA)* and particularly the ECER-Network 27 "Didactics: Learning and Teaching" continue to play an important role as a platform for the exchange among individual researchers in didactics/subject didactics. But additionally, we should organize a number of bi-national meetings on the state of the art in didactic research within certain regions or educational cultures or on specific topics within that framework. This will involve the explanation and transfer of scientific knowledge into another socio-cultural space or another educational setting, with all the linguistic and psychological issues in trying to understand one another across ethnic, national and cultural borderlines – and not only superficially (cf. the general discussion of translation issues and of scientific knowledge transfer in Chapter 16 above, cf. also *RISTAL, 5,* 2022).

But we should also consider an intensified discourse among existing groups of researchers focusing on similar issues, for example on research frameworks or formats of (subject) didactic research, on the study of content and goals for school education or on the demands for the professionalization of teachers under changing conditions in the world. We hope to have contributed to the awareness of the need for an intensified exchange about content-based teaching and learning in school (and beyond) and of the possibilities of a continued discourse about didactics and subject didactics, above all in Europe but also internationally. All of this in the same attitude as advocated earlier: finding out chances, respecting limits.

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He is also editor-in-chief of the two scientific journals *Theo-Web. Zeitschrift für Religionspädagogik* (Theo-Web. Academic Journal of Religious Education, www.theo-web.de) and of *RISTAL Research in Subject-Matter Teaching and Learning* (www.ristal.org).

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He is also the Co-founder of the Swiss *Konferenz Fachdidaktiken Schweiz* (KOFADIS)/ Conférence faîtière des didactiques de disciplines en Suisse (COFADIS) and co-editor of the international journal *"Research in Subject-Matter Teaching and Learning"* (RISTAL).

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Index