

Ritter, Roswitha; Wehner, Antje; Lohaus, Gertrud; Krämer, Philipp
Multi-professional and mono-professional collaboration and their association with teacher trainee's attitudes towards concepts of inclusive education
Empirische Sonderpädagogik 10 (2018) 2, S. 185-203



Quellenangabe/ Reference:

Ritter, Roswitha; Wehner, Antje; Lohaus, Gertrud; Krämer, Philipp: Multi-professional and mono-professional collaboration and their association with teacher trainee's attitudes towards concepts of inclusive education - In: Empirische Sonderpädagogik 10 (2018) 2, S. 185-203 - URN: urn:nbn:de:0111-pedocs-160050 - DOI: 10.25656/01:16005

<https://nbn-resolving.org/urn:nbn:de:0111-pedocs-160050>

<https://doi.org/10.25656/01:16005>

in Kooperation mit / in cooperation with:

Pabst Science Publishers <https://www.psychologie-aktuell.com/journale/empirische-sonderpaedagogik.html>

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EMPIRISCHE SONDERPÄDAGOGIK

ISSN 1869-4845

10. Jahrgang 2018 | Heft 2



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Empirische Sonderpädagogik

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Impressum

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Verlag:

Pabst Science Publishers
Eichengrund 28
D-49525 Lengerich
Tel. + 49 (0) 5484-308
Fax + 49 (0) 5484-550
E-Mail: pabst.publishers@t-online.de
www.pabst-publishers.de
www.psychologie-aktuell.com

Erscheinungsweise:

4 x jährlich

Preise:

(Jahresabonnement: 40,- €
Einzelheft: 15,- €
incl. MwSt. und Versand)

Verlagsredaktion:

Erika Wiedenmann
wiedenmann@pabst-publishers.com

Herstellung:

Armin Vahrenhorst
vahrenhorst@pabst-publishers.com

Administration:

Silke Haarlammert
haarlammert@pabst-publishers.com

Druck:

KM-Druck, D-64823 Groß-Umstadt

Titelbild:

Joseb Smoktun

ISSN 1869-4845 (Printausgabe)

ISSN 1869-4934 (Internetausgabe)

Empirische Sonderpädagogik, 2018, Nr. 2, S. 185-203
ISSN 1869-4845 (Print) · ISSN 1869-4934 (Internet)

Multi-professional and mono-professional collaboration and their association with teacher trainee's attitudes towards concepts of inclusive education

Roswitha Ritter, Antje Wehner, Gertrud Lohaus, & Philipp Krämer

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Abstract

The ratification of the UN Disability Rights Convention in Germany constitutes a new challenge for schools and teachers. In response, in 2015, the Conference of Education Ministers mandated that inclusion must be a topic within the first phase of teacher training. Many research studies emphasize the importance of professional collaboration for successful inclusive education at schools. Collaboration skills, however, must already have been taught in the first phase of teacher training. At the University of Wuppertal, Germany, a seminar-design was developed to offer teacher trainees the opportunity to gain knowledge about, and experience in, inclusive education and practice collaboration skills at the same time. The seminar comprises three parts: (1) academic course work at the university; (2) a practical phase at secondary schools around the city; and (3) a phase of reflection at the end. Teacher trainees work in either multi-professional tandems consisting of one teacher trainee for general education (GE), one teacher trainee for special educational needs (SEN), or in mono-professional tandems consisting of two teacher trainees for GE or two teacher trainees for SEN. A mixed-method approach is carried out to assess the association of mono-, as compared to multi-, professional collaboration with teacher trainees' attitudes towards, and concepts of, inclusive education. Analysis is performed at three different testing times during the course of the seminar, thus enabling analysis of both the effect of academic course work and practical experience. Attitudes towards, and concepts of, inclusive education are anticipated to be predictors of classroom behavior and professional knowledge and behavior. It is also expected that interdisciplinary exchange in multi-professional tandems will be associated with higher professional knowledge.

Keywords: Co-teaching, Multi-professional Teams, Inclusion, Attitude, Concepts.

Multi-professionelle und mono-professionelle Zusammenarbeit und ihre Verbindung zu den Einstellungen von Lehramtsstudierenden zu Konzepten von schulischer Inklusion

Zusammenfassung

Die Ratifizierung der UN-Behindertenrechtskonvention in Deutschland stellt eine neue Herausforderung für Schulen und Lehrer*innen dar. Daher beschloss die Hochschulrektorenkonferenz (HRK) im Jahr 2015, dass die Vorbereitung auf die schulische Inklusion bereits in der ersten Phase der Lehrer*innenbildung enthalten sein soll.

In einer Reihe von wissenschaftlichen Studien wird die Bedeutung der professionellen Zusammenarbeit für eine erfolgreiche schulische Inklusion immer wieder betont. Dabei sollten die Kooperationskompetenzen der künftigen Lehrer*innen vorzugsweise schon in der ersten Phase der Lehrer*innenbildung trainiert und eingeübt werden.

An der Bergischen Universität in Wuppertal wurde ein Seminarkonzept entwickelt, das den Lehramtsstudierenden die Möglichkeit bietet, Kenntnisse über und Erfahrungen im inklusiven Unterricht zu erlangen und gleichzeitig die Kooperationskompetenzen zu trainieren. Das Seminar besteht aus drei Phasen: i) einer universitären Phase, ii) einer praktischen Phase in einer Schule der Sekundarstufe I im Stadtgebiet und iii) einer Reflexionsphase.

Die Lehramtsstudierenden arbeiten entweder in einem multi-professionellen Team bestehend aus einem Lehramtsstudierenden für die Regelschulpädagogik (RePä) und einem Lehramtsstudierenden für die Sonderpädagogik (SoPä), oder in einem mono-professionellen Team bestehend aus zwei Lehramtsstudierenden der RePä oder zwei Lehramtsstudierenden der SoPä.

Die Auswirkung von multi-professioneller Kooperation auf die Einstellung der Lehramtsstudierenden zu und deren Konzepte von schulischer Inklusion wird mithilfe eines Mixed-Method-Ansatzes analysiert und verglichen mit der entsprechenden Auswirkung einer mono-professionellen Kooperation. Die Datenerhebung findet zu drei Messzeitpunkten im Laufe des Seminars statt, um sowohl den Effekt der universitären Phase als auch den Effekt der praktischen Erfahrung in den Schulen zu untersuchen. Sowohl die Einstellung zu als auch die Konzepte von schulischer Inklusion gelten als Prädiktoren für das Professionswissen und das Lehrerhandeln.

Es wird erwartet, dass der interdisziplinäre Austausch in den multi-professionellen Teams zu einer positiveren Einstellung und einem höheren Professionswissen führt.

Schlagwörter: Co-Teaching, Multi-professionelle Teams, Inklusion, Einstellung, Konzepte

Introduction

Inclusion and the Association with Teacher Training

Since Germany's ratification of the UN Convention on the Rights of Persons with a Disability in 2007 and its inception in 2009, the traditional school-system has had to deal with many changes integrating the joint education of children with and without special educational needs. Although the UN Convention demands an inclusive school system

(United Nations, 2006), there is neither a generally accepted definition nor parameterized characteristics of the term inclusive education (Farell, 2004; Grosche, 2015). Göransson and Nilholm (2014) identified at least four different types of definitions: one concerning placement; a specified individualized one; a general individualized one; and one concerning the community. The first definition denotes the mere placement of students with special education needs (SEN) in mainstream classrooms; the second identifies inclusion as meeting the social and academic needs of students with disabilities;

the third regards inclusion as meeting the social and academic needs of all students; and the fourth defines inclusion as the creation of communities. However, it is not only the vagueness of the definition of inclusive education, but also the insufficient training of in-service teachers with respect to inclusive education, that causes teachers to struggle to realize successful inclusion, as they function within an approach that depends on trial and error.

Consequently, in order to create a successful inclusive school-system, it is evident that teacher training has to be prioritized. This is a commonly agreed upon goal in a number of research and scientific publications (e.g., Lütje-Klose, Miller & Ziegler, 2014; Feuser, 2015; Seitz, 2011), but little conceptional contributions have been made by state administrations (Heinrich, Urban & Werning, 2013; Breyer & Erhardt, 2013). In 2015, the German Conference of Education Ministers resolved that inclusion must be a topic in the first phase of teacher training (HRK, 2015). The awareness that teachers need professional competences to take adequate measures in support of students with special needs (*ibid.*, p2) triggered a relatively detailed recommendation concerning the first phase of teacher training.

In order to answer the question which professional skills are needed to work in inclusive settings, an examination of the criteria for initial teacher training (ITE) in the UK may be helpful. Current ITE standards, which teachers must meet, state that teachers should:

- “understand their responsibilities under the SEN Code of Practice, and know how to seek advice from specialists in less common types of SEN;
- differentiate their teaching to meet the needs of students, including those with SEN;
- identify and support students who experience behavioral, emotional and social difficulties” (DfDES, 2004, p. 57 as cited in Golder, Norwich, & Bayliss, 2005, p. 93).

So, future teachers’ development of educational competences in relation to inclusion have to comprise certain areas, including:

- the development of an inclusive understanding (Seitz, 2011; Goujonsdottir et al., 2008);
- the ability to individually support (Kunze, 2010; Veber, Rott & Fischer, 2013);
- the development of diagnostic competences (Schrader, 2011).

Additionally, it is particularly the development of positive attitudes towards inclusion and heterogeneity (Avramidis, Bayliss & Burden, 2000; de Boer, 2012; Avramidis & Norwich, 2002), as well as the ability to collaborate in teams (Schwager, 2011; Pancsofar & Petroff, 2013; Lütje-Klose & Urban, 2014), which are essential for successful inclusive education. However, the term collaboration refers to the practice of co-teaching of two or more educational specialists in one classroom (e.g., Lütje-Klose & Urban, 2014; Murawski, 2009; Schwager, 2011). Hoffman, Koch and von Stechow (2012) emphasize that it is necessary for teachers in inclusive schools to practice inclusive education, as well as being aware of inclusive education requiring cooperation and differentiation (*ibid.*, p.133). Lütje-Klose and Urban (2014) consider cooperation of professionals as being crucial for inclusive schooling, because the establishment of a development-facilitating condition cannot be realized by only one teacher. The General Teaching Council for England (2005), therefore, recommends in-school professional learning embedded in a collaborative model as the most effective means of achieving ongoing positive change in teachers’ practices, attitudes, and beliefs about inclusive education. Accordingly, the U.S. Council of Chief State School Officers (CCSSO 2013) emphasizes Core Teaching Standards as follows:

- that teachers “should be able to make these decisions both independently and in collaboration with colleagues through a process of ongoing learning and reflection” (p. 5);

- that “when teachers collectively engage in participatory decision-making, designing lessons, using data, and examining student work, they are able to deliver rigorous and relevant instruction for all students and personalize learning for individual students.” (p. 5).

Sawalies, Veber, Rott and Fischer (2015) found that the development of an inclusive understanding, the ability to provide individual support, and diagnostic competences are well implemented in the university phase of teacher training in Germany. Developing positive attitudes and collaboration skills, however, seem to be more difficult to realize, as they refer to personality and traits. In fact, their implementation in teacher training remains a desideratum. Overall, attitudes of teachers, as well as the collaboration of teachers with different areas of expertise, such as general education (GE) and special educational needs (SEN), constitute key factors for inclusive education. As a result, teacher training has to emphasize collaboration and co-teaching in order to profoundly prepare teacher trainees for inclusion.

Attitudes and the Association with Inclusive Classroom Behavior

According to Rosenberg and Hovland (1969), attitudes are defined as predispositions for a particular response towards a specified class of objects. The class of objects could be various situations, individuals, groups, or social issues. Rosenbaum, Armstrong and King (1986), as well as Eagly and Chaiken (1993), state that attitude as a theoretical construct is specified by a multidimensional model with three components: (1) cognitive (evaluative beliefs); (2) affective (feelings or sentiments); and (3) behavioral (behavior intentions).

In addition to the model of attitude as a theoretical construct, some research perspectives focus on the relationship between attitudes and other dependent variables. Albarracín, Johnson and Zanna (2014), for ex-

ample, state that attitudes are supposed to influence not only behavior, but also beliefs and affects of an individual. In Ajzen's (1985) Theory of Planned Behavior, it is attitudes towards behavior, subjective norms, and perceived behavioral control that are known to predict intentions, which in turn predict behavior. This Theory of Planned Behavior implies that only specific attitudes towards a certain behavior can predict this behavior (Rosenbaum, Armstrong, & King, 1986).

Therefore, the importance of positive teacher attitudes towards inclusive education as predictors of behavior that promote successful inclusion has been demonstrated in several international studies. De Boer (2012) emphasizes that attitudes are a key factor for the acceptance of students with SEN in regular education. Sharma, Forlin, Loreman and Earle (2006) found that, if teachers are to be supportive of inclusive education, they not only need relevant skills and knowledge, but also positive attitudes. Empirical studies substantiate that attitudes as predictors for intentions and behavior determine the competence of the professional actions of classroom teachers (Heyl, Trumpp, Janz, & Seifried, 2014; Baumert & Kunter, 2006), which constitutes a key for successful inclusive education.

Avramidis and Kalyva (2007), Sari (2007), and Kurniawati, de Boer, Minnaert and Mangunson (2016) found a relationship between specialized training and positive attitudes of teachers towards inclusion. Sari evaluated an in-service teacher training program (INSET) on teacher attitudes towards inclusion. The results of the study show that an increased knowledge level leads to positive attitude changes of teachers. Kurniawati et al. (2016) evaluated the effect of elaborate face-to-face training on primary school teacher attitudes. This training program was shown to significantly positively influence teacher attitudes (ibid, p. 7).

In contrast, Tait and Purdie (2000) report that information-based courses to prepare teachers to work in inclusive classes increase

knowledge, but have little impact on teacher attitudes. Therefore, in order to promote positive attitudes, formal instruction should be combined with direct contact with children with SEN (Ford, Pugach, & Otis-Wilborn, 2001). In a study with GE primary teachers from inclusive or non-inclusive working schools, Avramidis and Kalyva (2007) report a significant main effect of "experience of inclusion" on teachers' attitudes. Experience is defined as affiliation with the respective schools. Teachers with longer institutional affiliation with inclusive schools exhibit more positive attitudes. Hence, it seems necessary to implement theoretical, as well as practical, courses to facilitate the development of the competence of professional action in inclusive classrooms. Overall, teacher attitudes towards inclusion influence teachers' inclusive classroom behavior, and attitudes towards inclusion may be influenced by theoretical and practical courses. However, changing attitudes remains a controversial goal. Thus, attitudes may be considered merely as a measurable indicator for inclusive practice.

Co-Teaching and the Association with Professional Development of Teacher trainees

Co-teaching is defined as continuous exchange between two or more educational specialists who share the responsibility for all students and teach jointly in one room (Friend et al., 2010). Co-teaching includes professional planning and delivering instruction. Six different approaches can be lined out:

- One teach, one observe: one teacher leads instruction, and the other collects data;
- Station teaching: instruction is divided into parts, which are taught by the different teachers;
- Parallel teaching: two teachers present the same material to half of the group each simultaneously;

- Alternative teaching: one teacher works with most students, while the other works with a small group for remediation;
- One teach, one assist: one teacher leads the instruction, while the other offers individual help for students;
- Team-teaching: both teachers lead the whole group instruction by both, lecturing or illustrating two ways to solve a problem (ibid, p. 12).

According to Johnson (2015), one decisive advantage of co-teaching is that students with different needs can have access to the same learning content because, with two teachers in the room, instruction can be differentiated. This makes co-teaching a significant prerequisite for successful inclusive education, in which co-teaching is generally defined as the partnering of a general and a special education teacher with the purpose of jointly delivering instruction to a heterogeneous group of students (Friend, 2008).

However, not only students benefit from co-teaching, but teachers improve their professional development as well. Scruggs, Mastropieri and McDuffie (2007) extracted from several research studies that teachers generally reported to have benefited professionally from co-teaching. Co-teachers generally believed their practices to be beneficial for students, and claim to share expertise during teaching. Teachers also reported to have learned from their co-teaching partners, and thus witnessed a transfer of expertise. Moreover, teachers identify the formation of positive attitudes towards co-teaching, and the development of the belief that the needs of students with SEN are better served in co-taught classes.

As a partnership between professional peers of different types of expertise, as well as the transfer of expertise, co-teaching can be regarded as a response to the increasing difficulty of a single professional keeping up with all the knowledge and skills necessary to meet all the needs of heterogeneous learning groups (Friend et al., 2010). Co-teaching,

therefore, leads to the gaining of positive experience of teachers in inclusive classrooms, as all of the expertise needed is available.

Overall, the ability to collaborate in multi-professional teams is one of the key competences of future teachers. Co-teaching experiences in multi-professional teams may have an effect on the development of teacher trainees' professional competences, as a transfer of knowledge may exist from one partner to the other. Furthermore, an increase in the perception of teaching efficacy is to be expected as a result from these experiences.

Research Question

Collaboration in multi-professional teams is a crucial factor to meet the demands of inclusion, since collaboration may lead to the development of professional knowledge and attitudes towards inclusion. Thus, teacher training must include collaboration in multi-professional teams, since the development of professional knowledge and attitudes towards inclusion is supposed to apply to teacher trainees, as well. However, more empirical evidence is needed to substantiate the assumption that collaboration in multi-professional teams leads to the same benefits for teacher trainees as for in-service teachers. Therefore, the presented study investigates how collaboration in multi-professional teams, compared to collaboration in mono-professional teams, affects teacher trainees' professional knowledge of, and attitudes towards, inclusion.

Panscofar and Petroff (2013) concluded that professional development through co-teaching experience may be associated with teacher confidence, interests, and attitudes. Soodak, Podell and Lehmann (1998) found that teachers' perception of teaching efficacy is a strong predictor of their attitudes towards inclusion. Accordingly, the authors assume that the reported benefits of co-teaching practices for all students and the transfer of knowledge lead to an increase of perceived teaching efficacy, and thus influence teacher

trainees' attitudes towards inclusion. Bosse et al. (2016) recently stated that perceived competence and professionalism are closely related with attitudes and beliefs, which in turn lead to an increased capacity to act professionally in classrooms.

Methodology

The following description of the research design is divided into four sections: (1) a detailed description of the academic course; (2) a description of the anticipated sample; (3) the evaluation instruments and their suitability are presented and established; and (4) the intended analysis methods of the data are delineated.

Academic Course

The research design of the present study is connected to a newly developed academic course addressing the issue of learning co-teaching and teaching in inclusive classrooms. The course-design was originally developed by a focus group consisting of a specialist on teaching methodology, a specialist on technical discipline, and a specialist on special education (Krämer, Nessler, Schlüter, & Erbring, 2014). The course design was evaluated quantitatively and qualitatively over a period of four university terms, and was continuously optimized based on evaluation results prior to this study.

Teacher trainees for general education (GE), as well as teacher trainees for special educational needs (SEN), may participate in this course. The goal of the course is to experience co-teaching as a team of either two partners of the same specialty or a team of one partner being a teacher trainee for SEN and one a teacher trainee for GE. The experience is intended to be both theoretical at the university and practical at schools. The academic course comprises three episodes: (A) the theoretical episode at the university

stage; (B) the practical episode at schools; and (C) the reflection episode (c.f. Figure 1).

The theoretical episode comprises a single-phase (A.1.), a plenum-phase (A.2.), an expert-phase (A.3.), and a tandem-phase (A.4.). Within the single-phase, every teacher trainee studies a reader according to their specialty with the assistance of given check-lists. Within the plenum-phase, teacher trainees discuss the different forms and features of co-teaching, as well as the requirements for its success. Within the expert-phase, teacher trainees discuss their expertise in inclusive teaching in groups according to their specialty, guided by an expert-instructor. In other words, teacher trainees for GE discuss the educational methodologies of their content subjects, while teacher trainees for SEN talk about strategies for inclusive settings. Additionally, teacher trainees individually reflect on their professional and personal characteristics, their strengths and weaknesses, and their expectations of the collaboration. Within the tandem-phase, teacher trainees exchange their own professional and personal characteristics, their strengths and weaknesses, and their expectations of the collaboration. Following this, the tandems develop a lesson plan in their respective subject for a vignette inclusive class. The vignette was developed by experts in subject-specific teaching methodology in cooperation with experts in SEN to describe a multifaceted learning group. The given topic of the lesson to be developed is also multifaceted, as there are manifold methodological approaches to the content. Students are explicitly instructed to develop a lesson in which the needs of all students in the class are served. The lesson plans, therefore, can only be developed as a co-construction of the two partners, which makes each partner dependent on the other to fulfill the task. Following Gräsel, Fußangel and Pröbstel (2006), co-construction is an intense, collaborative exchange between two or more partners concerning a task which could not be solved with only one partner's knowledge. During this process, partners gain knowledge

from one another, thus ensuring the transfer of expertise between them. The tandems then present their lesson plans to the group and receive feedback from the other group members and the instructors, who pay particular attention to the planned consideration of all students in the class.

For the second, the practical episode (B), the tandems visit inclusive classes at local schools once a week for 12 consecutive weeks. Teacher trainees spend a whole morning in their classes to become familiar with the students and their needs. After an appropriate time in class, teacher trainees jointly plan and conduct their own lessons in one of their chosen subjects, paying particular attention to meeting all of the students' needs, thus again making use of each partners' area of expertise. During this period, students are guided and supervised by a teacher of GE and a teacher of SEN in the schools, each of whom is familiar with the objectives of the seminar. Moreover, the instructors visit each of the tandems in the schools to ensure that they are given the opportunity to plan and conduct lessons, and that they are guided accordingly.

At the end of the practical phase, there is a reflection episode (C) with the instructors to evaluate teacher trainees' professional development and roles on a meta-level. There is a plenum discussion about experiences in the classrooms which is moderated by the instructors. Teacher trainees also exchange probate methods to deal professionally with difficult situations. Finally, they are asked to evaluate the experience they made at school and in the teams, and assess their contribution to their professional development by using a reflection sheet.

Sample

The academic course is intended for teacher trainees of GE and teacher trainees of SEN at the University of Wuppertal, Germany. Teacher trainees of GE may be students with any combination of subjects. Teacher trainees of SEN, however, are focused on

learning problems and social-emotional disorders. The teacher trainees may be either in bachelor- or master-programs. Participation is optional, but embedded in the examination regulations of the university. The academic course takes place once-per-semester over a period of six semesters. There is a maximum of 36 teacher trainees per semester that are accepted to attend the academic course.

Within the academic coursework, teacher trainees of both disciplines are matched to form either multi-professional tandems, i.e., one partner being a teacher trainee of SEN and the other of GE (intervention group), or a mono-professional tandem, i.e., both partners are either teacher trainees of SEN or of GE (control group). The matching is done randomly by the instructors.

Instruments

The following description of the evaluation instruments is divided into three parts: (1) introduction of the questionnaire used for the assessment of teacher trainees' attitudes; (2) description of the concept maps as instruments to visualize teacher trainees' professional knowledge of inclusion, as well as their implementation of newly acquired knowledge; and (3) delineation of the learning diaries as an instrument for the assessment of teacher trainees' cooperative skills.

Questionnaires for the assessment of attitudes.

Teacher trainees' attitudes are operationalized by means of a questionnaire which contains five subscales to query attitudes towards inclusion and self-efficacy. These subscales are chosen from other questionnaires in their entirety, meaning that all items of each sub-scale are included.

To assess belief in inclusive education and to gain information about teacher trainees' general attitudes towards inclusion, a subscale developed and validated by Przi-

billa, Lauterbach, Boshold, Linderkamp and Krezmien (2016) was chosen. The subscale is entitled *Belief in Inclusion* and assesses teachers' considerations about placement and instruction of students with SEN, their personal convictions regarding the idea of inclusive education, and their needs for further training and cooperation with teachers of SEN. The subscale is part of a questionnaire which was used in an extensive study to assess in-service teachers' attitudes towards inclusion. This subscale consists of seven items with a 4-point Likert scale that includes items, such as "Students without SEN want to have students with SEN in their general schools". The internal consistency value of the pilot testing was satisfactory ($\alpha = .61$).

To assess teacher trainees' attitudes towards inclusive education in schools, two subscales developed and validated by Bosse and Spörer (2014) were chosen. The subscales are entitled *Attitude Towards the Organization of Inclusive Education*, and *Attitude Towards the Effect of Inclusive Education*. These subscales assess teacher trainees' attitudes towards the instruction of students in inclusive settings, as well as the involvement and educational success of children with and without SEN in inclusive settings. The subscales are part of the KIESEL-instrument widely used in German-speaking countries. The subscales consist of four items each with 4-point Likert scale that includes items, such as "In principle, lessons can be designed so that they meet the needs of all children" for the subscale *Attitude Towards the Organization of Inclusive Education*, and "Students with disabilities have higher academic achievements if they are taught in mainstream classrooms" for the subscale *Attitude Towards the Effect of Inclusive Education*. Internal consistency in the pilot testing was $\alpha = .72$ and $\alpha = .73$, respectively, for the subscales.

To assess teacher trainees' confidence to be able to master the challenges of inclusive education, as well as their perception of the necessity of collaboration and their willingness to share responsibility with other pro-

professionals in inclusive classrooms, two subscales developed and validated by Bosse and Spörer (2014) and Cullen et al. (2010) are used. The subscales are entitled *Self-efficacy with Regard to the Organization of Inclusive Education*, and *Perception of Professional Roles and Functions*. The first-mentioned subscale is part of the above-stated KIESEL instrument, and the last-mentioned subscale is part of the Teacher Attitude Towards Inclusion Scale (TATIS). The TATIS questionnaire is utilized internationally to record teacher attitudes towards inclusion. The first-mentioned subscale consists of four 4-point Likert-scaled items, such as "I am convinced that I can provide suitable learning opportunities for every child, even with the biggest performance differences". The last-mentioned subscale consists of four 7-point Likert-scaled items, such as "All students benefit from team teaching; that is, the pairing of a general and a special education teacher in the same classroom". Internal consistency in the pilot testing was at $\alpha = .65$ and $\alpha = .72$, respectively, for the subscales.

In addition to the above-mentioned items in the subscales, the questionnaire also contains questions on demographic data. These include gender, age, course of study, and previous experience with students with SEN and/or inclusive education in private or professional contexts. In particular, the data on previous experience may help to identify any outliers in the quantitative data.

Concept maps for the assessment of concept and knowledge.

Teacher trainees' professional knowledge was recorded by using concept maps. Concept maps are graphical tools to organize and represent knowledge (Novak & Cañas, 2008). Concept maps include concepts and relationships between these concepts. Concepts are perceived regularities in events or objects, or records of events or objects, designated by a label (ibid. p. 10). Normally, the label for a concept is a word, such as *heterogeneity* or *cooperation*. Relationships

connect two or more concepts using linking words or phrases to form a meaningful statement (ibid. p. 1).

Concept maps represent knowledge in a hierarchical system with the most inclusive, most general concepts at the top of the map and the more specific, less general concepts arranged hierarchically below. Additionally, concept maps enable relationships or links between concepts in different segments or domains of the map.

In order to define a context for the teacher trainees, the concept is related to the focus question "What is educational inclusion?". When creating these concept maps, teacher trainees are entirely free to choose any concept they have in mind, yet instructed to ensure that each concept receives a logical and labelled connection to at least one other concept of the map. This allows for determination of the extent and quality of new connections that students are able to make after theoretical instruction and practical experience (Mason, 1992).

Learning diaries for the assessment of cooperative skills.

To quantitatively and qualitatively assess teacher trainees' development of collaboration skills, and to monitor students' progress and satisfaction in their tandems, teacher trainees are asked to write an entry into a learning diary for each school day. The learning diary consists of a modified version of the questionnaire *Fragebogen zur Arbeit im Team (FAT)* [Questionnaire Working in a Team; translation RR] (Kauffeld, 2004; modified by Gebhard et al., 2014) to assess essential aspects of collaboration with a total of 24 items: six assess goal-orientation, four address task-solving strategies, eight assess cohesion, four assess the assumption of responsibility; one clarifies social desirability; and one assesses conflict-solving skills. The questionnaire is based on a 4-point Likert scale. Additionally, there are two impulse questions for the teacher trainees to report about their specific team-teaching and class-

related experiences. Thus, any difficulties in the schools or within the teams can be brought to the instructors' attention, thereby allowing them to control confounding elements.

Data Collection

The research study will be conducted in a pre-post design. Teacher trainees' attitudes and concepts are recorded before and after different phases of intervention. The first testing will be conducted before the seminar (PreTest). After the academic course work block, the second testing will be conducted (Post1Test). The third testing will be done after the practical phase at schools (Post2-

Test) (cf. Fig. 1). Testing will be performed in a paper-and-pencil manner during meetings at the university, which guarantees a 100% response rate. In addition, testing will be conducted anonymously by using a code-system for each participant to facilitate unambiguous allocation.

Intended Analysis

Analysis of quantitative data/attitudes.

Prior to the evaluation of the questionnaire, a confirmatory factor analysis (CFA) will be performed to confirm the representation of the subscales by the measured variables. As the leading question triggers a difference hy-

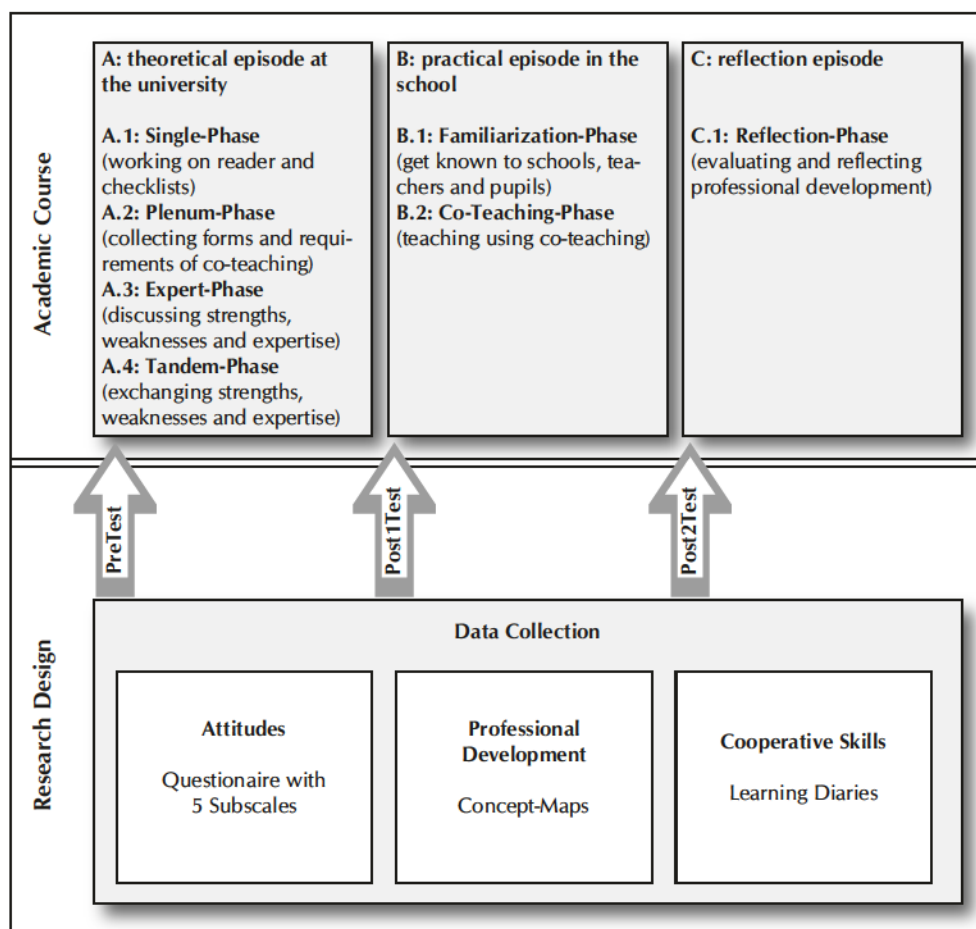


Figure 1. Design of Academic Course and Research Study

pothesis, the questionnaires will be evaluated quantitatively using t-test and analysis of variance (ANOVA) with repeated measurement. Thus, a comparison of teacher trainees attitudes in mono-professional and multi-professional teams at given test times and the development over time may be made. The leading question for this study aims to investigate how collaboration in multi-professional teams compared to collaboration in mono-professional teams affects teacher trainees' attitudes towards inclusion. By using t-tests and ANOVA, the mean values for each subscale at each given test time of teacher trainees of multi-professional tandems and teacher trainees of mono-professional tandems can be compared. Furthermore, mean values across the three test times can be compared between the two groups to determine any differences in the changes of attitudes.

Analysis of qualitative data/concepts

Descriptive analysis of the concept maps will be performed under graph-theoretical aspects, such as denseness of links, elaborateness, ruggedness, degree of centrality, and graph structure (cf.: Stracke, 2004). These analyses will provide insight into the complexity and depth of the maps, as well as the hierarchy of the concepts. Again, comparisons can be drawn across time and between the two groups with respect to the integration of new knowledge and knowledge transfer. Furthermore, the maps will be analyzed qualitatively by performing an inductive, summarizing qualitative content analysis (Mayring 2008) of the propositions produced by the connections between the concepts. This analysis will be the basis to create a reference concept map, which may then be utilized to deductively categorize the concept maps of all participating teacher trainees for all times of measurement. This allows for the analysis of teacher trainees' knowledge growth after the theoretical episode and the practical episode, the comparison of knowledge growth of the teacher trainees who

work in multi-professional tandems and those who work in mono-professional tandems, and the determination and comparison of the extent of knowledge transfer within multi-professional and mono-professional tandems.

The guiding research question intends to determine how collaboration in multi-professional teams compared to collaboration in mono-professional teams affects teacher trainees' professional knowledge of inclusion. The qualitative analysis of the concept maps provides answers to this question, e.g. by comparing the effects of multi- or mono-professional co-teaching on teacher trainees' concepts of inclusive education.

Analysis of mixed-method data/ collaboration skills

The questionnaires of the weekly learning diaries will be analyzed by using comparative, as well as correlative, methods to trace and compare the development of team-teaching skills. Again, t-tests and ANOVA allow for a comparison of the development of these skills between the two groups and across time. Correlations and regressions enable an analysis of a connection between the development of the skills and affiliation with one of the groups, either multi- or mono-professional.

The answers to the impulse questions will be analyzed by using an inductive, summarizing qualitative content analysis (Mayring, 2008). Lisch and Kriz (1978) define content analysis as trials reconstructing social processes; in this case, it is the trial to reconstruct the process of the development of collaboration skills. Again, a comparison of the development of these skills in mono- and multi-professional groups can be made from the data.

This mixed-method approach is considered by the authors to provide comprehensive data about teacher trainees' perception of collaboration, as well as their satisfaction with their partners. This may be helpful to explain possible outliers in the quantitative

and qualitative data. It is also intended to help control confounding elements within the tandems or in schools.

Discussion

The presented paper outlines a seminar-concept that may lead to more teacher trainees' knowledge about inclusion and to experience inclusion at schools in a team of either one teacher trainee of SEN and one of GE (multi-professional tandem), or in a team of two teacher trainees of SEN or of two teacher trainees of GE (mono-professional tandem). The seminar was jointly developed by experts in SEN and GE at schools, as well as teacher training at university, i.e., it is an interdisciplinary teaching-learning arrangement. The participating teacher trainees' attitudes towards, and concepts of, inclusive education are assessed to evaluate and compare the effect of multi-professional and mono-professional cooperation. The seminar has been piloted, and assessment will be conducted in the upcoming four university-terms (until the end of 2018).

On the Theory

Within the research study, teacher trainees' attitudes are assessed. Attitudes are not equal to behavior, which means that merely positive attitudes do not guarantee adequate professional action. However, attitudes are considered to be central predispositions for planned behavior, and therefore are often stated to be an elementary prerequisite for successful inclusive education. As the authors draw no conclusion about whether positive attitudes are better or worse predictors for successful inclusion, it is not the intention of the seminar to promote positive attitudes in teacher trainees. Attitudes here are only regarded as a measurable category for the evaluation of the effect of the seminar.

During the seminar, teacher trainees collect experience in, and gain knowledge

about, inclusive education. Accordingly, a change of the attitudinal object occurs, which may result in measuring different things at different test times. Therefore, the authors chose to apply a mixed-method approach to record not only attitude, but also the attitudinal object, with the concept maps.

On the Method

Academic course

The seminar is embedded in an obligatory, yet not subject-oriented, research project. Teacher trainees who choose to attend it are typically very interested in inclusive education at schools. Furthermore, as the seminar constitutes a relatively heavy workload for teacher trainees, only the more motivated and engaged students choose to attend. Thus, the sample cannot be assumed to represent the student population at the University of Wuppertal. The results from this study will only allow for a statement about multi- and mono-professional teams in the project. In particular, the quantitative data will have to be checked for ceiling effects. The effect of the seminar-concept on all teacher trainees at this university will have to be evaluated after it has been made part of the curriculum. The above-stated points will probably also lead to a relatively low total number of participants in this research study. This explorative and practical approach, however, permits first insights into the complex structure of the effects of theoretical instruction and practical experience within an either multi- or mono-professional team. Further research on a broader basis will have to follow.

A further limitation of the research study is that teacher trainees complete their practical phase at schools around the city. It is intended that there are not more than two tandems at one school to limit the burden on each individual school cooperating in this project. As a consequence, teacher trainees gain their experience at different schools with different variations of inclusive educa-

tion and different support and guidance by the teachers. Thus the participating students have to accomplish varying tasks within their respective environment, with the tasks and the environments not necessarily being comparable. These are confounding variables of which the authors are well aware, and which are difficult or even impossible to control in this practical and explorative approach. Teacher trainees write an entry into their learning diary for each day at the schools, the intention being to give instructors insight into student tasks and the option of intervention, if necessary. Furthermore, the supervising teachers are interviewed and informed about the authors' expectations of students' tasks and performance. In addition, the instructors visit each tandem on one of their days at school to gather information about teachers' and students' satisfaction, and to align students' engagement. However, the results of this research study will have to be interpreted on the basis of these conditions.

Moreover, there may be another limitation which is the impact of the instructors behavior on the mono-professional tandems. However, it is in any case the same instructor for all seminars and participating students. The instructors distanced themselves from any positioning, and explicitly explained that: (1) I will contribute to a research process to find out possible differences of the effects of multi- and mono-professional co-teaching; (2) I am not in favor of one or the other form of co-teaching; and (3) There are no good or better attitudes and concepts.

Instruments

The evaluation instrument to record teacher trainees' attitudes in this research study is a composition of subscales of different questionnaires. Although the questionnaires from which the subscales were taken are validated and approved, the newly composed instrument still must be validated prior to use in this research study. Additionally, after the

data collection a confirmatory factor analysis (CFA) will be conducted to hopefully confirm the factor loadings of all scales.

Furthermore, the questionnaire assesses explicit attitudes, which might trigger responses according to social norms. This constitutes a limitation of all research about attitudes and is hard to avoid. As the same instructors of the seminar are conducting the survey as well, there is a risk of obtaining supposedly favorable responses. An attempt is made to counteract this limitation by explicitly stating that there is no definition of "good" or "better" attitudes, and the grading of the seminar does not depend on any response to any of the evaluation instruments. Moreover, the questionnaires are anonymous, and there is no way of tracing them back to students.

Concept maps are utilized in order to visualize teacher trainees' concepts of inclusion. Teacher trainees may not be familiar with the creation of concept maps, as they are not typically implemented in education. Therefore, the creation has to be explained and practiced for the concept maps to be useful evaluation instruments. This is realized prior to the first testing time, and repeated before each subsequent test time. The instructors chose the conceptual context of Cars to explain and illustrate the creation of a concept map, as this context seemed to be familiar to all teacher trainees.

Implementation and Implications

Successful inclusive education requires multi-professional collaboration. Multi-professional teaching in schools, in turn, necessitates training multi-professional collaboration at universities as preparation for teacher trainees. As an interdisciplinary teaching-learning arrangement, the conception and implementation of this seminar requires a paradigm change within university structures. Well-trodden paths have to be left in order to initiate cooperation between faculties as varied as the School of Mathematics and Natural Sciences and the School of Edu-

cation. Furthermore, the seminar constitutes a merging of the three sub-sections of teacher training: technical sciences, content-specific teaching methodologies, and educational sciences, which again requires close cooperation between experts in different fields. In addition, the coordination of study regulations and the crediting of academic achievement in the different courses of study have to be negotiated. Thereby, the seminar represents an innovation with respect to its conception and intention, and differs from seminars usually offered to teacher trainees.

In addition to cooperation within the university structures, the seminar-design requires cooperation between the university and the local secondary schools teaching inclusive classes. As the schools and the supervising teachers cooperate voluntarily, it is necessary to grant them some form of benefit for their engagement. This is facilitated by teacher trainees helping out during their periods in school. In addition, a material pool for differentiated lessons in different subjects, which is available to all participating teachers, is provided by the instructors of the seminar. Furthermore, the supervising teachers are invited to the university twice-a-year to discuss and exchange different approaches to inclusive education among colleagues and with scientists. This, again, initiates a paradigm change with respect to the course of study of teacher training at the university.

Despite the aforementioned limitations of the study design, the authors are confident that it will provide valuable insights into the seminar's effect on teacher trainees' attitudes towards, and concepts of, inclusive education, and with that provide the possibility to determine any differences between multi- and mono-professional collaboration. As a result of the interdisciplinary collaboration in multi-professional teams in the theoretical and practical phases, teacher trainees may benefit from one another's knowledge and expertise and may expand their conception of inclusive education, which in turn could have an impact on their perceived self-effi-

cacy, and thus on their attitudes as predispositions for professional action.

The entanglement of theory and practice during teacher training has not yet been satisfactorily accomplished (Fraefel, 2012), even though teacher trainees have one semester of field experience in schools. The entanglement of theory and practice in inclusive education seems to be particularly difficult to accomplish, as teacher trainees have little opportunity to complete their field experience in inclusive classes. During the practical phase of this seminar, teacher trainees collaborate on equal footing with their team partners to face the challenges of inclusive education. According to Schön (1983), action in practice can be labelled as problem-based learning, as "[i]n the real-world practice, problems do not present themselves to the practitioners as givens. They must be constructed from the materials of problematic situations which are puzzling, troubling, and uncertain" (ibid, p. 40). It is this problem-based learning in a team on equal terms that has been shown to enhance students' commitment and learning, as well as the integration of theoretical knowledge (Fraefel, Bernhardsson-Laros, & Bäuerlein, 2016). According to Reusser (2005), field placements at schools can promote cognitions that are important for professional action, if they are organized as problem-oriented learning arrangements. However, Reusser, Pauli and Elmer (2011) state that personal dispositions and attitudes are decisive factors for the transfer of professional competence into professional action. Working in a multi-professional team may provide more opportunity to increase knowledge and competence, and hereby perceived self-efficacy, which leads to professional actions in inclusive classrooms.

Conclusion

In order to meet the demands of inclusion, teacher training needs to focus on implementing collaboration and co-teaching at the university stage. In-service teachers greatly benefit from a multi-professional collaboration of teachers of GE and teachers of SEN, mainly through a transfer of expertise and a change of attitudes. However, there seems to be a lack of empirical evidence that this applies to pre-service teachers as well, especially since most universities may face difficulties establishing a multi-professional collaboration of teacher trainees (e.g., because the university does not offer a course of studies for SEN).

The present research study may provide insight into the question of whether mono-professional collaboration could constitute a worthwhile alternative to multi-professional collaboration, as the complex association of concepts of, and attitudes towards, inclusion are investigated. Additionally, the current research project introduces an innovative academic course to implement multi-professional collaboration for teacher trainees at the university stage using theoretical and practical episodes.

The aim of this study is to investigate the effect of the academic course on teacher trainees' attitudes towards, and concepts of, inclusive education and hereby to determine any differences between mono- and multi-professional collaboration in theoretical and practical episodes. Thus, the research project, as well as the academic course, may contribute to an innovative teacher training program based on empirical evidence focusing on the preparation of teacher trainees for inclusion.

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*Erstmalig eingereicht: 25.12.2016
Überarbeitung eingereicht: 22.05.2017
Angenommen: 30.11.2017*