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Educational Research Literacy

Special Issue Editorial

In recent years, the focus of educational research has shifted to the requirement of evidence-based educational practice, which is seen as the foundation of continuous professionalization activities. Even though the claim to impart such fundamental research skills in academic education is not new (Bundesassistentenkonferenz, 1970), it has been revived in the course of the empirical shift in education following the so-called *PISA shock* in both Germany (Bos, Postlethwaite, & Gebauer, 2010; Messner, 2016) and Austria (Altrichter, Brüsemeister, & Heinrich, 2005). Research literacy is therefore included in general definitions of standards and objectives for Higher Education degrees (Kultusministerkonferenz, 2005; Wissenschaftsrat, 2000), but can also be found in the context of study programs in the field of Educational Science, e.g., in teacher education curricula (BMUKK, 2013; Kultusministerkonferenz, 2004). At the heart of respective efforts is the conception of competencies as situation-specific skill that underlies observable performance, but manifests itself through a combination of multiple facets such as cognition, conation, affect, and motivation (Blömeke, Gustafsson, & Shavelson, 2015; Klieme, Hartig, & Rauch, 2008; Weinert, 1999).

Even though the debate about competency has stimulated a highly active interdisciplinary research field with focus on proficiency in certain domains and on different educational levels (cf. Baumert & Tillmann, 2016), there is still only little research about the ability to access, interpret, critically reflect, and apply research as an objective of higher education. This is probably due to the fact that in Educational Science, research literacy is not comprehended as content knowledge, but as generic, procedural knowledge, which is acquired during studies (quasi as side effect), and enables students to academically reflect domain-specific contents (e.g., Wecker, Hetmanek, & Fischer, 2014). Descriptions of the aspired competence facets can be found in curricular models (Willison & O'Regan, 2007) and comprise aspects like a) identifying problems/framing questions, b) using data, c) transform-

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ing information into decision, d) transforming data into information, and e) evaluating outcomes (e.g., Gutman & Genser, 2017; Mandinach & Gummer, 2016). In the Research Skill Development Framework (Willison & Buisman-Pijlman, 2015), these requirements are complemented by another dimension with different levels of autonomy from supervisor instigated to researcher instigated to discipline leading. A similar principle was used by Rueß, Gess, and Deicke (2016) in a model of research-based teaching, that distinguishes, whether students learn through reception, application, or inquiry. The authors' description of learning activities can be used to illustrate the difference between *engagement with research* and *engagement in research*, which was introduced by Borg (2010). *Engagement with research* corresponds with activities like engaging with or discussing research results, methods or the whole research process. Such assignments aim at promoting relevant abilities to access and appraise knowledge in complex contexts that are typical for the line of work in educational practice, and will be referred to as *Research Literacy* in the following. By contrast, the term *engagement in research* refers to planning and implementing research. With the long-term objective to be able to generate new knowledge based on scientific methods and as part of a certain scientific community, this term refers to a stronger focus on acting and will be labeled as *Research Competence.*

All articles in this special issue dwell on the topic of *Educational Research Literacy* and *Educational Research Competence*, respectively, as a result of higher education in the field of Educational Science. In the following, we give a short summary of the featured articles, which address different competence facets.

The first two articles focus on the theory-led development and empirical construct validation of assessment instruments that can be used for course or study program evaluation. With a stronger focus on *engagement in research*, *Gess, Wessels, and Blömeke* show that Research Competence is overall similar across the Social Sciences (sociology, political science, educational studies, psychology) with regard to knowledge domain and research steps, but that there are differences due to the focus in research tradition. The authors interpret this as an indicator that Research Competence can be considered as transdisciplinary ability. From a psychometrical point of view it is also noteworthy that Gess et al. are a good example that sophisticated competency assessment can get along with small item-samples based on a multidimensional conceptual framework.

Groß Ophoff, Wolf, Schladitz, and Wirtz focus on the *engagement with research* in relation to the steps of the research cycle. They define Educational Research Literacy as the ability to purposefully access, reflect, and use evidence from educational research in the field of Educational Science (teacher education, educational studies, early education, health education, educational psychology). Based on data from two different samples of university students, the authors investigate the question, which competence facets constitute this competence. The results consistently revealed that Educational Research Literacy seems to consist of one dominant general factor and the three secondary factors Information Literacy, Statistical Literacy, and Evidence-based Reasoning, which represent particular re-

quirements of the research cycle. With regard to psychometric modeling, Groß Ophoff et al. illustrate further that in competency measurement, omissions should not be treated as incorrect, but as missing responses.

In the interview study by *Haberfellner and Fenzl*, pre-service teachers' perceived importance of the *engagement with research* and *the engagement in research* was investigated based on a theoretical framework with five aspects of utility value. The interviewees were asked both to evaluate the importance of educational research for teachers in general and for themselves, and the impact of research on educational practice. The interviewees believed that attaining knowledge on educational research helps them to get prepared for scientific work as well as for their future work as teachers. However, this is in contrast to evidence that teachers do not read published research (due to lack of accessibility, time, and motivation).

The study by *Klein, Wagner, Klopp, and Stark* also addresses both the *engagement in* and the *engagement with research*. The authors present a conceptualization of a course for teacher students that addresses applicable educational knowledge for the theory-based explanation of complex school situations. This conceptualization focuses on the integration of knowing how something *is not* or *is not done* (termed as *negative knowledge*) by highlighting typical errors of the application of theories to situations. This is compared to a traditional course without explication of possible errors. Additionally, instructional support (or the lack thereof) is given, resulting in a 2x2 design with four groups of students. The evaluation of the experimental variation showed that typical errors could be prevented when students were provided with negative knowledge. This is interpreted as indicator of the usefulness of scientific knowledge.

Rott and Leuders deal with epistemological beliefs, especially the dimension of certainty of knowledge: What do students know about the certainty of mathematical knowledge and the way that it is substantiated? For this purpose, the authors investigated the epistemological beliefs of pre-service teachers in mathematics education. They were able to show that the belief position (whether mathematical knowledge is considered as certain or uncertain) and the belief justification (how thoroughly the beliefs are supported by reasons and arguments) can and should be distinguished theoretically as well as empirically. In order to investigate the interplay of beliefs and knowledge, the authors implemented also a test for mathematical-critical thinking as assessment of subject matter knowledge and as an additional aspect of Research Literacy. They report correlations between critical thinking and the belief justification, but not the belief position, which is interpreted as indicator for the importance of justified beliefs. Their understanding of Research Literacy can be interpreted as *engagement with research* because the participating teacher training students had to reflect upon mathematical research methods (especially logical deduction) and the research process (possible flaws in the review process).

The last contribution in this special issue by *Schladitz, Groß Ophoff, and Wirtz* originates from the same research group as Groß Ophoff et al., and can be cate-

gorized as research about Educational Research Literacy, too. In this article, the authors take on a stronger psychometric perspective on test and item properties. The authors compare the difficulty of (stem-equivalent) open- vs. forced-choice test items. Their results show no clear advantage of either response format. However, both formats seem to measure the same construct. What is more important, the authors report no correlation between objective difficulty (Educational Research Literacy test) and subjectively perceived difficulty, but that items with free responses were systematically rated as more difficult. Therefore, they come to the conclusion that both formats may be used for the assessment of Educational Research Literacy, but that potential motivational (and other) effects of the response format should be taken into account.

Even though the articles in this special issue contribute to the conceptual clarification of *Educational Research Literacy* and *Competence*, it should finally be noted that, of course, further research about *Educational Research Literacy* and *Competence* is needed. In particular, the question whether evidence-based education can support professionalization and development processes in educational practice, remains unanswered – although indication for the potential of data use in education can be found (Lai & McNaughton, 2016; Schildkamp & Kuiper, 2010). However, it also has to be clarified which research skills students need for their specific future occupation and should therefore be included in higher education curricula. For example, teachers are usually not expected to *engage in research* but to *engage themselves with research* about, for example, the contents they teach, the methods they use, or the diversity of students they teach (e.g., Kultusministerkonferenz, 2004). But if students are indeed not expected to *engage themselves in research*, the question remains whether or not they need to be trained in Research Competence. In other words: Can Research Literacy be obtained at all without actively constructing problem-relevant knowledge (by engaging in research)? In this sense, approaches like action research (Altrichter, Feldman, Posch, & Somekh, 2013) even claim that teachers should become researchers of their own practice in order to resolve the theory-practice gap (Elliot, 1991). Connected with this is a clear need for the theory-based development of research-oriented courses in Educational Science study programs (e.g., inquiry-based learning; c.f. Pedaste et al., 2015) and their empirical evaluation. Such studies should exceed the boundaries of courses at single institutions and aim at the comparison of different universities or learning opportunities, and strive additionally to implement controlled field trials.

With this special issue, we hope to instigate a productive discussion and systematic investigation of Educational Research Literacy and Competence, which is long overdue since Davies' (1999) question: "What is evidence-based education?" We wish you an interesting read.

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