

**Effects of Multi- Compared to Mono-professional Co-teaching on Pre-service
Teachers' Attitudes, Concepts, and Beliefs of Inclusive Education**

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**La fine di uno è sempre l'inizio dell'altro,
qualunque esso sia.**

Abstract

In 2009, the UN-Convention on the Rights of Persons with Disabilities was incepted in Germany. Since then, all pupils have the right to education, for which the states are obliged to provide inclusive school-systems. Pupils have the right to attend mainstream schools independent of their physical or cognitive predisposition. On order to support all pupils, teachers have to be able to adapt lessons to their diverse needs. Consequently, teacher training has to be structured to prepare future teachers for that task.

Numerous scholars have therefore investigated what are the prerequisites for successful inclusion, and there seems to be a consensus that positive attitudes towards inclusion and the ability to work in a team are essential for inclusion to be successful. These should be addressed during teacher training. In the context of inclusive education, co-teaching is defined as the joint delivery of instruction by a teacher for General Education (GE) together with a teacher for Special Educational Needs (SEN). For the context of this study, this constellation is called multi-professional co-teaching.

The object of this study is to evaluate, whether teacher trainees working with a partner of a different discipline develop more positive attitudes and more elaborate knowledge/beliefs about inclusion than teacher trainees working in a team with a partner of the same discipline. For that purpose, a newly designed seminar for teacher trainees for GE and for SEN was evaluated to assess its effect on teacher trainees' attitude, collaboration skills, and beliefs about inclusive education. The seminar has three different episodes: i) a theoretical episode to introduce teaching techniques suitable for groups of different learners as well as different forms of co-teaching, ii) a practical episode in which teacher trainees plan and conduct lessons for inclusive classes in co-operation, iii) and a reflective episode to discuss newly acquired knowledge on a meta-level. During the practical episode, teacher trainees worked in multi-professional teams (i.e. one teacher trainee for GE and one for SEN) or in mono-professional teams (two teacher trainees for GE or two teacher trainees for SEN).

Attitude and collaboration skills were assessed at three different testing times: before the seminar (t1), after the theoretical episode (t2), and after the practical episode (t3) with the help of questionnaires. Beliefs were assessed at two testing times: before the seminar (T1) and after the practical episode (T2). To assess beliefs, teacher trainees created concept maps to visualize their subjective definition of inclusive education.

Questionnaires were analyzed quantitatively applying inference statistical methods; the concept maps were analyzed qualitatively performing a summarizing, inductive, qualitative

content analysis of the propositions. Additionally, the structures of the maps were analyzed applying graph-theoretical calculations.

Results indicate that all teacher trainees significantly improve their collaboration skills during the practical episode. Furthermore, teacher trainees working in multi-professional teams develop more positive attitudes towards inclusion than teacher trainees working in mono-professional teams. Also, they expand their subjective conceptualization of inclusion to include aspects like differentiation, individualization, and support; aspects that do not appear in the concepts of members of mono-professional teams.

Therefore, this seminar form appears to be a suitable means to prepare teacher trainees for inclusive education. Consequently, it is recommended to implement it in the training curriculum for future teachers.

Zusammenfassung

Im Jahr 2009 wurde in Deutschland die UN-Konvention über die Rechte von Menschen mit Behinderungen verabschiedet. Seitdem haben alle Schüler und Schülerinnen das Recht auf Bildung und die Länder sind verpflichtet, integrative Schulsysteme bereitzustellen. Die Schülerinnen und Schüler haben das Recht, unabhängig von ihrer körperlichen oder kognitiven Veranlagung eine Regelschule zu besuchen. Um alle Schüler und Schülerinnen zu unterstützen, müssen die Lehrer in der Lage sein, den Unterricht an ihre unterschiedlichen Bedürfnisse anzupassen. Daher muss die Lehrerausbildung so gestaltet werden, dass zukünftige Lehrer auf diese Aufgabe vorbereitet werden.

Zahlreiche wissenschaftliche Studien wurden daher durchgeführt um zu untersuchen, was wichtige Voraussetzungen für eine erfolgreiche Inklusion sind, und es scheint ein Konsens darüber zu bestehen, dass eine positive Einstellung zur Inklusion vonseiten der Lehrkräfte und die Fähigkeit, in einem Team zu arbeiten, unerlässlich für eine erfolgreiche Inklusion sind. In der Lehrerausbildung sollten daher gerade diese Fähigkeiten adressiert werden. Im Rahmen des inklusiven Unterrichts wird Co-Teaching definiert als die gemeinsame Erteilung von Unterricht durch einen Lehrer für Allgemeine Bildung (GE) zusammen mit einem Lehrer für Sonderpädagogische Förderung (SEN). Im Rahmen dieser Studie wird diese Konstellation als multiprofessionelles Co-Teaching bezeichnet.

Ziel dieser Studie ist es zu evaluieren, ob Lehreramtsstudierende, die mit einem Partner einer anderen Disziplin zusammenarbeiten, positivere Einstellungen und komplexere Kenntnisse/Vorstellungen über inklusiven Unterricht entwickeln als Lehreramtsstudierende, die in einem Team mit einem Partner derselben Disziplin arbeiten.

Zu diesem Zweck wurde ein neu konzipiertes Seminar für Lehreramtsstudierende der Regelschulpädagogik und solche der sonderpädagogischen Förderung evaluiert, um deren Auswirkungen auf die Einstellung, die Kooperationsfähigkeit und die Überzeugungen der Lehrerauszubildenden zum inklusiven Unterricht zu bewerten. Das Seminar besteht aus drei verschiedenen Episoden: i) einer theoretischen Episode zur Einführung von Lehrmethoden, die für Gruppen verschiedener Lernender sowie für verschiedene Formen des Co-Lehrens geeignet sind, ii) einer praktischen Episode, in der Lehreramtsstudierende gemeinsam im Team Unterricht für inklusive Klassen planen und durchführen, iii) und einer reflektierenden Episode zur Diskussion neu erworbenen Wissens auf Metaebene. Während der praktischen Episode arbeiteten die Lehramtsstudierenden in multiprofessionellen Teams (d.h. ein Studierender für die Regelschulpädagogik und einer für die sonderpädagogische Förderung)

oder in monoprofessionellen Teams (zwei Studierende für die Regelschulpädagogik oder zwei für die sonderpädagogische Förderung).

Die Einstellungen und die Kooperationsfähigkeiten wurden mit Hilfe von Fragebögen zu drei verschiedenen Testzeiten gemessen: vor dem Seminar (t1), nach der theoretischen Episode (t2) und nach der praktischen Episode (t3). Die Überzeugungen wurden zu zwei Testzeiten gemessen: vor dem Seminar (T1) und nach der praktischen Episode (T2). Zu diesem Zweck erstellten die Studierenden Concept-Maps, um ihre subjektiven Definitionen und Vorstellungen von inklusivem Unterricht zu visualisieren.

Die Fragebögen wurden quantitativ unter Anwendung inferenz-statistischer Methoden analysiert; die Concept-Maps wurden qualitativ analysiert indem eine zusammenfassende, induktive, qualitative Inhaltsanalyse der Propositionen durchgeführt wurde. Zusätzlich wurden die Map-Strukturen mit Hilfe grafentheoretischer Berechnungen analysiert.

Die Ergebnisse deuten darauf hin, dass alle Lehramtsstudierenden ihre Kooperationsfähigkeiten während der praktischen Episode signifikant verbessern. Darüber hinaus entwickeln Lehramtsstudierende, die in multiprofessionellen Teams arbeiten, eine positivere Einstellung zur Inklusion als Lehramtsstudierende, die in mono-professionellen Teams arbeiten. Außerdem erweitern sie ihre subjektive Konzeptualisierung der Inklusion um Aspekte wie Differenzierung, Individualisierung und Unterstützung; Aspekte, die in den Konzepten von Studierenden in mono-professionellen Teams nicht vorkommen.

Daher scheint diese Seminarform ein geeignetes Mittel zu sein, um die Lehrkräfte auf den inklusiven Unterricht vorzubereiten. Auf Grundlage dessen wird empfohlen, eine derartige Seminarform in das Curriculum für zukünftige Lehrer aufzunehmen.

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1. Introduction

In Germany in the early 20th century, pupils with special educational needs were taught in separate special-needs-schools. Towards the end of the 20th century, children with special needs were given the possibility to attend education in mainstream schools within the scope of the available material and personnel possibilities. The prerequisite was a corresponding application from the parents, on which the school inspectorate decided with the consent of the school authorities.

With the Salamanca Declaration in 1998 and the ratification of the UN-Convention on the Rights of Persons with Disabilities in 2006 and its inception in 2009, parents of pupils with special needs have the right to have their children taught in regular, mainstream schools without any prior application or decisions depending on resources. In 2014, the ninth School Rights Amendment Act to include the unconditional right for every child to education in mainstream schools became effective. This has challenged the traditional school-system to incorporate many changes in order to integrate the joint education of children with and without special educational needs. Teachers and principals are held to implement inclusive education and to integrate pupils with special educational needs; however, there is little guidance as to the criteria and the strategies. Despite the demand for an inclusive school system (United Nations, 2006), there is neither a generally accepted definition nor operationalizable characteristics of the term *inclusive education* (Farell, 2004, Grosche, 2015). Rather, teachers work on a trial and error basis to accommodate their teaching to the needs of a diverse group of learners.

In order to fulfill the UN-Convention's demand to facilitate successful educational inclusion and to support teachers implementing it, several scholars attempted to identify crucial prerequisites. Among others, teachers' positive attitudes towards inclusion (Avramidis, Bayliss, & Burden, 2000; Avramidis & Norwich, 2002; de Boer, 2012) as well as the need of more than one teacher in the classroom (Solis, et al., 2012; Pancsofar & Petroff, 2013; Lütje-Klose & Urban, 2014; Scruggs, Mastropieri, & McDuffie, 2007) were identified as being such crucial elements of successful educational inclusion.

Additionally, as there is no commonly agreed upon definition or operationalizable characteristics of inclusive education, teachers have to fall back onto their subjective conceptualization and their beliefs about inclusive education. Beliefs are action guiding in the classrooms (Mandl & Huber, 1983), particularly in demanding situations (Helmke, 2015). Therefore, the need to reflect on these beliefs in order to restructure and expand them

to facilitate successful inclusive education has also been identified in several scholarly works (Brownlee, Purdie, & Boulton-Lewis, 2001; Howard, McGee, Schwartz, & Purcell, 2000).

Currently, neither in-service nor pre-service teachers are adequately prepared to deliver educational service that serves the needs of a heterogeneous group of pupils in an inclusive classroom (VBE, 2017; Lütje-Klose, Miller, & Ziegler, 2014). Therefore, the Conference of Education Ministers of Germany resolved in 2015 that inclusion must be a topic in the first phase of teacher training (HRK, 2015). It is recommended that teacher training be oriented towards a school of diversity, which is to be seen as a cross-section task for all disciplines (HRK, 2015; Moser & Demmer-Diekmann, 2012, p. 159). The development of competencies for an inclusive educational system, including basic special educational skills, should be anchored in the curriculum of all teacher training programs (HRK, 2015, p. 3).

This means that teacher training must contain elements to address educational inclusion (e.g. Seitz, 2011; Engelbrecht, 2013; Lütje-Klose, Miller, & Ziegler, 2014; HRK, 2015). Future teachers have to be prepared to be able to deliver instruction that serves the needs of diverse learners. Regarding the identified prerequisites for successful inclusion mentioned above, teacher training should address attitudes towards inclusion as well as the co-teaching skills and the preparedness to collaborate with teachers of different professions. Moreover, teacher training should address pre-service teacher beliefs about inclusive education and their role for action in the classrooms.

The following paragraphs, therefore, elaborate on the notions *Attitude* (1.1), *Co-teaching* (1.2), *Teacher beliefs* (1.3) and their theoretical foundations and roles for teacher training for inclusive education as well as their relation to each other (1.4),.

1.1 Attitudes

There is a variety of definitions of the notion *attitude*. In the early 20th century, Allport (1935) developed a definition stating that “attitude is a mental and neural state of readiness, organized through experience, exerting a directive or dynamic influence upon the individuals’ response to all objects and situations with which it is related” (ibid, p. 810). Other researchers defined attitudes as being predispositions for a particular response towards a specified class of objects (Rosenberg et al. 1960; Rosenberg & Hovland, 1969). Rosenbaum et al. (1986), Eagly and Chaiken (1993), and others state that attitude is a theoretical construct specified as a multi-dimensional model with three components: (1)

cognitive (evaluative beliefs), (2) affective (feelings and sentiment), and (3) behavioral (behavior intentions). More recent research defines attitude as being evaluations that are related to, although distinguishable from, affect, behavior, and cognition (Fazio, 2007). Common to all these definitions is the fact that attitude is an internal state formed by experience, it is directed towards an attitudinal object, and it is modifiable (figure 1).

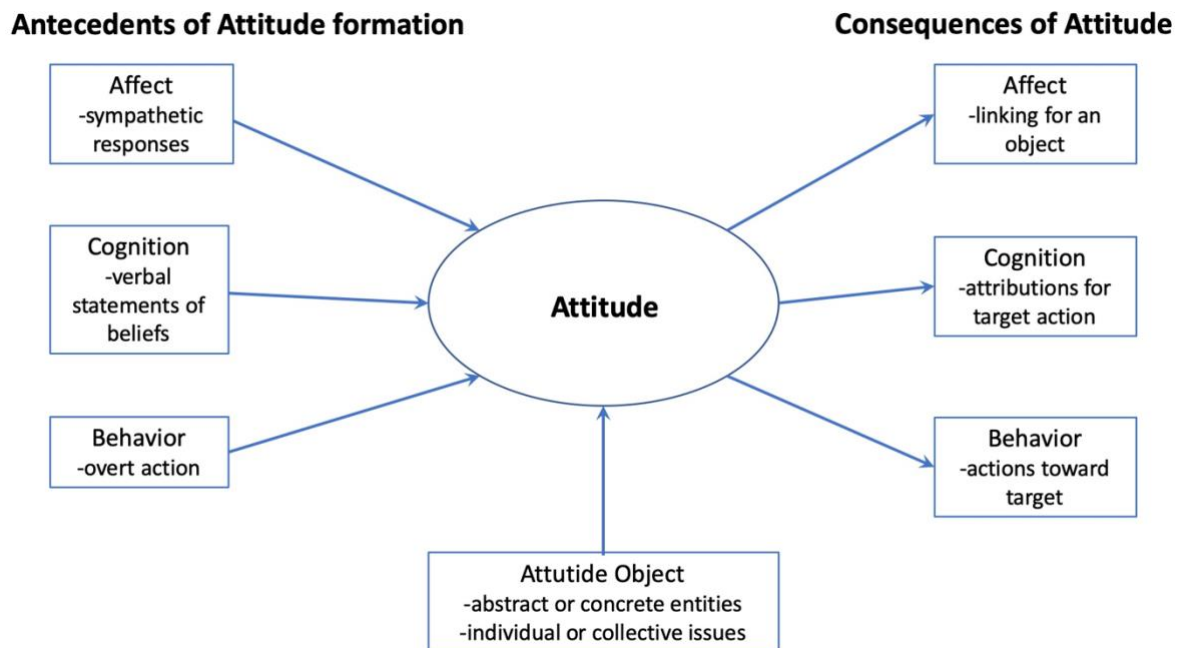


Figure 1. Schematic conception of the affective-cognitive-behavioral framework for attitude formation and consequences (adapted from Rosenberg et al., 1960)

Some research perspectives focus on attitude and its relation with other dependent variables. Ajzen (1985, 1991), for example, postulates the Theory of Planned Behavior, which declares that it is attitudes towards behavior, subjective norms, and perceived behavioral control that are known to predict intentions, which in turn predict behavior (figure 2).

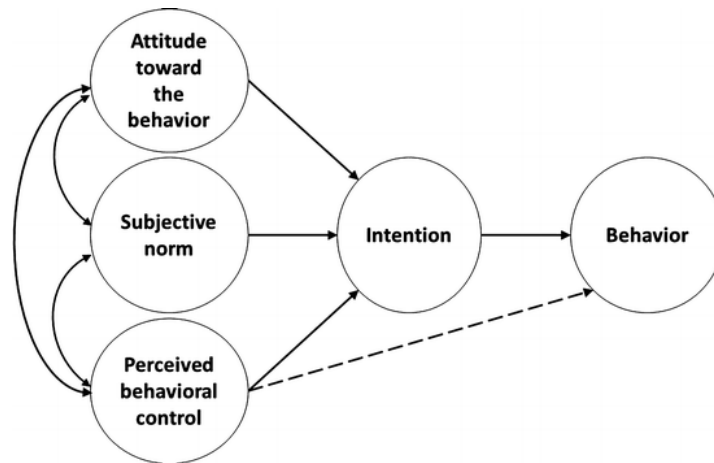


Figure 2. Theory of Planned Behavior

Source: Bairaktarova & Woodcock, 2017 (adapted from Ajzen, 1991)

For inclusive education, this means that positive attitudes, together with subjective norms and perceived behavioral control, predict inclusion-supportive behavior in the classrooms. Therefore, the importance of positive attitudes as a crucial prerequisite for successful inclusion has been demonstrated in several international studies. Avramidis et al. (2000) state that, for inclusion to be effective, the school personnel most responsible for its success – mainstream teachers – should be receptive to its principles and demands; de Boer (2012) emphasizes that attitudes are a key factor for the acceptance of students with SEN in regular education, and Sharma, Forlin, Loreman, and Earle (2006) found that, if teachers are to be supportive of inclusive education, they not only need the relevant skills and knowledge, but also positive attitudes. Empirical studies substantiate that attitudes as predictors for intentions and behavior determine the competence of professional action of classroom teachers (Heyl, Trumpa, Janz, & Seifried, 2014; Baumert & Kunter, 2006), which is a key for successful inclusive education. Consequently, holding positive feelings towards children with SEN leads to positive beliefs and high perceived behavioral control levels, which in turn lead to higher levels of behavioral intentions (MacFarlane & Woolfson, 2013, p. 51).

1.2 Co-teaching

Co-teaching may be understood as the continuous exchange between two or more educational specialists who share the responsibility for all pupils and teach jointly in one room (Friend et al., 2010). Co-teaching includes professional planning and delivering of instruction; there are six different approaches to it:

- One teach, one observe: one teacher leads instruction, 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 pupils 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 pupils
- Team-teaching: both teachers lead the whole group instructions by both lecturing or illustrating two ways to solve a problem (ibid, p. 12).

Johnson (2015) emphasizes that one decisive advantage of co-teaching is that pupils with different needs can have access to the same learning content, because with two teachers in the room, instruction can be differentiated and individualized. This makes co-teaching a crucial prerequisite for successful inclusive education. In that context, co-teaching generally is defined as the partnering of a teacher for general education (henceforth referred to as GE) and a teacher for special educational needs (henceforth referred to as SEN) with the purpose of jointly delivering instruction to a heterogeneous group of pupils (Friend, 2008). With that, co-teaching provides teachers for GE and those for SEN a greater opportunity to ensure that pupils with disabilities obtain a more structured and appropriate education within their community (Schwager, 2011; Murawski, 2009).

Besides being beneficial for the pupils in the classroom, co-teaching is also of advantage for the teachers as they perceptibly increase their professional knowledge by discussing and negotiating different approaches of teaching and thus exchanging expertise. In addition to that, teachers also report to have gained more positive attitudes towards co-teaching by merely experiencing it and to have developed the belief that the needs of pupils with special educational needs are better served in co-taught classes (Scruggs, Mastropieri, & McDuffie, 2007).

Research supports that teachers' self-efficacy beliefs influence their teaching behavior and their pupils' motivation and performance (Klassen & Chiu, 2010). Therefore, it is to be assumed that co-teaching leads to the gaining of positive experiences in inclusive

classes, which in turn leads to a higher perception of teaching efficacy, again which in turn leads to higher motivation and better performance of the pupils.

Yet, it has been found that real, genuine collaboration is not achieved by the mere presence of two teachers in one classroom; equitable team-teaching with shared responsibility seems to be a rare practice (Strogilos & Tragoulia, 2013). Jurkowski and Müller (2018) surveyed 13 newly formed teaching dyads in a longitudinal study to examine teachers' cooperation behaviour. After one year, the multi-professional cooperation remained constant at a low level for both dyad members. Moreover, the dyads participating in the study failed to develop as a teaching dyad with a shared view and understanding about their cooperation (ibid, p. 229). This means that there is a need to train teachers to be able to co-teach and develop a shared view and understanding about the cooperation (Chitiyo & Brinda 2018). Ideally, this is to be integrated into the first phase of teacher training (HRK, 2015), which means that teacher trainees have to be familiarized with both theory and practice of co-teaching.

1.3 Teachers' Beliefs

As stated above, so far there is neither a commonly agreed upon definition nor operationalizable characteristics of the term inclusive education. Therefore, several scholars attempted to provide definitions and investigate scientists' and practitioners' beliefs and conceptualization of inclusive education (cf. Göransson & Nilholm, 2014; Przibilla, Linderkamp, & Krämer, 2018). Despite these attempts, the definition remains vague (Nilholm & Göransson, 2017). Therefore, teachers cannot rely on the operationalization of the term to provide guidelines for action in the classroom; rather, they have to rely on their beliefs and their subjective conceptualization of the notion to be able to deduce adequate action in the classroom.

In the international research context, teacher beliefs are generally defined as being a psychological concept describing a person's views and propositions about the world which are accepted as being true. The person decides individually on the creation of criteria to judge the relevance or importance of these views and propositions. These criteria don't have to follow logical orders; for the individual person, however, they are informative and action guiding (Kagan, 1992; Richardson, 1996; Richardson & Placier, 2002). Beliefs and the theoretical notion of knowledge can be clearly separated from each other: in contrast to knowledge, beliefs do not have to comply with any criteria of truth (Richardson, 1996).

Thus, teacher beliefs are views and propositions about the world of teaching and schooling, and it is the teachers who judge their importance and relevance individually. As such, teacher beliefs are dealt with as being action guiding in educational processes, particularly in poorly defined and complex situations, because they help simplify situations and identify aims and objectives (Nespor, 1987). Nishino (2012) conceptualizes teacher beliefs about teaching and learning as being influenced by various factors, and themselves influence classroom practices. In addition to the influential factors identified by this author, here it is assumed that the perceived teaching efficacy influences teacher beliefs as well (figure 3).

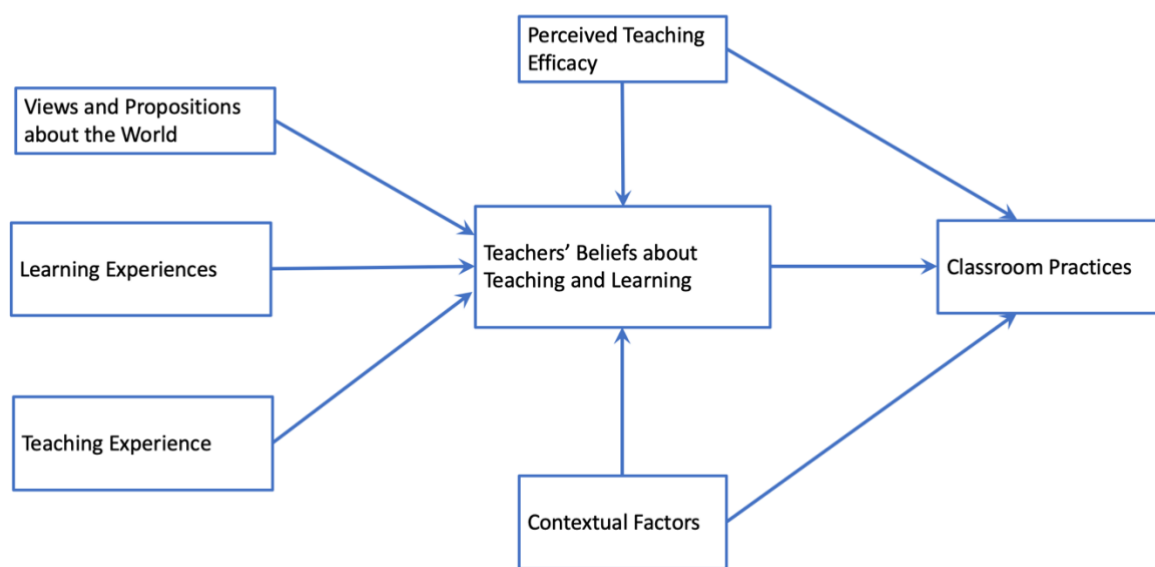


Figure 3. Conceptual Model of Teacher Beliefs and Practices (adapted from Nishino, 2012)

Furthermore, for teachers, beliefs are of particular importance as they constitute the grounds for professional everyday actions. In the context of teaching, these actions mainly consist of influencing other people in interpersonal relationships (Mandl & Huber, 1983). Teacher beliefs form the basis on which teachers create hypotheses about the learning processes of their pupils and the necessary (individual) support. In other words, beliefs constitute the expert knowledge on the ground of which teachers draw decisions concerning teaching and interaction (Biesta, Priestley, & Robinson, 2015).

Bourdieu and Passeron's (1990) concept of "pedagogic work" was the basis for Gale, Mills, and Cross (2017) to identify three principles as an indicator of inclusive pedagogy: (a) a belief that all students are of value for the learning environment, (b) a design that values

differences, and (c) actions that work with rather than act on students. All three principles have to interact, with beliefs being the ideas that “name and frame good teaching”. Beliefs about teaching inform pedagogic design and action (ibid, p. 349). Particularly the belief about inclusive teaching informs teachers’ actions with respect to valuing heterogeneity and taking appropriate measures to design adequate learning environments. Therefore, it is essential that these beliefs be addressed within teacher training in order to prepare future teachers to be able to deliver successful inclusive teaching.

1.4 The relation of co-teaching, attitude, and teacher beliefs

Beliefs and attitudes are closely related, as beliefs are said to be connections of attitude objects and other entities in a prepositional way. Beliefs, therefore, arise from a person’s knowledge about the connections of an attitude object and other entities; beliefs are therefore determinants of attitude (Eagly & Chaiken, 1998). Following that, attitudes of individuals toward any given object can be predicted as a function of the individual’s beliefs about attributes or aspects of the attitude object and related evaluations (Fishbein, 1963). This may be the reason for some inconsistencies in the definition and distinction of beliefs and attitudes (Strauß & König, 2017).

The relationship between specialized training and positive attitudes has been demonstrated in several international research studies (Silverman, 2007; Sari, 2007; Avramidis & Kalyva, 2007; Kurniawati et al., 2016; Bosse et al., 2016). Sari (2007), for example, evaluated the effect of an in-service teacher training program on teacher attitudes towards inclusion. The results show that an increased knowledge level leads to positive attitude changes of teachers (ibid, p. 7). Moreover, MacFarlane and Woolfson (2013) found a positive correlation between the attendance in in-service teacher training programs and teachers’ feelings towards pupils with SEN.

It was also shown in several research studies that co-teaching leads to an increased perception of self-efficacy (Scruggs, Mastropieri, & McDuffie, 2007). Co-teachers benefit from their partners’ expertise and plan and conduct instruction that suits all pupils in the classroom. Thus, pupils’ motivation and performance increases, which leads to an elevated perception of self-efficacy (Klassen & Chiu, 2010).

Additionally, teachers with more positive beliefs and higher levels of self-efficacy were found to have greater intention and commitment to teaching pupils with SEN in their

classrooms (ibid, p. 51). Therefore, assuming that effective and equitable co-teaching in different-discipline teams not only serves the needs of all pupils in the classroom, but also leads to the development of professional knowledge and higher perceived self-efficacy (Scruggs, Mastropieri, & McDuffie, 2007), it also may lead to more positive attitudes and beliefs toward inclusion (Bendixen & Rule, 2004). Positive attitudes, in turn, are essential for successful inclusive education (de Boer, 2012), as they are predictors of behavior in the classroom (figure 4).

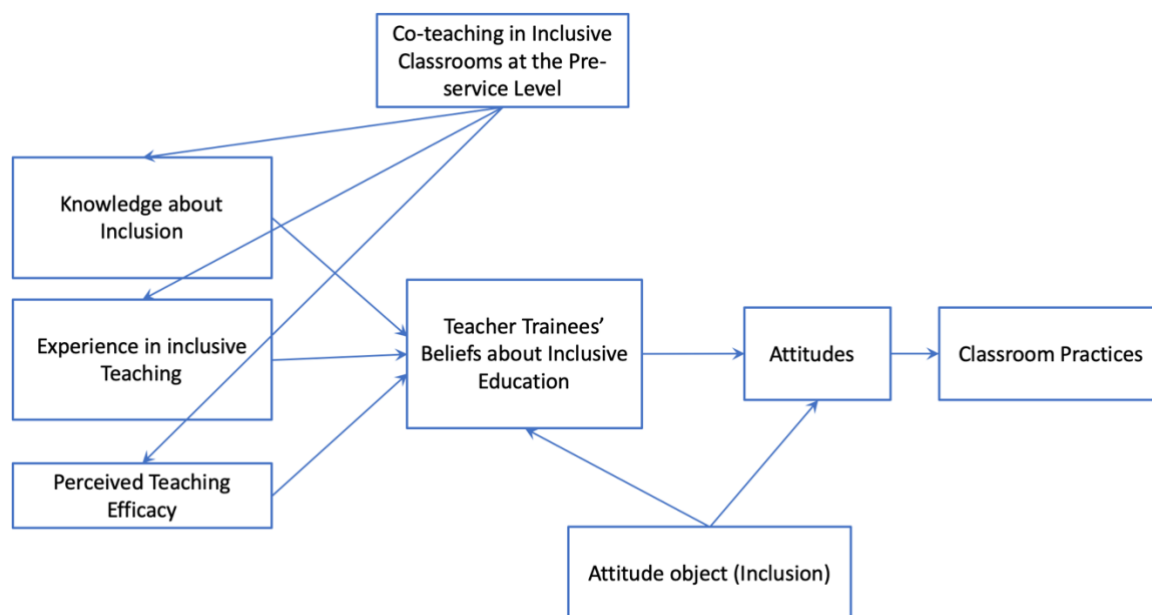


Figure 4. Model of the relation between co-teaching, beliefs, and attitude

1.5 Research Questions and Objectives of this Study

Based on the afore-mentioned considerations, the present study intends to investigate and find answers to the following research questions:

- I) What is a suitable seminar-form for the first phase of teacher training to prepare future teachers for inclusive education? More precisely, and considering that co-teaching skills and positive attitudes are crucial pre-requisites for successful inclusion, this means to investigate whether:
 - 1) the seminar-form has an influence on teacher trainees' attitudes?
 - 2) the seminar has an influence on teacher trainees' collaboration skills?

- 3) there is a difference in attitude change and development of collaboration skills between members in multi- and those in mono-professional co-teaching teams?

Furthermore, it is to be assessed II) whether the seminar-form has an influence on teacher trainees' beliefs, conceptualization, and subjective definition of inclusive education. In detail, this means, it is to be assessed

- 4) what are teacher trainees' beliefs, subjective conceptualizations, and definitions of inclusive education?
- 5) whether there is an expansion of this conceptualization after the seminar?
- 6) whether there is a difference in the development of the beliefs and conceptualization between members in multi- and those in mono-professional teams?

To answer these research questions, a common seminar for teacher trainees for GE and those for SEN was designed, during which participants worked in teams of one teacher trainee for SEN and one for GE (multi-professional teams), or two teacher trainees for SEN or two for GE (mono-professional teams) in inclusive classes for one semester. During the course of the seminar, teacher trainees' attitudes toward inclusion, their collaboration skills, and their subjective definitions/beliefs about inclusive education were assessed.

2. Material and Methods

In order to investigate the effect of co-teaching practice during teacher training on teacher trainees' preparedness for inclusive education, a common seminar for teacher trainees for GE and those for SEN was designed. This seminar was offered as a compulsory-elective subject for teacher trainees for GE in their Master's program and for teacher trainees for SEN in their Bachelor's program.

For teacher trainees for GE, the seminar constitutes one of the obligatory research-projects the curriculum mandates¹ with a workload of 6 ECTS points. For teacher trainees for SEN, the seminar was one of the options to fulfil the component "didactic methods and teaching techniques for the support in inclusive education" of the module "Special educational methods and strategies"². In this case, the workload is 4 ECTS points. The difference is accounted for in that teacher trainees for SEN do not have to do research during the practice and therefore do not have to draft a research protocol.

As the seminar comprises a theoretical and a practical part (see below), there was a need for schools willing to cooperate and accommodate teacher trainees on one day of the week for the course of a whole university term. It was possible to win secondary schools of all German school forms for this cooperation. This means that teacher trainees gained their practical experience in inclusive classes of schools of different forms³.

In the following section, there is a detailed description of the seminar design of the academic course (2.1), a detailed description of the research design (2.2) including a description of the instruments used and a substantiation of their suitability (2.2.1), the data collection (2.2.2) and the methods of analysis (2.2.3). The last paragraph (2.3) of this section gives a detailed description of the participating teacher trainees.

¹ For an example curriculum for Master of Education, Biology, please refer to the WEB site <https://bscw.uni-wuppertal.de/pub/bscw.cgi/d8819820/am11126.pdf>

² For the curriculum for the Bachelor of Education, special education, please refer to the WEB site <https://bscw.uni-wuppertal.de/pub/bscw.cgi/d9635180/am14091.pdf>

³ Please refer to Appendix 1 for a list of all cooperating schools

2.1 Academic Course

Basis for the research design of the presented study is a newly developed academic course addressing the issues of inclusive education and co-teaching in inclusive classrooms.

Initially, the course-design was developed by a focus group consisting of a specialist for teaching methodology, a specialist for the didactics and pedagogy, and a specialist for special education (Krämer, Nessler, Schlüter, & Erbring, 2014). Prior to this study, the course design had been evaluated quantitatively and qualitatively over a period of 4 university terms and, based on the evaluation results, had constantly been optimized.

The academic course is open for teacher trainees for general education (GE) and for teacher trainees for special educational needs (SEN); it aims at providing both theoretical and practical experience of co-teaching as a team of either two partners of the same professionality (mono-professional team) or a team of one partner being a teacher trainee for SEN and one a teacher trainee for GE (multi-professional team). The academic course consists of three individual episodes (please refer to figure 5). 1: the theoretical episode at the university stage, 2: the practical episode at schools, and 3: the reflection episode. The theoretical episode is conducted similar to a jig-saw activity and it comprises a single-phase (1.1.), a plenum-phase (1.2.), an expert-phase (1.3.), and a tandem-phase (1.4.).

Within the single-phase (1.1), every teacher trainee works through a set of provided literature dealing with relevant topics of their respective future professions in the context of inclusive education, including the theory and prerequisites and preconditions of co-teaching. A provided checklist helps teacher trainees to extract the most important aspects.

In the plenum-phase (1.2), teacher trainees discuss the different forms and features of co-teaching as well as the requirements for its success in the context of inclusive education.

The expert-phase (1.3) aims at achieving an awareness of teacher trainees' individual expertise by discussing subject-related aspects of didactics and teaching-practices for inclusive teaching in groups according to their professionality, guided by an expert-instructor. More precisely, this means that teacher trainees for GE discuss the educational methodologies of their content subjects while teacher trainees for SEN talk about strategies for inclusive settings. Following that, teacher trainees individually reflect on their professional and personal characteristics, their strengths and weaknesses, as well as their expectations of the collaboration. The last part of this episode is the matching of the

tandems. Depending on teacher trainees' availability during the week, their studied subjects and matching school-curricula, as well as their mobility to reach different schools around the city, teacher trainees are matched to form either mono- or multi-professional teams.

Following that is a section of open time and space for the newly matched team partners to introduce themselves to each other and to get to know each other.

Within the tandem-phase (1.4), teacher trainees exchange their own professional and personal characteristics, their strengths and weaknesses, as well as their expectations of the collaboration. Following that, the tandems collaboratively develop a lesson plan in one of their respective subjects for a vignette inclusive class. The vignette – a description of a multifaceted learning group – was developed by experts of subject specific teaching methodologies in cooperation with experts of special educational needs to cover a wide range of possible heterogeneity attributes. Teacher trainees have a choice of several lesson topics with manifold methodological approaches to the content, which makes this task multifaceted as well. As the lesson plans have to contain elements that explicitly serve the needs of all pupils in the class, they can only be developed as a co-construction of the two partners, which makes each partner dependent on the other to fulfill the task. According to Gräsel, Fußangel, & 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. By debating and discussing during the process of lesson-plan-development, partners exchange and expand knowledge, thus ensuring the transfer of expertise between the partners. The lesson plans are then presented to the instructors and fellow students for feed-back; thereby, fellow students pay particular attention to the planned consideration of all students in the class.

For the second, the practical episode (2), the tandems join and teach inclusive classes at different schools around the city once a week for twelve consecutive weeks (one university term). Teacher trainees spend one complete school-morning, i.e. from 8.00 a.m. to 2:00 p.m., in their classes to become familiar with the pupils and their needs in the course of the day. After an appropriate time of sitting in on class, teacher trainees jointly plan and conduct their own lessons in one of their chosen subjects, paying particular attention to meeting all the pupils' needs. Here, again, they make use of each partners' area of expertise. During this period, an in-service teacher for GE and an in-service teacher for SEN, each of whom is familiar with the objectives of the seminar, guide and supervise the teacher trainees.

Additionally, the instructors visit each of the teams at the schools to ensure that they are given the opportunity to plan and conduct lessons, and that they are guided accordingly.

The last episode of this seminar is a reflection episode (3) with the instructors to reflect on teacher trainees' professional development and role on a meta-level. First, there is a plenum discussion to exchange experiences in the classrooms, which is moderated by the instructors. Teacher trainees talk about probate methods to deal professionally with difficult situations. After that, instructors summarize the gained experiences, reflect on them with the teacher trainees and evaluate them from a meta-level. Hereby, teacher trainees are asked to evaluate their experiences at the schools and in the teams and assess their contributions to their professional development.

2.2 Research design

2.2.1 Instruments

The following description of the evaluation instruments is divided in three parts. The first part introduces the questionnaire used for the assessment of teacher trainees' attitudes. The second part describes the concept maps as instruments to visualize teacher trainees' subjective conceptualization of inclusion as well as their implementation of newly acquired knowledge. The third part, finally, delineates the learning diaries as instruments for the assessment of teacher trainees' cooperative skills and contentment in the team.

2.2.1.1 *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 (see Appendix 2). These subscales are chosen from other questionnaires in their entirety, meaning that all items of each subscale are included. (See table 1 for subscales, example items and internal consistencies)

The first subscale of the questionnaire, developed and validated by Przibilla et al. (2016), assesses the belief in inclusive education and general attitude towards inclusion. It is titled *Belief in inclusion* and it assesses teachers' considerations about placement and instruction of pupils with SEN, their personal convictions towards the idea of inclusive education, and their needs for further training. The subscale is part of a questionnaire which was used in an extensive study to assess in-service teachers' attitudes towards inclusion; it consists of 7 items with 4-point Likert scaling, e.g.: Pupils without SEN want to have pupils

with SEN in their general schools. The internal consistency of this subscale at the pilot testing was satisfactory ($\alpha=.61$).

Teacher trainees' attitudes towards inclusive education in schools were assessed with the help of two subscales developed and validated by Bosse & Spörer (2014). The subscales are titled *Attitude towards the organization of inclusive education* and *Attitude towards the effect of inclusive education*. In these subscales, teacher trainees' attitudes towards the instruction of pupils in inclusive settings as well as the involvement and educational success of children with and without SEN in inclusive settings are being assessed. They are part of the KIESEL-instrument which is widely used in German-speaking countries. The subscales consist of 4 items each with 4-point Likert scaling, e.g.: 'On 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 'Pupils with disabilities have higher academic achievements if they are taught in mainstream classrooms' for the subscale *Attitude towards the effect of inclusive education*. Internal consistencies in the pilot testing were at $\alpha=.72$ and $\alpha=.73$ respectively for the subscales.

Teacher trainees' personal conviction 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 professionals in inclusive classrooms are assessed with the help of two subscales developed and validated by Bosse and Spörer (2014) and Cullen et al., (2010). The subscales are titled *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, the latter is part of the Teacher Attitude Towards Inclusion Scale (TATIS), a scale widely used in the international research on attitudes towards inclusive education. The first mentioned subscale consists of 4 4-point Likert scaled items, e.g.: '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 4 7-point Likert scaled items, e.g.: 'All pupils benefit from team teaching; that is, the pairing of a general and a special education teacher in the same classroom'. Internal consistencies in the pilot testing were at $\alpha=.65$ and $\alpha=.72$ respectively for the subscales.

Besides 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 pupils with SEN and/or inclusive education in private or professional

contexts. Particularly the data on previous experience may help explain any outliers in the quantitative data.

Table 1. Subscales, example items and internal consistencies (Cohen's alpha, α) for the attitude questionnaire

Subscale	Number of items	Likert-scaling	Example item	α validation	α this study
(1) Welcoming Inclusion	7	1-4	For inclusion to be successful, there has to be cooperation between general teachers and teachers for SEN	.64	.66°
(2) Attitude towards the effect of inclusive education	4	1-4	Pupils with disabilities have higher academic achievements if they are taught in mainstream classrooms	.74	.78
(3) Attitude towards the organization of inclusive education	4	1-4	Lessons can, on principle, be designed so that they meet the needs of all children	.77	.88
(4) Self-efficacy with regard to the organization of inclusive education	4	1-4	I am convinced that I can provide suitable learning opportunities for every child, even with the biggest performance differences	.73	.85
(5) Perception of professional roles and functions	4	1-7	All pupils benefit from team teaching; that is, the pairing of a general and a special education teacher in the same classroom	.68	.65°

Note. °Cronbach's alpha values are slightly below the acceptable value of .7 in two subscales; however, for they are very close to .7, the subscales were used for analysis.

2.2.1.2 Concept maps for the assessment of concept and knowledge.

Teacher trainees' professional knowledge was documented with the help of concept maps (see Appendix 3 and 4). Concept maps are graphical tools to organize, visualize, and represent knowledge (Novak & Cañas, 2008, 2010), they consist of concepts (generally nouns) and relationships (generally predicates) 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).

Generally, Concept maps represent knowledge in a hierarchical manner 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 allow for relationships or links between concepts in different segments or domains of the map as well as in different hierarchical levels.

In order to define a context for the teacher trainees, the focus question “What is educational inclusion?” is printed on the working sheet. This is the only context-giving item on the sheet, meaning that neither concepts nor linking words were suggested. Therefore, teacher trainees are entirely free to choose any concept they have in mind, which minimizes the influence and maximizes the probability of the representation of the individuals’ factual knowledge structure. The only instruction teacher trainees were given was to ensure that each concept receives a logical and labelled connection to at least one other concept of the map. This allows for the determination of the extent and quality of new connections students are able to make after theoretical instruction and practical experience (Mason, 1992).

2.2.1.3 Learning diaries and questionnaire for the assessment of collaboration skills.

The quantitative and qualitative assessment of teacher trainees’ development of collaboration skills and the monitoring of their progress and contentment in their teams was accomplished with the help of a learning diary for each school day (see Appendix 5). This 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), and it assesses essential aspects of collaboration using a total of 24 items: 6 items are on goal-orientation, 4 are on task-solving strategies, 8 on cohesion, and 4 on the assumption of responsibility. One item clarifies social desirability and one asks for conflict solving skills (See table 2 for subscales, example items and internal consistencies). The items are 4-point-Likert-scaled from 1 = always applies to 4= never applies. This questionnaire is a diagnostic instrument within the field of work- and organization psychology; it assesses significant contents of teamwork and as such is used in several international studies (e.g. Figl and Saunders, 2011; Körner, 2008; Gebhard et al., 2014). In addition to the questionnaire there are two impulse questions for the teacher trainees to openly 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 enabling them to control confounding elements.

Table 2. Subscales, example items and Internal Consistency (Cohen's alpha) for the collaboration questionnaire

Subscale	Number of items	Likert-scaling	Example item	α this study
Goal orientation	6	1-4	I identify myself with the goals of the team	.81
Task-accomplishment	4	1-4	The team members know about their tasks	.76
Cohesion	8	1-4	We talk open and freely with each other	.75
Assumption of responsibility	4	1-4	All our team members feel responsible for the results	.71

2.2.2 Data Collection

The research study is conducted in a pre-post design, meaning that teacher trainees' attitudes and concepts are recorded before and after different phases of intervention. The first assessment of teacher trainees' attitudes and concepts takes place before the seminar (PreTest t1). After the academic course work block, the second assessment is conducted (Post1Test t2). The third assessment is done after the practical, but before the reflection episode (Post2Test t3; see figure 5). Assessment is conducted in a paper-and-pencil manner during meetings at the university, which guaranties a 100% response rate. Also, the questionnaires and concept maps are anonymized by using a code-system for each participant to facilitate unambiguous allocation of all three assessments of one individual.

The questionnaire to assess teacher trainees' collaboration skills is part of a learning diary, which is filled, completed, and turned in weekly during the practical episode. For the

evaluation of the development, the first (T1), sixth (T2), and twelfth (T3) completed questionnaires were analyzed. As the completion of this learning diary is part of the academic achievement requirement for teacher trainees, the return rate was also at 100%.

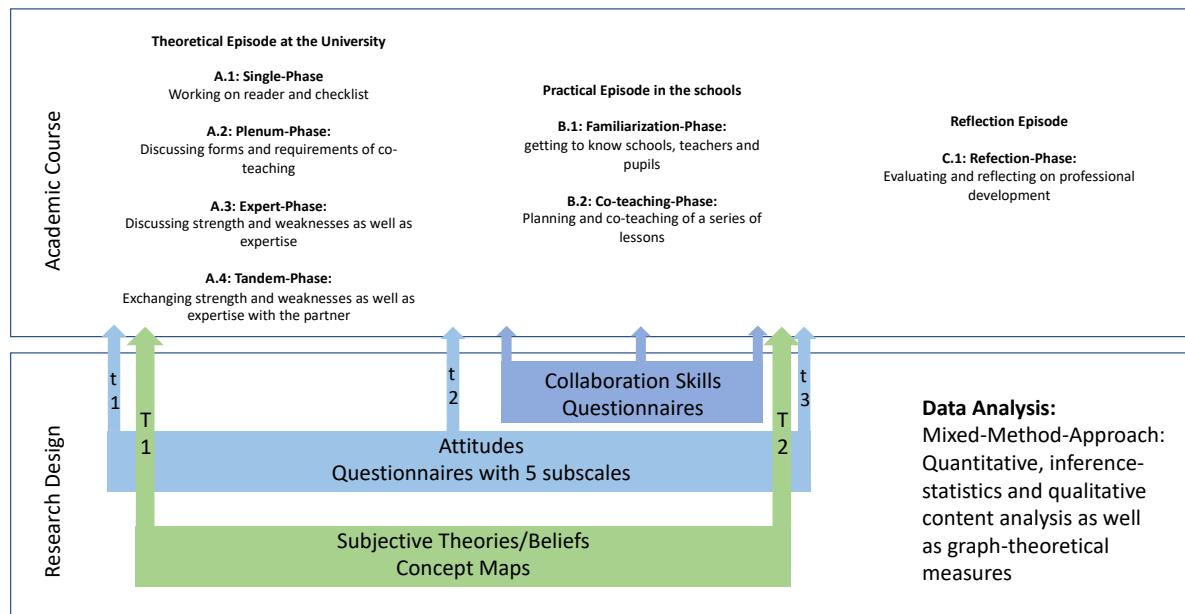


Figure 5. Design of academic course and research study

2.2.3 Data analysis

Questionnaires

The data of the questionnaires assessing teacher trainees' attitudes towards inclusion and their perceived self-efficacy were quantitatively analyzed using the software program IBM SPSS Statistics. As the structure of the data is hierarchical with respect to the consecutive seminars and dyadic with respect to the tandem constellation, hierarchical linear models were designed prior to performing mean value comparison analyses. Thereby, the model-fit values of empty models, i.e. models without level 2 variables, were compared to models containing the dyads and the individual seminars as level 2 variables. The model-fit could not be improved in any of the cases; therefore, to account for the non-independence of the data on time, Analyses of Variance (ANOVA) with repeated measurements were performed. This method of analysis allows for the comparison of mean values of the individual subscales between two groups over time, e.g. comparing the development of attitude towards the effect of inclusive education between teacher trainees for SEN and those for GE or between teacher trainees in multi- and those in mono-professional teams.

Teacher trainees' collaboration skills were assessed with the help of a questionnaire as well. Like the questionnaire assessing attitudes, the data of this questionnaire were analyzed quantitatively using the program IBM SPSS Statistics. Here, student's t-tests and ANOVAs with repeated measurement were performed to compare mean values of different groups of teacher trainees at different testing times. Thus, it is possible to determine a change of collaboration skills over time and also to compare developments of collaboration skills of different team constellations.

Concept maps

The analysis of the concept maps was performed using two different approaches:

1. The propositions, i.e. two concepts and their linking predicate as the smallest units of analysis of the concept maps, were analyzed in order to gain insight into the semantic context of the concepts. For this purpose, an inductive, summarizing qualitative content analysis (cf.: Lisch & Kriz, 1978; Mayring, 2015) was performed.

As a first step, approximately half of all 2049 propositions were used to create a system of categories. This means that of 1013 randomly chosen propositions, a summarizing content analysis was performed. Thereby, the units of analysis were paraphrased (step Z1), the paraphrases were generalized and brought into a common level of abstraction (step Z2), generalized paraphrases of the same meaning were merged to obtain a first reduction of the data material (step Z3). The paraphrases were then bundled and integrated at the desired level of abstraction (step 4) in order to further reduce and compress the data material into a system of categories. This system of categories then built the basis to code all the propositions from the concept maps using the software MAXQDA. Thereupon followed statistical analyses of the number of codings in given categories at the different testing times and also for participants in different team-constellation (multi- or mono-professional teams) using the software programs Excel and IBM SPSS. Thus, comparisons can be drawn between the different testing times as well as between the maps originating from teacher trainees in multi- with those in mono-professional teams at testing time t2. Thereby it can be explored (1) which concepts of inclusive education exist among teacher trainees and (2) whether there is a change of these concepts during the course of the seminar and also (3) whether there is a difference between teacher trainees in multi- and those in mono-professional teams.

Furthermore, of the numbers of propositions coded into the different categories, cluster analyses were performed using the software IBM SPSS

(Schendera, 2010). To do this, the data of the testing time before the seminar (t1) and after the practical experience (t2) were analyzed separately to compare cluster formation and thus be able to trace any differences before and after the seminar. Firstly, the method HIERARCHICAL CLUSTERS as well as the test statistics *explained variance of the ratio of error variance of single-cluster-solutions to a 1-cluster-solution* (ETA_{k2}), *Proportional Reduction of Error* (PRE_k), and *the ratio of explained and non-explained variance* ($F-MAX_k$; c.f. Bacher, 2001) were performed for all codings to determine the appropriate and meaningful number of clusters. After that, a partitioning cluster-analysis (QUICK CLUSTER method K-MEANS) was performed to determine the centers of each cluster. With that, an ANOVA was calculated to determine the contribution to cluster formation of each category. Finally, the cluster centers were determined using only the categories that significantly contributed to the cluster formation. Cluster affiliations were assigned to each participant on the ground of the calculation of Euclidian distances of the participants' individual concept and the cluster composition at each testing time. Thus, insights into the compositions of concepts and their change can be gained.

2. The structure of the concept-map represents the structure and composition of a person's knowledge. To be able to analyze concept maps with the help of algorithmic methods, they have to be modelled as mathematical graphs. Each graph consists of nodes (concepts) and edges (links), which allows for the usage of graph-theoretical techniques for analysis. There are additional techniques to not only analyze individual concept maps, but also concept maps of whole groups of test persons together. Mühling (2017) summarizes different appropriate techniques to define the procedure of *Concept Landscaping*, which combines all concept maps of a group of people with all the contained nodes and edges to one common graph. This common graph can then be analyzed using statistical or graph-theoretical techniques, one of them being the technique of *pathfinder-analysis* (Mühling, 2014). Pathfinder networks only contain links made by very many participants. Very many in this context means that for the chosen parameters, the total amount of the used links is maximal (parameters p = total number of concepts -1; q = infinite); there is no other possibility to connect all concepts and achieve a higher number of links. The lengths and paths of pathfinder networks contain information about how similar the connected concepts are in the original data. Thus, the pathfinder network is an

algorithmic method of edge-pruning a graph by keeping all nodes and systematically remove edges (Mühling, 2017).

This strategy determines the most important structural characteristics of a group of concept maps, thus generating a network consisting of the most frequently used nodes and edges. The less frequently used nodes and edges, however, are not merely eliminated; instead, there are different parameters to govern the algorithm to render networks that are representative of all conflated concept maps (Mühling, 2014).

The resulting pathfinder networks can then be analyzed according to their structure. Kinchin, Hay, and Adams (2000) determined three different organization types of concept maps: (1) the chain structure, the simplest connection of one concept with the respective next, shows a linear connection of several concepts; (2) the spoke structure, slightly more elaborate, shows a central concept connected with several others; (3) the net-structure, where all the concepts are interconnected several times. The chain structure represents linear knowledge, without interconnection, the spoke-structure is a representation of slightly more elaborate and interconnected knowledge, and the net-structure represents a whole set of puzzle-pieces belonging to a knowledge domain. These puzzle-pieces are interconnected and mutually essential to make for the whole.

Furthermore, statistical measures such as betweenness centrality, degrees, or communalities (cf.: Stracke, 2004) can be applied to capture the characteristics of the landscape-graph. All the graph-theoretical analyses were carried out using the package *comato* for the statistical program *R*.

2.3 Sample

The academic course for teacher trainees for GE and for SEN was first offered in the summer term 2016 (April to September) and following that in four subsequent terms, i.e. five consecutive terms until summer term 2018. Within that time, a total of 97 teacher trainees attended the seminar, 54 of which were teacher trainees for SEN and 43 were teacher trainees for GE; 59 teacher trainees formed a total of 30 multi-professional teams (one teacher trainee for GE was in a team with an in-service teacher for SEN), 38 teacher trainees formed a total of 19 mono-professional teams (table 3). 80 participants were female.

On average, the participants were 22.9 years old, with a standard deviation of 3.2 years. The teacher trainees for SEN were in their Bachelor's program in their second or third semester, the teacher trainees for GE were in their Master's program (semester 2, 3 or 4). 81% of all participants reported to have had practical experience in schools already; 66% reported to have had experience with pupils with SEN in schools and 56 % reported to have had experience with children with SEN in private contexts. About half of the participants reported to have attended seminars on inclusion prior to attending this elective-compulsory seminar, 40% reported to have attended seminars on the topic of co-teaching.

Table 3. Number and distribution of participants

Semester	Total Number of teacher trainees	Teacher trainees for SEN	Teacher trainees for GE	Number of multi- prof teams	Number of mono- prof. teams
Summer 2016	15	8	7	5	3
Winter 16/17	32	20	12	7	9
Summer 17	18	7	11	7	2
Winter 17/18	14	8	6	4	3
Summer 18	18	11	7	7	2
Total	97	54	43	30	19

3. Results

Most of the results of the present research study have already been published or are in consideration to be published in national and international journals. In sum, there are two publications, one manuscript accepted but not yet published, and two manuscripts submitted for consideration for publication, one of them being under review after revision. This section, therefore, is composed of five manuscripts and, additionally, results of further qualitative analyses of the concept maps and propositions.

The first part in this section is a publication in the journal *heiEDUCATION* entitled “Inklusionsorientierte Lehrer/innenbildung: Interdisziplinäres Seminarkonzept für Studierende der Regelschulpädagogik und der Sonderpädagogik [Inclusion-oriented teacher education: Interdisciplinary seminar concept for teacher trainees for general and special education]” (3.1) This section describes the didactic structure and the rationale of the seminar. (Ritter, Wehner, Lohaus, Krämer, 2019b)

The publication in the journal *Empirical Special Education: International* entitled “Multi-professional and Mono-professional Collaboration and its Association with Both Student Teachers Attitudes towards, and Concepts of, Inclusive Education” (3.2) comprises the second part in this section. It gives a detailed description of the research design and the research method.

(Ritter, Wehner, Lohaus, Krämer, 2018)

Following that, there is a manuscript, which is currently under review after revision with the journal *Teachers and Teacher Education* entitled “Effect of same- compared to different-discipline co-teaching on pre-service teachers’ attitude towards inclusion and their collaboration skills” (3.3). This manuscript provides results of the quantitative analysis of the data assessing teacher trainees’ development of attitudes and collaboration skills. (Note: this manuscript has been accepted and published with minor modifications while this dissertation was being reviewed. Ritter, Wehner, Lohaus, Krämer, 2019d).

The next part contains a publication in the conference proceeding for the international conference of researchers on inclusion (IFO) entitled *Inklusion im Spannungsfeld von Normalität und Diversität*. The essay is entitled “Konzepte von

schulischer bei Lehramtsstudierenden: Entwicklung eines Kategorienschemas durch induktive, zusammenfassende qualitative Inhaltsanalyse Inklusion [Concepts of inclusion of teacher trainees: Development of a system of categories by applying an inductive, summarizing qualitative content analysis]” (3.4). This publication presents the composition of teacher trainees’ subjective beliefs about inclusive education. (Ritter, Wehner, Lohaus, Krämer, 2019a)

The manuscript submitted for consideration for publication in the journal *Frontiers in Education – Teacher Education* entitled “Pre-service teachers’ beliefs about inclusive education before and after multi- compared to mono-professional co-teaching: An exploratory study” (3.5) as the following part provides insight into the qualitative analysis of the concept maps displaying teacher trainees’ beliefs about inclusive education. (Note: this manuscript has been accepted and published with minor modifications while this dissertation was being reviewed. Ritter, Wehner, Lohaus, Krämer, 2019c).

The last part of this section contains the results of a cluster analysis of the propositions (3.6) as well as the analysis of concept maps created by in-service teachers (3.7) as a comparison to the ones created by pre-service teachers. The last section in this paragraph summarizes all the results (3.8).

3.1 Inclusion-oriented teacher training: trans-disciplinary seminar-concept for teacher trainees for general education and for special needs education (Research Paper 1, peer reviewed)

Summary:

Educational inclusion calls for teachers who are prepared to teach heterogeneous groups of pupils. In order to be able to serve the needs of all students, teachers need expertise in the field of special educational needs as well as in subject didactics. Interdisciplinary co-teaching is widely regarded as beneficial not only to students’ learning outcomes, but also to the overall professional development of teachers. Therefore, interdisciplinary cooperation should be initiated as early as in the first phase of teacher training.

The University of Wuppertal has developed the concept for a seminar that addresses teacher trainees for special educational needs (SEN) as well as teacher trainees for general

education (GE). At first, students attend a theoretical episode at the university, in which they acquire basic knowledge about educational inclusion and co-teaching. This episode is conducted as a jigsaw activity, in which teacher trainees exchange their specific knowledge and expertise. This ensures reflecting on one's own area of expertise and discussing it with a partner. Furthermore, at the end of this episode there is a phase of team-building. During this phase, two teacher trainees for GE or for SEN (mono-professional teams) or one teacher trainee for GE and one for SEN (multi-professional team) exchange personal and professional characteristics and expectations in order to ensure positive team communication. The first collaborative task is the creation of a lesson plan for a fictive inclusive class, for which the expertise of both partners is already essential. Feedback on the lesson plans is given by the instructors and the other teacher trainees, thus initiating active knowledge construction.

After this theoretical episode, there is an episode of practical experience in inclusive classes. The teams support and conduct lessons in one of their studied subjects once a week over the period of one semester (12 weeks). This requires not only the subject-related scientific and pedagogical expertise of the GE teachers, but also and, most importantly, the educational and inclusion-oriented expertise of the SEN teachers. The intensive exchange in the multidisciplinary teams results in an interconnection of partial competencies and a transfer of expertise between the partners. Teacher trainees write learning diaries for each school-day, an activity that guarantees rethinking about and reflecting on teaching practices.

The final reflective episode facilitates the recognition of the acquired knowledge on a meta-level.

The seminar-concept is evaluated and assessed to capture teacher trainees' attitudes and beliefs about inclusive education before and after the seminar and of multi- and mono-professional teams in comparison.

Evaluation is not yet completed; however, feedbacks from participating teacher trainees support and underline that this seminar-concept is suitable to prepare teacher trainees for inclusive education.

**Inklusionsorientierte Lehrer/innenbildung: disziplinübergreifendes
Seminarkonzept für Studierende der Regelschulpädagogik und der
sonderpädagogischen Förderung**

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Zusammenfassung

Die schulische Inklusion verlangt nach Fachkräften, die darauf vorbereitet sind, heterogene Lerngruppen zu unterrichten. Dafür brauchen sie sowohl sonderpädagogische als auch fachdidaktische Expertise, um den Bedürfnissen aller Schüler/innen gerecht werden zu können. Multiprofessionelle Kooperation wird als eine zentrale Gelingensbedingung betrachtet, nicht nur im Hinblick auf die Lernerfolge der Schüler/innen, sondern auch auf die Professionalisierung der Lehrkräfte. Daher sollte die Kooperation bereits in der universitären Phase der Lehrer/innenbildung initiiert werden.

Ein an der Bergischen Universität Wuppertal entwickeltes Seminarkonzept richtet sich an Studierende der sonderpädagogischen Förderung und der Regelschulpädagogik; es fokussiert insbesondere die kooperative Zusammenarbeit. Zunächst besuchen die Teilnehmer/innen ein Blockseminar, das Grundlagen zu schulischer Inklusion und Co-Teaching vermittelt. Nach einer Phase der aktiven Teambildung begleiten und gestalten die Teams gemeinsam ein Semester lang einmal wöchentlich Unterricht in inklusiven Schulen. Für die Konzeption der eigenen Unterrichtseinheiten ist zusätzlich zur fachwissenschaftlichen und fachdidaktischen Expertise der Regelschulpädagogik-Studierenden insbesondere die bildungswissenschaftliche und inklusionsorientierte Expertise der Studierenden der sonderpädagogischen Förderung notwendig. Durch den intensiven Austausch im multiprofessionellen Tandem erfolgen sowohl die Verschränkung der Teilkompetenzen als auch ein Transfer der Expertise beider Partner/innen.

Das Seminar wird im Rahmen der „Kohärenz in der Lehrerbildung“ (KoLBi) der Bergischen Universität Wuppertal angeboten. KoLBi ist Teil der „Qualitätsoffensive Lehrerbildung“ von Bund und Ländern und wird aus Mitteln des Bundesministeriums für Bildung und Forschung gefördert.

Schlagwörter: disziplinübergreifendes Seminarkonzept, Co-Teaching, inklusionsorientierte Lehrer/innenbildung, Kompetenzverschränkung

Abstract

Educational inclusion calls for teachers who are prepared to teach heterogeneous groups of students. In order to be able to serve the needs of all students, teachers need expertise in the field of special educational needs as well as in subject didactics. Interdisciplinary co-teaching is widely regarded as beneficial not only to students' learning outcomes but also to the overall professional development of teachers. Therefore, interdisciplinary cooperation should be initiated as early as in the first phase of teacher training.

The University of Wuppertal has developed the concept for a seminar that addresses trainee teachers for special educational needs (SEN) as well as trainee teachers for general education (GE). At first, students attend a theoretical unit at the university, in which they acquire basic knowledge about educational inclusion and co-teaching. At the end of this unit, there is a phase of active team-building with two partners of different disciplines. Thereafter, the teams support and conduct lessons at inclusive schools once a week over the period of one semester (12 weeks). This requires not only the subject-related scientific and pedagogical expertise of the GE teachers but also and, most importantly, the educational and inclusion-oriented expertise of the SEN teachers. The intensive exchange in the multidisciplinary teams results in an interconnection of partial competencies and a transfer of expertise between the partners.

Keywords: interdisciplinary seminar concept, co-teaching, inclusion-oriented teacher training, interconnection of competencies

3.1.1 Einleitung

Um eine gelingende schulische Inklusion zu ermöglichen, sollte die Vorbereitung auf das Unterrichten in heterogenen Lerngruppen bereits in der ersten Phase der Lehrer/innenbildung enthalten sein. Dies ist ein allgemein anerkanntes Ziel in etlichen wissenschaftlichen Publikationen (vgl. Feuser 2015; Lütje-Klose, Miller, Ziegler 2014). Vor allem eine positive Einstellung der Lehrkräfte zu schulischer Inklusion (vgl. Avramidis, Byaliss, Burden 2000; de Boer 2012) und die Fähigkeit, in interdisziplinären Teams zu arbeiten (vgl. Schwager 2011; Lütje-Klose et al. 2005) werden häufig als zentrale Elemente und Gelingensbedingungen genannt. Lütje-Klose und Urban (2014) stellen fest, dass die Schaffung entwicklungsfördernder Bedingungen für eine sehr heterogene Gruppe von Lernenden vielfach nicht von einer Lehrkraft alleine umgesetzt werden kann. Daher

„gehören Inklusion und professionelle Kooperation zusammen wie zwei Seiten einer Medaille“ (ebd., S. 113). Multidisziplinäre Kooperation fördert jedoch nicht nur die individuellen Leistungen der Schülerinnen und Schüler, sondern trägt auch zur Professionalisierung der Lehrkräfte bei (vgl. Pancsofar, Petroff 2013). Durch die Kooperation findet sowohl ein Transfer von Expertise (vgl. Scruggs, Mastropieri, McDuffie 2007) als auch ein Austausch und ein Überdenken von Überzeugungen (vgl. Gräsel, Fußangel, Pröbstel 2006) statt. Formale Lerngelegenheiten bieten die Möglichkeit, die Kooperation zu initiieren, weshalb die Hochschulrektorenkonferenz fordert, multiprofessionelle Kooperation als festen Bestandteil ins Studium zu integrieren (vgl. HRK 2015). Allerdings gibt es dafür bislang weder konzeptuelle Vorgaben seitens der Ministerien noch erprobte Konzepte oder empirisch abgesicherte Befunde.

Die aus diesem Grund an der Bergischen Universität Wuppertal entwickelte und evaluierte Seminarform für Lehramtsstudierende der Regelschulpädagogik und Lehramtsstudierende der sonderpädagogischen Förderung bietet eine formale Lerngelegenheit, Kooperation und Co-Teaching zu erlernen und einzuüben. Das Seminar besteht aus drei Phasen, in denen Co-Teaching theoretisch angebahnt, praktisch durchgeführt und anschließend reflektiert wird.

3.1.2 Co-teaching im inklusiven Unterricht – das Seminarkonzept

Das Seminar „Co-Teaching im inklusiven Unterricht“ wird sowohl für Lehramtsstudierende für die Haupt-, Real- oder Gesamtschule (HRGe) und Gymnasium oder Gesamtschule (GymGe) als auch für Lehramtsstudierende der sonderpädagogischen Förderung angeboten. Die HRGe- und GymGe-Studierenden besuchen die Lehrveranstaltung im Rahmen des Forschungsprojekts im Master of Education (M. Ed.) mit insgesamt 6 nachgewiesenen ECTS einschließlich des Leistungsnachweises in Form eines Forschungsprotokolls.⁴ Für Lehramtsstudierende der sonderpädagogischen Förderung ist das Seminar im Modul „Didaktische Methoden und Vermittlungstechniken im inklusiven Unterricht“ sowie im Modul „Berufsfeldpraktikum“ im Bachelor of Education (B. Ed.) verortet. Die Studierenden erhalten insgesamt 9 ECTS inklusive des Nachweises durch ein Lerntagebuch und einen

⁴ Siehe beispielhaft „Prüfungsordnung für den Teilstudiengang Biologie des Studienganges Master of Education – Lehramt an Gymnasien und Gesamtschulen an der Bergischen Universität Wuppertal“, <https://bscw.uni-wuppertal.de/pub/bscw.cgi/d8819820/am11126.pdf> [07.07.2018].

Praktikumsbericht.⁵ Das gemeinsame Seminar gliedert sich in drei Phasen: eine universitäre, eine schulpraktische und eine reflexive Phase (Abbildung 6).

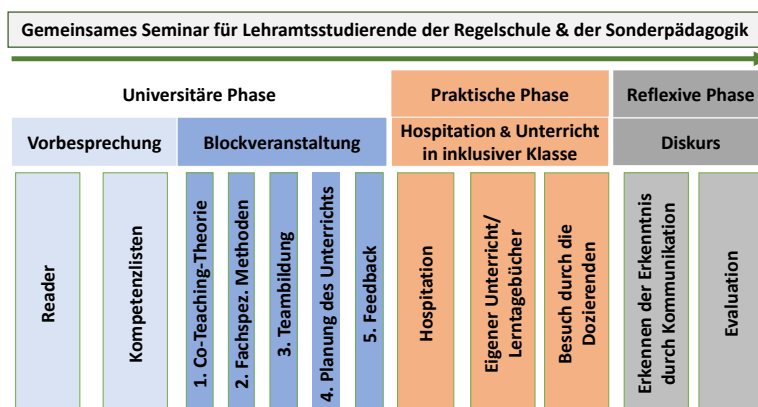


Figure 6. Co-Teaching im inklusiven Unterricht, Seminarkonzeption

3.1.2.1 Universitäre Phase

Die universitäre Phase setzt sich aus einer gemeinsamen zweistündigen Vorbesprechung, der individuellen Bearbeitung eines Readers sowie einer gemeinsamen neunstündigen Blockveranstaltung zusammen. Die Vorbesprechung findet etwa eine Woche vor der Blockveranstaltung statt und dient dazu, das Konzept des Projekts zu erläutern und die Reader mit den Kompetenzlisten vorzustellen; sie enthalten je nach Studiengang und Studienfach unterschiedliche Themenblöcke zu „Fachdidaktische Aspekte für den inklusiven Unterricht“ und „Sonderpädagogisch-methodische Aspekte für den inklusiven Unterricht“ sowie die gemeinsamen Texte zu „Co-Teaching“ und „Gesetzliche Grundlagen der Inklusion“. Mithilfe von Kompetenzlisten können die Studierenden überprüfen, ob sie sich die Inhalte korrekt erschlossen haben.

Die Blockveranstaltung folgt dem Prinzip des Expertenpuzzles, in dem die Studierenden in fachgleichen Gruppen zunächst ihre jeweiligen Reader besprechen und dann in den disziplinübergreifenden Teams vorstellen. Die Blockveranstaltung besteht aus insgesamt fünf Einheiten.

Die erste Einheit widmet sich dem Hauptinhalt des Seminars, nämlich dem Co-Teaching. Die Studierenden schreiben zwei Kernsätze der wichtigsten Aspekte des Co-Teaching für

⁵ Siehe „Prüfungsordnung für den Kombinatorischen Studiengang Bachelor of Education – Sonderpädagogische Förderung an der bergischen Universität Wuppertal“, <https://bscw.uni-wuppertal.de/pub/bscw.cgi/d9524581/am14032.pdf> [07.07.2018].

den inklusiven Unterricht auf Moderationskarten und heften sie nach kurzer Erläuterung an ein Flipchart, wonach sie diese in Themengebiete gruppieren. In einem Plenumsgespräch werden dann die wichtigsten Voraussetzungen und Bedingungen des Co-Teaching, die Vorteile für den inklusiven Unterricht sowie die unterschiedlichen Formen herausgestellt. Den Abschluss dieser Einheit bildet ein Lehrfilm, der die Praxis und die Methoden des Co-Teaching darstellt.

In der zweiten Einheit arbeiten die Studierenden der Regelschulpädagogik in fächerhomogenen, die Studierenden der sonderpädagogischen Förderung in studienganghomogenen Kleingruppen, um mithilfe von Leitfragen die Spezifika der jeweiligen Fachdidaktiken bzw. der sonderpädagogischen Unterrichtsmethoden zu definieren. Ziel ist es, ein Bewusstsein für die Charakteristika einer Lehrkraft dieses Faches bzw. der sonderpädagogischen Förderung zu entwickeln und so zu Einsichten in die je spezifische Expertise zu gelangen. Im Gespräch mit einer Fachdozentin oder einem Fachdozenten zum Abschluss dieser Einheit erstellt jeder Studierende ein eigenes fachliches Kompetenzprofil.

In der dritten Einheit identifizieren die Studierenden zudem ein jeweils eigenes Persönlichkeitsprofil, indem sie sich besonderer Charaktereigenschaften, Vorlieben, Arbeitsweisen, Erwartungen und Ängste bewusstwerden und diese für sich verschriftlichen.

In der nächsten Phase des Seminars steht die aktive Teambildung als essenzielle Voraussetzung für erfolgreiches Co-Teaching im Mittelpunkt. Die von den Dozierenden nach pragmatischen Kriterien (z.B. lehrveranstaltungsfreie Tage an der Universität, studierte Fächer, Wohnort und Mobilität etc.) gematchten Tandems – jeweils ein/e Studierende/r der Sonderpädagogik und der Regelschulpädagogik (= multiprofessionelles Team) – tauschen sich intensiv sowohl über ihre professionellen als auch persönlichen Charakteristika aus. Dabei sollen sie vor allem die Erwartungen an sich selbst und an den Partner/die Partnerin bezüglich der Arbeits- und Verantwortungsteilung im Unterricht konkret thematisieren. Für diese Phase wird bewusst eine sowohl räumlich als auch zeitlich freilassende Umgebung geschaffen, sodass sich die Studierenden in einen privaten Austausch begeben können.

Die vierte Einheit besteht aus der Aufgabe, im Team eine Unterrichtsstunde im Fach der/des Studierenden der Regelschulpädagogik für eine Vignette, d.h. eine kontextgebende Beschreibung einer fiktiven inklusiven Klasse, zu skizzieren. Diese plant das Tandem in Ko-Konstruktion sowohl unter Einbezug der fachwissenschaftlich und fachdidaktisch relevanten Aspekte des Unterrichtsinhalts als auch der fachlichen und methodischen

Anpassung des Unterrichtsgangs an alle Schülerinnen und Schüler. Anhand der auf Flipchart übertragenen Entwürfe präsentieren die Studierenden ihre Ideen und begründen die Wahl der Methoden im Plenum, um in der fünften Einheit Feedback sowohl von den Kommiliton/innen als auch von den Dozierenden zu bekommen.

Die Gestaltung der pädagogisch-arrangierten Umwelt in allen Phasen des Blockseminars liegt nahe am Pol der *Lerner/innenzentrierung* (vgl. Reinmann, Mandl 2006), in der die aktive Position der Lernenden und die reaktive Haltung der Lehrenden im Mittelpunkt stehen. Gemäß dem Paradigma des Konstruktivismus sind hier der „aktive Aufbau und die Veränderung von Wissensstrukturen auf Seiten der Lernenden zentral“ (Zumbach, Astleitner 2016, S. 39). Dabei konstruieren die Individuen Wissen auf der Basis sowohl neuen als auch vorhandenen Wissens, das somit immer eine subjektive Komponente enthält (ebd.). Besonders wichtig ist dabei der soziale Austausch, weil nach Zumbach und Astleitner erst durch die diskursive Auseinandersetzung mit Inhalten eine tiefere Verarbeitung erfolgen kann. Da im skizzierten Seminar die Handlungskompetenz der angehenden Lehrer/innen in unterrichtlichen Situationen vorbereitet, eingeübt und gefestigt werden soll, ist vor allem die subjektive Komponente der Wissensgenerierung bedeutsam, denn nach Ajzen (1985) stellt die subjektive Norm/das subjektive Wissen eine von drei Determinanten für die Intention und damit für das Verhalten dar.

Das ‚Anbahnen‘ der professionellen Partnerschaft ist wesentliches Element des Blockseminars. Nach Johnson (2015) ist das gegenseitige Kennenlernen der Teampartner eine wichtige Voraussetzung für ein funktionierendes Co-Teaching. Ein unverzichtbarer Schritt hierbei ist es, sich bewusst Zeit zu nehmen, um sich über Ziele, Interessen und Stile auszutauschen. Friend und Cook (2007) sprechen in diesem Zusammenhang von *frame of reference* (Referenzrahmen), der sich auf vergangene Erfahrungen, Einstellungen und Überzeugungen, persönliche Qualitäten sowie vergangene und aktuelle Gefühle und Erwartungen an andere bezieht. Dieser *frame of reference* sollte den jeweils anderen Teampartner/innen bekannt sein, weshalb Murawski (2009) die *suitcase activity* vorschlägt (S. 44). Hierbei werden die angehenden Teampartner/innen angeleitet, zunächst ihre eigenen ‚Koffer zu packen‘, d.h. sich der eigenen Erfahrungen, Einstellungen usw. bewusst zu werden und diese dann vor dem Teampartner oder der Teampartnerin ‚auszupacken‘. Mit diesem proaktiven Ansatz zur Herauskristallisation möglicher Konflikte sowie von Gemeinsamkeiten und Unterschieden (vgl. Johnson 2015) lassen sich durch diese Aktivität Missverständnisse und Enttäuschungen vermeiden.

Die erste gemeinsame Aktivität der Teams ist der Entwurf einer Unterrichtsstunde für eine Vignette einer inklusiven Klasse. Diese Form der Zusammenarbeit ist nach Gräsel, Pröbstel und Fußangel (2006) als Ko-Konstruktion und damit als die am höchsten entwickelte Form der Kooperation zu bezeichnen. Dabei tauschen die Partner sich intensiv hinsichtlich einer Aufgabe aus und beziehen ihr individuelles Wissen aufeinander. Erst durch die Synthese von fachwissenschaftlichem und fachdidaktischem Wissen der/des Regelschulpädagogen/in mit dem methodischen und inklusionsorientierten Wissen der/des Sonderpädagogen/in gelingt die Gestaltung eines Unterrichts, der angepasst ist an die Bedürfnisse aller Lernenden. Kennzeichnend für diese Form der Zusammenarbeit ist, dass sie unabhängig von persönlichen Vorlieben als Bestandteil des professionellen Handelns erfolgt, worin auch Shaplin (1964) die Vorzüge des Co-Teaching sieht.

Die anschließende Vorstellung des Unterrichtsentwurfs bedeutet ein eigenständiges Erklären und ‚Rechtfertigen‘ des Lösungsbeispiels durch die Studierenden, wodurch eine tiefere Verarbeitung und ein besseres Verständnis erfolgen (vgl. Wylie, Chi 2014). Das Feedback der Lehrenden dient als Anregung und Beratung im Prozess der aktiven Wissenskonstruktion (vgl. Reinmann, Mandl 2006).

3.1.2.2 Praktische Phase

„Wenn also einer die Theorie besitzt ohne die Erfahrung, und das Allgemeine kennt, aber das darunterfallende Einzelne nicht kennt, so wird er in der Praxis oftmals fehlgreifen. Denn Gegenstand der Praxis ist das Einzelne“, so beschrieb schon Aristoteles (1907, S. 7) die Differenz zwischen Theorie und Praxis. Theorie kann die praktische Realität niemals vollständig abbilden und Praxis repräsentiert niemals die exakte Anwendung von theoretischen Prinzipien, stellt Vogel (2011, S. 5) fest; er folgert, dass es zu deren Umsetzung der Entwicklung von Urteilskraft und Routine bedarf. In der Professionalisierung zukünftiger Lehrer/innen muss also eine angemessene Verknüpfung von Theorie und Praxis erfolgen, um die Ausbildung dieser Urteilskraft zu ermöglichen und zu unterstützen. Gerade das Co-Teaching muss in der Praxis erprobt werden, um Routine ausbilden zu können.

Daher sind die Studierendenteams für die Dauer eines Semesters (zwölf Wochen) an einem Tag in der Woche in einer inklusiven Klasse in einer Schule der Sek. I. Sie begleiten die Klasse durch einen ganzen Schultag, um die Schüler/innen in unterschiedlichen Fächern, zu unterschiedlichen Tageszeiten und u. U. in unterschiedlichen Konstellationen zu erleben. Nach einer angemessenen Zeit des Kennenlernens und der unterstützenden Aktivitäten übernehmen die Teams den Unterricht. In Abstimmung mit der Fachlehrkraft der Klasse und

dem/der Sonderpädagogen/in planen und gestalten die Teampartner/innen selbstständig eine Unterrichtssequenz und führen diese durch. Die Reflexion der einzelnen Stunden erfolgt sowohl unter den beiden Partner/innen als auch mit der Fachlehrkraft und dem/der Sonderpädagogen/in der Klasse.

Für den Lernerfolg der Studierenden in der Praxis ist die Qualität der universitären Betreuung von großer Bedeutung (vgl. Gröschner, Seidel 2012). Neben der Möglichkeit der vor- und nachbereitenden Begleitung durch die Dozierenden werden vor allem flankierende Konzepte, die kontinuierliche Lerngelegenheiten und eine Optimierung des Theorie-Praxisbezugs bieten, als effektiv erachtet (vgl. Allen, Wright 2014). Deshalb verfassen die Studierenden zu jedem Schultag einen Eintrag in ein Lerntagebuch, das den Dozent/innen zur Verfügung steht. Auf diese Weise können mögliche Probleme oder Konflikte innerhalb des Teams, aber auch die Fortschritte der Studierenden in Bezug auf die Kooperation nachvollzogen werden. Zudem besuchen die Dozierenden des Seminars jedes Team an einem vereinbarten Termin, um den Unterricht und die Interaktion der beiden Partner/innen zu verfolgen und mit ihnen im Anschluss zu reflektieren. Brouwer und Korthagen (2005) betrachten solche Unterrichtsbesuche als förderlich für die Lernerfahrung während des Praktikums. Die intensivere Vorbereitung und Planung der besuchten Unterrichtsstunde einerseits und die gemeinsame Reflexion andererseits bewirken eine vertiefte Auseinandersetzung mit den gegebenen unterrichtlichen Situationen und deren Verlauf. Vor allem die Rückmeldung zur Zusammenarbeit im Tandem durch den/die Dozenten/in und das anschließende Gespräch ermöglichen eine Diskussion über und ein Überdenken von individuellen Handlungen. Dadurch haben die Studierenden die Gelegenheit, Theorie und Praxis des Co-Teaching im inklusiven Unterricht zu verknüpfen und darin Routine auszubilden, die für ihre zukünftigen Aufgaben in heterogenen Klassen bedeutsam ist.

3.1.2.3 Reflexive Phase

„Isoliert man berufspraktisches Handeln von Reflexion, wird es auf instrumentelles Handeln verkürzt. Das halte ich im Rahmen einer wissenschaftlichen Lehrerbildung für unzulässig“, postuliert Hedke (2000). Dubs (2008) betont, dass die theoretische Reflexion der praktischen Erfahrung bedeutsam sei, um überhaupt daraus zu lernen. Erst die Reflexion und der Austausch mit anderen mache die eigene Erfahrung verstehbar und initiiere Lernprozesse. Dieser Position folgend ist nach der praktischen Phase eine Reflexionsveranstaltung für die Studierenden obligatorisch. Hier werden die Erfahrungen der Praxis im Unterricht und mit dem/r Teampartner/in auf einer Metaebene betrachtet, diskutiert und mit der Theorie in

Beziehung gesetzt. Mithilfe von Leitfragen bewerten die Studierenden individuell das Gelingen des eigenen Unterrichts und die Zusammenarbeit im Tandem sowie den subjektiven Lernerfolg und den Beitrag zur eigenen Professionalisierung. Vor allem thematisieren, vergleichen und erörtern sie Theorie und Praxis des inklusiven Unterrichts in den Schulen und des Co-Teaching.

3.1.3 Evaluation

Das hier skizzierte Seminar wird wissenschaftlich evaluiert (zu Details siehe Ritter et al., 2018). Da eine positive Einstellung zu schulischer Inklusion als Prädiktor für das Handeln im inklusiven Unterricht und somit als eine der zentralen Gelingensbedingungen gilt (vgl. Avramidis, Byaliss, Burden 2000), wird der Effekt des Seminars bezüglich der Änderung der Einstellung der Studierenden zu schulischer Inklusion untersucht. Die erste forschungsleitende Frage ist daher, ob und inwieweit sich die Einstellung zu schulischer Inklusion durch das Seminar und vor allem durch die Zusammenarbeit mit einem Partner eines anderen Studiengangs im Vergleich mit der Zusammenarbeit mit einem Partner des gleichen Studiengangs verändert. Die Erhebung erfolgt mittels eines Fragebogens, der fünf Subskalen enthält: Sieben Items zur Subskala *Inklusionswunsch* aus dem Instrument von Przibilla et al. (2016), je vier Items zu den Dimensionen *Einstellung zu den Effekten des inklusiven Unterrichts*, *Einstellung zur Gestaltung des inklusiven Unterrichts*, *Selbstwirksamkeit in Bezug auf den inklusiven Unterricht* aus dem KIESEL-Instrument von Bosse und Spörer (2014) sowie *Wahrnehmung der professionellen Rolle und Funktion* aus dem TATIS-Instrument von Cullen et al. (2010). Die Erhebung erfolgt zu drei Messzeitpunkten, und zwar vor der Vorbesprechung, nach der universitären Phase und nach der praktischen Phase. So kann eine eventuelle Veränderung der Einstellung und Selbstwirksamkeit nachgezeichnet werden. Um feststellen zu können, inwieweit der Austausch und die Ergänzung mit einem Partner eines anderen Studiengangs einen Einfluss auf die Veränderung der Einstellung hat, werden die Daten von Studierenden in multiprofessionellen Teams (Interventionsgruppe) mit denen in monoprofessionellen Teams (Kontrollgruppe) verglichen. Dabei kommen sowohl die statistischen Verfahren der T-Tests mit Messwiederholung als auch der Varianzanalyse (ANOVA) zum Einsatz.

Neben der Einstellung wird auch die multiprofessionelle Kooperation als zentrales Element der schulischen Inklusion angesehen (vgl. Grosche et al. 2017), da durch den interdisziplinären Austausch ein Transfer von Wissen und Expertise stattfindet (vgl. Scruggs, Mastropieri, McDuffie 2007). Die zweite forschungsleitende Fragestellung

beschäftigt sich daher mit der Veränderung bzw. Erweiterung der subjektiven Theorien und der Konzepte von schulischer Inklusion durch den Einfluss des multiprofessionellen Austausches. Zur Analyse der Konzepte erstellen die Studierenden Concept-Maps zu den drei oben genannten Messzeitpunkten. Diese werden sowohl qualitativ durch zusammenfassende, induktive, qualitative Inhaltsanalyse (vgl. Mayring 2008) der Propositionen als auch quantitativ durch graph-theoretische Berechnungen (vgl. Mühling 2017) evaluiert. Die Ergebnisse aus der quantitativen und der qualitativen Forschung werden trianguliert, um den Effekt des Seminars und der multiprofessionellen Kooperation auf unterschiedlichen Ebenen betrachten zu können.

Bisher wurde das Seminar in vier konsekutiven Kohorten durchgeführt, mit einer Gesamtanzahl von $N = 79$ Studierenden, von denen 42 Studierende der Sonderpädagogik und 37 Studierende für das Lehramt an der Regelschule sind; nur 13 Beteiligte sind männlich. Insgesamt haben 49 Studierende das Seminar in einer Interventionsgruppe und 30 in einer Kontrollgruppe belegt (ein Studierender für das Lehramt in der Regelschule musste aus organisatorischen Gründen mit dem Sonderpädagogen der besuchten Schule kooperieren).

3.1.4 Diskussion

Die subjektive Beurteilung des Seminars durch die Studierenden mithilfe eines standardisierten Fragebogens zeigt eine hohe Wertschätzung der Theorie-Praxis-Verzahnung. Nahezu alle Teilnehmenden äußerten sich positiv über den Praxisbezug und die Möglichkeit, die Theorie sofort umsetzen und erproben zu können; diese Möglichkeit bietet sich in den anderen Seminaren nicht. Ein weiterer häufig erwähnter Aspekt ist die Betreuung während der Praxisphase, über die sich ein Großteil der Studierenden positiv äußerte. In der Reflexionsveranstaltung geben sie häufig an, dass sie durch das Seminar, und hier vor allem in der Praxis mit einem Partner, sehr viel Handlungsroutine und Handlungskompetenz erworben haben. Die oben erwähnte Urteilskraft, die sich vor allem durch die Praxis entwickelt, scheint im intensiven Austausch mit dem/r Teampartner/in noch stärker ausgebildet zu werden. Diese subjektive Beurteilung bestätigt und unterstreicht die theoretischen Überlegungen und Befunde, die Grundlage für die Konzeption des Seminars waren. Allerdings merkten einige Studierende an, dass der Zeit- und Arbeitsaufwand für das Projekt relativ hoch sei und vor allem die Vorbereitung der eigenen Unterrichtsstunden sehr viel Engagement erfordere. Da es sich bei diesem Seminar um eine Wahl-

Pflichtveranstaltung handelt, ist damit zu rechnen, dass hauptsächlich Studierende mit hoher Motivation daran teilnehmen.

Wegen der Praxisphase in unterschiedlichen Schulen und unterschiedlichen Klassen sind die Anleitung und die Begleitung der Unterrichtsvorbereitung und -durchführung sehr divergent. Trotz des Wissens der Lehrkräfte über das Seminarkonzept und die Erwartungen an die Studierenden entstehen mit den einzelnen Klassen auch abweichende Rahmenbedingungen und Handlungserwartungen, sodass die Erfahrungen stets situativ und damit nicht miteinander vergleichbar sind. Um dennoch ähnliche Lerngelegenheiten für alle Studierenden in den Schulen zu ermöglichen, werden in jedem Semester Workshops für die kooperierenden Lehrkräfte zu allen relevanten Themen des Seminars angeboten, um die universitären Erwartungen an die Studierenden zu verdeutlichen und somit eine größere Betreuungs- und Beratungsübereinstimmung seitens der Lehrkräfte zu erreichen.

Die Studierenden-Teams verbringen einen ganzen Tag in der Woche in den inklusiven Klassen, was bedeutet, dass sie an diesem Tag keine Lehrveranstaltungen an der Universität belegen können. Da die Curricula für die unterschiedlichen Studiengänge und Fächer nicht immer den gleichen Wochentag als veranstaltungsfrei zulassen und außerdem die Stundenpläne der kooperierenden Klassen nicht an jedem Tag in der Woche eines der studierten Fächer der Teams aufweisen, ist die Logistik der Zuordnung der Studierenden in die Teams und in die Schulen und Klassen recht aufwändig. Daher sind immer auch Kompromisse auf allen Seiten erforderlich.

Die fakultätsübergreifende Kooperation stellt eine weitere Besonderheit dar. Das Seminar wird sowohl Lehramtsstudierenden für HRGe oder GymGe mit den unterschiedlichsten Fächern als auch Studierenden der sonderpädagogischen Förderung angeboten. Das erfordert eine fachbereichs- und fakultätsübergreifende Abstimmung der Seminarinhalte und Prüfungsmodalitäten, was zuweilen zu Problemen auf der Ebene der Organisation führt. Vor einer curricularen Verankerung des Seminars sollten deshalb sowohl die Erwartungen an die Praxisphase als auch die inneruniversitäre Organisation mit allen beteiligten Akteuren geklärt werden.

Da die Datenerhebung noch nicht abgeschlossen ist, stehen zurzeit lediglich vorläufige Ergebnisse zur Verfügung. Diese lassen vermuten, dass das Seminar sowohl zur Entwicklung einer positiveren Einstellung als auch zur Erweiterung bzw. zur Veränderung der Konzepte von schulischer Inklusion beiträgt. Vor allem die Einstellung der Studierenden in multiprofessionellen Teams scheint sich signifikant zum Positiven zu verändern.

Außerdem ist zum Ende der praktischen Phase eine bessere Vernetzung der Konzepte und somit ein differenzierteres Wissen über Inklusion sowie tatsächlich ein Transfer von Wissen und ein Überdenken von Überzeugungen bei den Studierenden in multiprofessionellen Teams sichtbar.

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3.2 Multi-professional and Mono-professional Collaboration and its Association with Both Student Teachers Attitudes towards, and Concepts of, Inclusive Education

(Research Paper 2, peer reviewed)

Multi-professional and mono-professional collaboration and its association with both student teacher attitudes towards, and concepts of, inclusive education

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Abstract:

The ratification of the UN Disability Rights Convention in Germany constitutes a new challenge for schools and teachers. Thus in 2015, the conference of education ministers therefore resolved that inclusion has to 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, have to be trained preferably in the first phase of teacher training already. At the University of Wuppertal, Germany, a seminar-design was developed to offer student teachers the opportunity to gain knowledge about and experience in inclusive education and practice collaboration skills at the same time. The seminar consists of three parts: i) academic course work at the university, ii) a practical phase at secondary schools around the city, and iii) a phase of reflection at the end.

Student teachers work in either multi-professional tandems consisting of one student teacher for general education (GE) or one student teacher for special educational needs (SEN), or in mono-professional tandems consisting of two student teachers for GE or two student teachers for SEN. Mixed-method approach is carried out to assess the association of mono- as compared to multi-professional collaboration with student teacher attitudes towards and concepts of inclusive education. Analysis is carried out at three different testing times during the course of the seminar, thus analyzing both the effect of academic course work and practical experience. Attitudes towards and concepts of inclusive education are said to be predictors for classroom behavior and professional knowledge and acting.

It is expected that the interdisciplinary exchange in multi-professional tandems will associate with higher professional knowledge.

Keywords: co-teaching, multi-professional teams, inclusion, attitude, concepts

3.2.1 Introduction

3.2.1.1 *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 a lot of changes integrating the joint education of children with and without special educational needs. The UN Convention demands an inclusive school system (United Nations, 2006); however, 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 definition: one concerning placement, a specified individualized one, a general individualized one, and one concerning the community. The first definition denotes the mere placement of pupils with SEN in mainstream classrooms, the second identifies inclusion as meeting the social and academic needs of pupils with disabilities, the third sees inclusion as meeting the social and academic needs of all pupils, 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 makes teachers struggle to realize the successful inclusion of whatever type, as they act in an approach depending 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 there is little conceptional thought from the side of the state administrations (Heinrich, Urban & Werning, 2013; Breyer & Erhardt, 2013). In 2015, the German Conference of Education Ministers resolved that inclusion has to be a topic in the first phase of teacher training (HRK, 2015). The awareness that teachers need professional competences to take adequate measures in the support of pupils with special needs (ibid., p2) triggered a relatively detailed recommendation concerning the first phase of teacher training.

As to the question, which professional skills are needed for working in inclusive settings, a look at the criteria for initial teacher training (ITE) in the UK may be helpful. The 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 pupils, including those with SEN;
- identify and support pupils who experience behavioral, emotional and social difficulties” (DfDES, 2004, p. 57 as cited in Golder, Norwich, & Bayliss, 2005, p. 93).

This means that future teachers’ development of educational competences with relation to inclusion have to comprise areas like

- the development of an inclusive understanding (Seitz, 2011; Goujonsdottir et al., 2008),
- the ability to individually support (Kunze, 2010; Veber, Rott & Fischer, 2013), and
- 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; Pancscofar & Petroff, 2013; Lütje-Klose & Urban, 2014) which is 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 a necessity for teachers in inclusive schools to be in favor of inclusive education coupled with the fact that inclusive education is inconceivable without cooperation and differentiation (ibid, p.133). Lütje-Klose and Urban (2014) consider cooperation of professionals as being essential 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. In line, the US Council of Chief State School Officers (CCSSO 2013) emphasizes in their Model Core Teaching Standards

- 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 individually support and the 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 grasp as they deal with personality and traits; their implementation in teacher training remains a desideratum. Concluding, attitudes of teachers as well as the collaboration of teachers with different areas of expertise such as general education and special education are key factors for inclusive education. As a result, teacher training has to emphasize collaboration and co-teaching in order to prepare student teachers for inclusion.

3.2.1.2 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: a cognitive one (evaluative beliefs), an affective one (feelings or sentiments), and a behavioral one (behavior intentions).

Besides the model of attitude as a theoretical construct, there are research perspectives that focus on the relationship between attitudes and other dependent variables. Albarracín, Jonhson, and Zanna (2005), for example, 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 said 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 for behavior that promotes successful inclusion has been shown in several international studies. Avramidis et al., (2000) state that, for inclusion to be effective, the school personnel most responsible for its success –mainstream teachers – should be receptive to its principles and demands; de Boer (2012) emphasizes that attitudes are a key factor for the acceptance of students with SEN in regular education, and Sharma, Forlin, Loreman, & Earle (2006) found that, if teachers are to be supportive of inclusive education, they not only

need the relevant skills and knowledge, but also positive attitudes. Empirical studies substantiate that attitudes as predictors for intentions and behavior determine the competence of professional action of classroom teachers (Heyl, Trumpp, Janz, & Seifried, 2014; Baumert & Kunter, 2006), which is 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 & Purdie (2000) state 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 general education 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 to the respective schools. Teachers with longer institutional affiliation to inclusive schools show 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 on inclusive classrooms. Concluding, teacher attitudes towards inclusion influence teachers’ inclusive classroom behavior, and attitudes towards inclusion may be influenced by theoretical and practical courses. However, the authors would like to emphasize that changing attitudes is a controversial goal. Thus, attitudes may be considered merely as a measurably indicator for inclusive practice.

3.2.1.3 Co-Teaching and the Association with Professional Development of Student Teachers

Co-teaching is defined as the continuous exchange between two or more educational specialists who share the responsibility for all pupils and teach jointly in one room (Friend et al., 2010). Co-teaching includes professional planning and delivering instruction; there are six different approaches to it:

- One teach, one observe: one teacher leads instruction, 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 pupils 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 pupils
- Team-teaching: both teachers lead the whole group instructions 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 pupils 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 generally is defined as the partnering of a general and a special education teacher with the purpose of jointly delivering instruction to a heterogeneous group of pupils (Friend, 2008).

However, co-teaching is not only of advantage for the pupils but also for the teachers' professional development. 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 were beneficial for students and they share expertise during teaching. Teachers also reported to have learned from their co-teaching partners and thus witnessed a transfer of expertise. Moreover, teachers report the formation of positive attitudes towards co-teaching and the development of the belief that the needs of pupils 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 viewed 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 the expertise needed is available.

Concluding, 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 student teachers' professional competences, as there may be a transfer of knowledge from one partner to the other and a raise of the perception of teaching efficacy.

3.2.1.4 Research Question

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

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

3.2.2 Methodology

The following description of the research design is divided into four sections: firstly, there is a detailed description of the academic course. Secondly, the anticipated sample is described. Thirdly, the evaluation instruments and their suitability are presented and established, and, fourthly, the intended analysis methods of the data are delineated.

3.2.2.1 Academic Course

The research design of the presented 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 for teaching methodology, a specialist for the technical discipline, and a specialist for special education (Krämer, Nessler, Schlüter, & Erbring, 2014). The course design had been evaluated quantitatively and qualitatively over a period of 4 university terms and had constantly been optimized based on evaluation results prior to this study.

Student teachers for general education (GE) as well as student teachers for special educational needs (SEN) may participate in that course. The goal of the course is to experience co-teaching as a team of either two partners of the same professionalism or a team of one partner being a student teacher for SEN and one a student teacher for GE. The experience is intended to be both theoretical at the university and practical at schools. The academic course comprises of 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).

Similar to a jigsaw, 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 student teacher studies a reader according to their professionalism with the help of given checklists. Within the plenum-phase, student teachers discuss the different forms and features of co-teaching as well as the requirements for its success. Within the expert-phase, student teachers discuss their expertise for inclusive teaching in groups according to their professionalism, guided by an expert-instructor. That is, student teachers for GE discuss the educational methodologies of their content subjects while student teachers for SEN talk about strategies for inclusive settings. Additionally, student teachers individually reflect on their professional and personal characteristics, their strengths and weaknesses, as well as their expectations of the collaboration. Within the tandem-phase, student teachers exchange their own professional and personal characteristics, their strengths and weaknesses, as well as their expectations of the collaboration. Following that, 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 of special educational needs 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 pupils 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, & 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 the partners. The tandems then present their lesson plans to the group and receive feed-back from the other group members and the instructors, who particularly pay 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 twelve consecutive weeks. Student teachers spend a complete morning in their classes to become familiar with the pupils and their needs. After an appropriate time of sitting in on class, student teachers jointly plan and conduct their own lessons in one of their chosen subjects, paying particular attention to meeting all the pupils' needs, thus again making use of each partners' area of expertise. During this period, students are guided and supervised by a teacher for GE and a teacher for 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 student teachers' professional development and role on a meta-level. There is a plenum discussion about experiences in the classrooms which is moderated by the instructors. Student teachers exchange probate methods to deal professionally with difficult situations. Finally, they are asked to evaluate their experience they had at the schools and in the teams and assess their contribution to their professional development with the help of a reflection sheet.

3.2.2.2 Sample

The academic course is intended for student teachers for general education and student teachers for special education at the University of Wuppertal, Germany. Student teachers for general education may have any combination of subjects. Student teachers for special educational needs are focused on learning problems and social-emotional disorders. The student teachers may be either in their bachelor- or master-program. The participation is optional, but embedded in the examination regulations of the university. The academic course takes place once per semester over a period of 6 semesters. There is a maximum of 36 student teachers per semester that are accepted to attend the academic course.

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

3.2.2.3 Instruments

The following description of the evaluation instruments is divided in three parts. The first part introduces the questionnaire used for the assessment of student teachers' attitudes, the second part describes the concept maps as instruments to visualize student teachers' professional knowledge of inclusion as well as their implementation of newly acquired knowledge. The third part, finally, delineates the learning diaries as instrument for the assessment of student teachers' cooperative skills.

3.2.2.3.1 Questionnaires for the assessment of attitudes.

Student teacher 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 subscale are included.

To assess the belief in inclusive education and to gain information about student teachers' general attitude towards inclusion, a subscale developed and validated by Przibilla, Lauterbach, Boshold, Linderkamp, & Krezmien (2016) was chosen. The subscale is titled *Belief in inclusion* and assesses teachers' considerations about placement and instruction of pupils with SEN, their personal convictions towards the idea of inclusive education, and their needs for further training and cooperation with teachers for 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 7 items with 4-point Likert scaling, e.g.: Pupils without SEN want to have pupils with SEN in their general schools. The internal consistency value of the pilot testing was satisfactory ($\alpha=.61$).

To assess student teachers' attitudes towards inclusive education in schools, two subscales developed and validated by Bosse & Spörer (2014) were chosen. The subscales are titled *Attitude towards the organization of inclusive education* and *Attitude towards the effect of inclusive education*. These subscales assess student teachers' attitudes towards the instruction of pupils 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 4 items each with 4-point Likert scaling, e.g.: On 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 Pupils 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 student teachers' conviction 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 professionals in inclusive classrooms, two subscales developed and validated by Bosse and Spörer (2014) and Cullen et al., (2010) are used. The subscales are titled *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, the last-mentioned subscale is part of the Teacher Attitude Towards Inclusion Scale (TATIS). The TATIS questionnaire is used internationally to record teacher attitudes towards inclusion. The first mentioned subscale consists of 4 4-point Likert scaled items, e.g.: 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 4 7-point Likert scaled items, e.g.: All pupils 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.

Besides 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 pupils with SEN and/or inclusive education in private or professional contexts. Particularly the data on previous experience may help to explain any outliers in the quantitative data.

3.2.2.3.2 Concept maps for the assessment of concept and knowledge.

Student Teachers' professional knowledge was recorded with the help of 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 student teachers, the concept is related to the focus question “What is educational inclusion?”. When creating these concept maps, student teachers 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 the determination of the extent and quality of new connections students are able to make after theoretical instruction and practical experience (Mason, 1992).

3.2.2.3.3 Learning diaries for the assessment of cooperative skills.

To quantitatively and qualitatively assess student teachers’ development of collaboration skills, and to monitor students’ progress and satisfaction in their tandems, student teachers 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: 6 of them assessing goal-orientation, 4 addressing task-solving strategies, 8 assessing cohesion and 4 on the assumption of responsibility. One item clarifies social desirability and one asks for conflict solving skills. The questionnaire is 4-point Likert scaled. Additionally, there are two impulse questions for the student teachers 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 enabling them to control confounding elements.

3.2.2.4 Data Collection

The research study is conducted in a pre-post design, meaning that student teacher attitudes and concepts are recorded before and after different phases of intervention. The first testing takes place before the seminar (PreTest). After the academic course work block, the second testing is conducted (Post1Test). The third testing is done after the practical phase at schools (Post2Test; cf. figure 7). Testing is conducted in a paper-and-pencil manner during meetings at the university, which guaranties a 100% response rate. Also, testing is conducted

anonymously by using a code-system for each participant to facilitate unambiguous allocation.

Figure 1. Design of Academic Course and Research Study

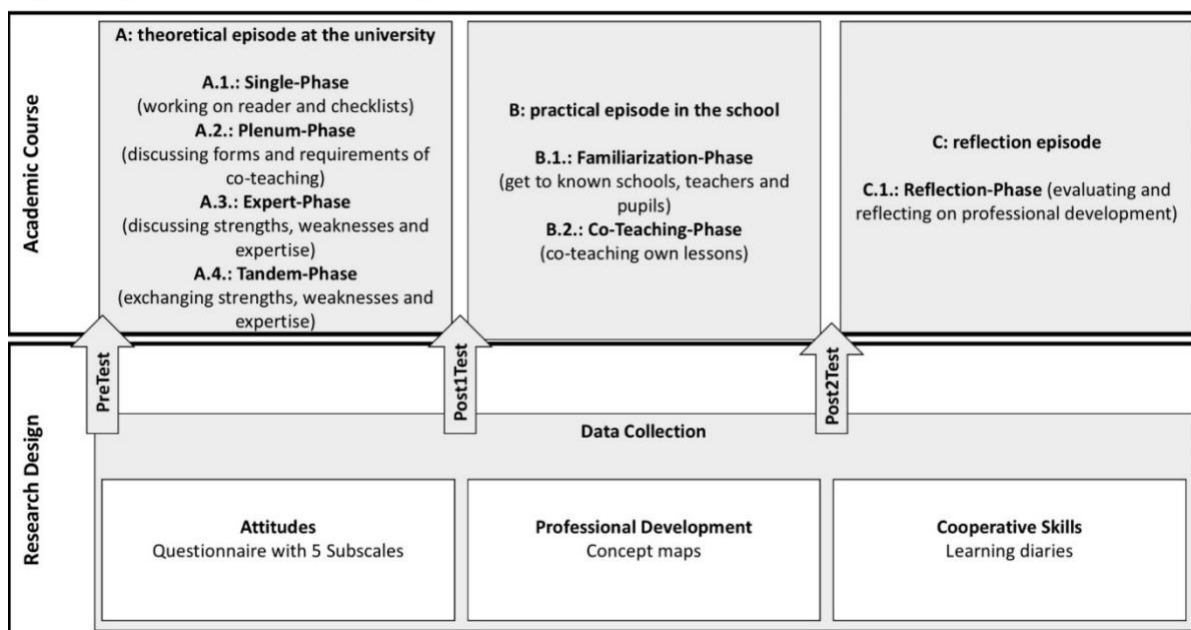


Figure 7. Design of academic course and research study

3.2.3 Intended Analysis

3.2.3.1 Analysis of quantitative data/attitudes.

Prior to the evaluation of the questionnaire, there will be a confirmatory factor analysis (CFA) to confirm the representation of the subscales by the measured variables.

As the leading question triggers a difference hypothesis, the questionnaires will be evaluated quantitatively using t-Test and Analysis of Variance (ANOVA) with repeated measurement. Thus a comparison of student teacher attitudes in mono-professional and multi-professional teams at given test times and the development over time may be drawn. The leading question for this study is to investigate how collaboration in multi-professional teams compared to collaboration in mono-professional teams affects student teacher attitudes towards inclusion. With the help of t-Tests and ANOVA, the mean values for each subscale at every given test time of student teachers of multi-professional tandems and student teachers 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.

3.2.3.2 Analysis of qualitative data/concepts.

The descriptive analysis of the concept maps is conducted under graph-theoretical aspects such as denseness of links, elaborateness, ruggedness, degree of centrality, and graph structure (cf.: Stracke, 2004). These analyses give 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 are analyzed qualitatively by performing an inductive, summarizing qualitative content analysis (Mayring 2008) of the propositions produced by the connections between the concepts. This analysis leads to the creation of a reference concept map, which may then be used to deductively categorize the concept maps of all participating student teachers for all times of measurement. This allows for the analysis of student teachers' knowledge growth after the theoretical episode and the practical episode, the comparison of knowledge growth of the student teachers who work in multi-professional tandems and those who work in mono-professional tandems, as well as the determination and comparison of the extent of knowledge transfer within multi-professional and mono-professional tandems.

The guiding research question is to investigate how collaboration in multi-professional teams compared to collaboration in mono-professional teams affects student teacher professional knowledge of inclusion. The qualitative analysis of the concept maps brings about answers these questions, namely the comparison of the effect of multi- or mono-professional co-teaching on student teachers' concepts of inclusive education.

3.2.3.3 Analysis of mixed-method data/collaboration skills.

The questionnaires of the weekly learning diaries are 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 allow for an analysis of a connection between the development of the skills and the affiliation to one of the groups, either multi- or mono-professional.

The answers to the impulse questions are analyzed using an inductive, summarizing qualitative content analysis (Mayring, 2008). Lisch and Kriz (1978) define content analysis as the trial to reconstruct 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 drawn from the data.

This mixed-method approach is considered by the authors to provide comprehensive data about student teachers' perception of collaboration as well as their satisfaction with their partners. This may be helpful in order 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.

3.2.4 Discussion

The presented paper outlines a seminar-concept that offers student teachers the opportunity to gain knowledge about inclusion and to experience inclusion at schools in a team of either one student teacher for SEN and one for GE (multi-professional tandem) or in a team of two student teachers for SEN or two student teachers for GE (mono-professional tandem). The seminar was jointly developed by experts in special and general education at schools as well as teacher training at university; it is an interdisciplinary teaching-learning-arrangement. The participating student teacher 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; assessment will be conducted in the upcoming four university-terms (until end of 2018).

3.2.4.1 *On the Theory*

Within the research study, student teachers' attitudes are assessed. Attitudes are not equal to behavior, which means that merely positive attitudes do not guarantee for adequate professional action. Yet attitudes are considered to be central predispositions for planned behavior and therefore they often are 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 by no means intention of the seminar to promote positive attitudes in student teachers. Attitudes here are only seen as a measurable category for the evaluation of the effect of the seminar.

During the seminar, student teachers collect experience in and gain knowledge about inclusive education. With this, there also comes about a change of the attitudinal object, which may result in measuring different things at the 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.

3.2.4.2 *On the Method*

3.2.4.2.1 Academic course.

The seminar is embedded in an obligatory, yet not subject-oriented research project and student teachers who choose to attend it are typically the ones who are very interested in inclusive education at schools. Furthermore, as the seminar constitutes a quite heavy workload for student teachers, 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 only allow for a statement about multi- and mono-professional teams in the project. Particularly the quantitative data will have to be checked for ceiling effects. The effect of the seminar-concept on all student teachers at this university will have to be evaluated after it has been made part of the curriculum.

The points stated above 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 base will have to follow.

A further limitation of the research study is that student teachers 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, student teachers gain their experience at different schools with different realizations of inclusive education and different support and guidance by the teachers. This means that 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; which, however, are difficult or even impossible to control in this practical and explorative approach. Student teachers write an entry into their learning diary for each day at the schools, the intention being to give the 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. Also, 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. Yet the results of this research study have to be interpreted considering these conditions.

Moreover, there may be the danger of the instructors taking influence on mono-professional tandems. However, it is the same instructors for all seminars and participating students. The instructors distanced themselves from any positioning and explicitly explained that i) it is the research question to find out any differences of the effects of multi- and mono-professional co-teaching, that ii) they are not in favor of one or the other form of co-teaching, and that iii) there are no good or better attitudes and concepts.

3.2.4.2.2 Instruments.

The evaluation instrument intended to be used to record student teachers' attitudes in this research study is a composition of subscales of different questionnaires. The questionnaires the subscales were taken from are validated and approved; however, the newly composed instrument has not been validated prior to use in this research study. The authors are aware of the possibility that this new composition might influence student teachers' response behavior. Therefore, a confirmatory factor analysis (CFA) will be conducted after the data collection to support the factor loadings of the individual items on the respective subscales.

Furthermore, the questionnaire assesses explicit attitudes, which might trigger responses according to the social norm. This is a limitation of all research about attitudes and difficult to evade. As the instructors of the seminar are also those conducting the survey, there is the risk of obtaining supposedly favorable responses. The attempt is made to counteract this limitation by explicitly stating that there is no definition of "good" or "better" attitude and the grading of the seminar is not dependent 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 used in order to visualize student teachers' concepts of inclusion. Student teachers 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 before the first testing time and repeated before each following 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 student teachers.

3.2.4.3 Implementation and Implications

Successful inclusive education needs multi-professional collaboration. Multi-professional teaching in schools in turn has the requirement of training multi-professional collaboration at universities as a preparation for student teachers. As an interdisciplinary teaching-learning

arrangement, the conception and implementation of this seminar requires a change of thinking 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 Education. 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 the seminars usually offered to student teachers.

Besides 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 student teachers 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 change of thinking with respect to the course of study of teacher training at the university.

Despite the aforementioned limitations of the study design, the authors are convinced it will provide valuable insights into the seminar's effect on student teachers' 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, student teachers 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-efficacy and for this reason on their attitudes as predispositions for professional action.

So far, the entanglement of theory and practice during teacher training has not been accomplished satisfactorily (Fraefel, 2012), even though student teachers 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 student teachers have little

opportunity to complete their field experience in inclusive classes. During the practical phase of this seminar, student teachers 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 the cognition that is important for professional action, if they are organized as problem-oriented learning arrangements. However, Reusser, Pauli & Elmer (2011) state that personal dispositions and attitudes are decisive factors for the transfer of professional competence into professional acting. Working in a multi-professional team may provide more opportunity to increase knowledge and competence and hereby perceived self-efficacy which leads to professional acting in inclusive classrooms.

3.2.5 Conclusion

In order to meet the demands of inclusion, teacher training needs to focus and to implement collaboration and co-teaching at the university stage. In-service teachers greatly benefit from a multi-professional collaboration of teachers for GE and teachers for 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 for pre-service teachers as well, especially since most universities may have problems to establish a multi-professional collaboration of student teachers (e.g. because the university does not offer the course of studies for SEN).

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

The aim of the study is to investigate the effect of the academic course on student teacher 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 based on empirical evidence focusing on the preparation of student teachers for inclusion.

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3.3 Effect of same compared to different-discipline co-teaching on pre-service teachers' attitude towards inclusive education and their collaboration skills (*Research Paper 3, peer reviewed*)

Effect of same-discipline compared to different-discipline co-teaching on pre-service teachers' attitude towards inclusive education and their collaboration skills

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Abstract:

The present study evaluates the effect of a seminar on teacher trainees' preparedness for inclusion. Teacher trainees of GE and those of SEN work in different- or same-discipline tandems to jointly plan and conduct lessons in inclusive classes. Assessments of attitudes and collaboration skills were conducted at three different testing times. All teacher trainees developed significantly higher collaboration skills. Teacher trainees in different-discipline tandems developed more positive attitudes than those in same-discipline tandems. Particularly trainees of GE in different-discipline tandems developed higher confidence with regard to inclusive teaching. Thus, the seminar makes for a suitable preparation for inclusive teaching.

Keywords: Co-teaching; attitude; inclusive education; pre-service teachers; teacher training; collaboration skills

Effect of Same-discipline Compared to Different-discipline Collaboration on Teacher Trainees' Attitudes towards Inclusive Education and their Collaboration Skills

3.3.1 Introduction

Following the United Nations Convention on the Rights of Persons with Disabilities, children must not be excluded from the general education system on the basis of disability (United Nations, 2006, p.17). Instead, “State Parties shall ensure an inclusive education system at all levels [...]” (ibid., p16). The UN-Convention was preceded by The Salamanca Statement on Principles, Policy and Practice in Special Needs Education in 1994 (UNESCO, 1994), in which 92 governments agreed upon fundamental policy shifts to promote the approach of inclusive education. Therefore, inclusion of children with special educational needs in mainstream schools has been encouraged through legislation internationally for over 20 years. In Germany, the Convention was ratified in 2007 and incepted in 2009. Since then, the traditional school-system has had to deal with many changes integrating the joint education of children with and without special educational needs.

Despite the UN demand for State Parties to ensure an inclusive education system, there is neither a generally accepted definition nor operationalizable characteristics of the term inclusive education (cf.: Farell, 2004; Göransson & Nilholm, 2014; Author et al., 2016). In addition, teachers do not feel adequately prepared to provide lessons that meet the diverse needs of all pupils in a heterogeneous class (Fakolade, Adeniyi, & Tella, 2009; VBE, 2017). For the vagueness of the definition and the insufficient preparation, teachers struggle to realize inclusive education in the classroom, as they function within an approach that depends on trial and error (Grosche, 2015).

In 2015, the German Conference of University Rectors resolved that inclusion must be a topic within the first phase of teacher training (HRK, 2015). The resulting recommendations state that teacher training should be oriented towards a school of diversity, which is to be seen as a cross-section task for all disciplines (HRK, 2015; Moser & Demmer-Diekmann, 2012, p. 159). The development of competencies for an inclusive educational system, including basic special educational skills, should be anchored in the curriculum of all teacher training programs (HRK, 2015, p. 3).

In order to create a successful inclusive school system, teacher training has to be prioritized (e.g. Seitz, 2011; Engelbrecht, 2013; Lütje-Klose, Miller, & Ziegler, 2014). Particularly the ability to collaborate in teams (Solis, et al., 2012; Pancsofar & Petroff, 2013; Lütje-Klose & Urban, 2014) as well as the development of positive attitudes towards inclusion and heterogeneity (Avramidis, Bayliss, & Burden, 2000; Avramidis & Norwich, 2002; de Boer, 2012) are seen as important prerequisites for successful inclusive education.

3.3.1.1 *Co-teaching*

Collaboration of teachers is often referred to as co-teaching, which 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). In the context of inclusive education, co-teaching may be defined as the partnering of a general education teacher (henceforth referred to as GE) and a special education teacher (henceforth referred to as SEN) for the purpose of jointly delivering instruction to a diverse group of students, including those with disabilities or other special needs, in a general education setting (Friend, 2008). This definition of co-teaching provides the basis for its application in the present study; however, for the purpose of the study it is expanded to also include the partnering of same-discipline teacher trainees, i.e. either two teacher trainees for GE or two for SEN.

Johnson (2015) points out that one decisive advantage of co-teaching is that children with different needs can have access to the same learning content, because instruction can be differentiated by the two specialists. Thereby, not only the pupils benefit, but also the two teachers of different-disciplines profit from the increase of their professional knowledge through debating different approaches of teaching and exchanging expertise. Moreover, teachers report to have gained more positive attitudes towards co-teaching through its experience and to have developed the belief that the needs of students with special educational needs are better served in co-taught classes (Scruggs, Mastropieri, & McDuffie, 2007).

Also, research supports that teachers' self-efficacy beliefs influence their teaching behaviour and their pupils' motivation and performance (Klassen & Chiu, 2010). Co-teaching, therefore, leads to the gaining of positive experiences in inclusive classes, which in turn leads to a higher perception of teaching efficacy and possibly to a more positive attitude towards inclusion.

Yet, research shows that real, genuine collaboration is not achieved by the mere presence of two teachers in one classroom; equitable team-teaching with shared responsibility seems to be a rare practice (Strogilos & Tragoulia, 2013). Jurkowski and Müller (2018) surveyed 13 newly formed teaching dyads in a longitudinal study to examine teachers' cooperation behaviour. After one year, the professional cooperation remained constant at a low level for both dyad members. Moreover, the dyads participating in the study failed to develop as a teaching dyad with a shared view and understanding about their cooperation (ibid, p. 229). This means that there is a need to train teachers to be able to co-teach and develop a shared view and understanding about the cooperation (Chitiyo & Brinda 2018).

3.3.1.2 Attitudes

Attitudes are defined as predispositions for a particular response towards a specified class of objects (Rosenberg & Hovland, 1969). Eagly and Chaiken (1993), among others, state that attitude as a theoretical construct is specified as a multi-dimensional model with three components: (1) cognitive (evaluative beliefs), (2) affective (feelings and sentiment), and (3) behavioural (behaviour intentions). Some research perspectives focus on attitude and its relation with other dependent variables. Following Ajzen's (1985) Theory of Planned Behaviour, it is attitudes towards behaviour, subjective norms, and perceived behavioural control that are known to predict intentions, which in turn predict behaviour. The importance of positive attitudes as predictors of behaviour that promotes successful inclusion, therefore, has been demonstrated in several international studies (Sharma, et al., 2006; de Boer, 2012; Heyl et al., 2014). Holding positive feelings towards children with SEN leads to positive beliefs and high perceived behavioural control levels, which in turn lead to higher levels of behavioural intentions (MacFarlane & Woolfson, 2013, p. 51). Positive attitudes, therefore, are crucial pre-requisites for inclusion-promoting behaviour.

3.3.1.3 Relation between attitude and co-teaching at the pre-service level

Several studies report a relationship between specialized training and positive attitudes (Sari, 2007; Avramidis & Kalyva, 2007; Kurniawati, de Boer, Minnaert, & Mangunsong, 2016). Sari (2007) evaluated an in-service teacher training programme on teacher attitudes towards inclusion. The results show that an increased knowledge level leads to positive attitude changes of teachers (ibid, p. 7). Moreover, MacFarlane and Woolfson (2013) found a positive correlation between the attendance in in-service teacher training

programmes and teachers' feelings towards pupils with SEN. Additionally, teachers with more positive beliefs and higher levels of self-efficacy were found to have greater intention and commitment to teaching pupils with SEN in their classrooms (ibid, p. 51). Therefore, assuming that effective and equitable co-teaching in different-discipline teams not only serves the needs of all pupils in the classroom, but also leads to the development of professional knowledge and higher perceived self-efficacy (Scruggs, Mastropieri, & McDuffie, 2007), it also may lead to more positive attitudes toward inclusion. Positive attitudes, in turn, are essential for successful inclusive education (de Boer, 2012), as they are predictors of behaviour in the classroom.

This has been demonstrated for in-service teachers in several research publications, but has not yet been investigated for pre-service teachers. Strieker, Gills and Zong (2013) investigated the effect of a seminar on co-teaching for pre-service middle school teachers on their attitude towards co-teaching, but not attitude towards inclusive education.

Furthermore, research shows that collaboration has to be trained in order to be advantageous for inclusive education (Chitiyo & Brinda, 2018). In that context it is mostly the necessity of different-discipline collaboration that is stressed to be a prerequisite for successful inclusive education (Friend, 2008). In the first phase of teacher training at the university, structures are relatively rigid and thus facilitating different-discipline collaboration of teacher trainees to train collaboration skills can be rather difficult. The present study, therefore, sets to investigate the effect of different-discipline, in comparison with same-discipline, co-teaching of teacher trainees for GE and for SEN on their attitudes toward inclusion. Hence, this is the first study to combine both the evaluation of collaboration skill-development in different- and same-discipline teams and its effect on teacher trainees' attitudes towards inclusive education.

The research questions for the present study are

What is the effect of a seminar, in which teacher trainees collaborate in a different- or same-discipline team to plan and conduct lessons in inclusive classes, on the participants' attitudes towards inclusion and their collaboration skills?

In detail, this means:

(a) Is there a difference in developing attitude change between teacher trainees in different-discipline and those in same-discipline teams?

(b) Is there a difference in developing attitude change between teacher trainees for GE and those for SEN?

(c) Considering teacher trainees for GE or those for SEN individually: is there a difference between those members who worked in different-discipline and those who worked in same-discipline teams?

3.3.2 Methodology and methods

3.3.2.1 Academic course

Basis for the investigation is a newly designed, common academic course for teacher trainees for SEN and teacher trainees for GE at the University of Wuppertal, Germany (for a detailed description of the seminar design see Author et al., in press). The seminar was first offered in the summer-term 2016 (April to September), and following that in four subsequent terms until summer-term 2018. The seminar consists of three different episodes: (1) a theoretical episode at the university, (2) a practical episode in an inclusive class of a secondary school, (3) and a reflection episode at the university (see figure 8).

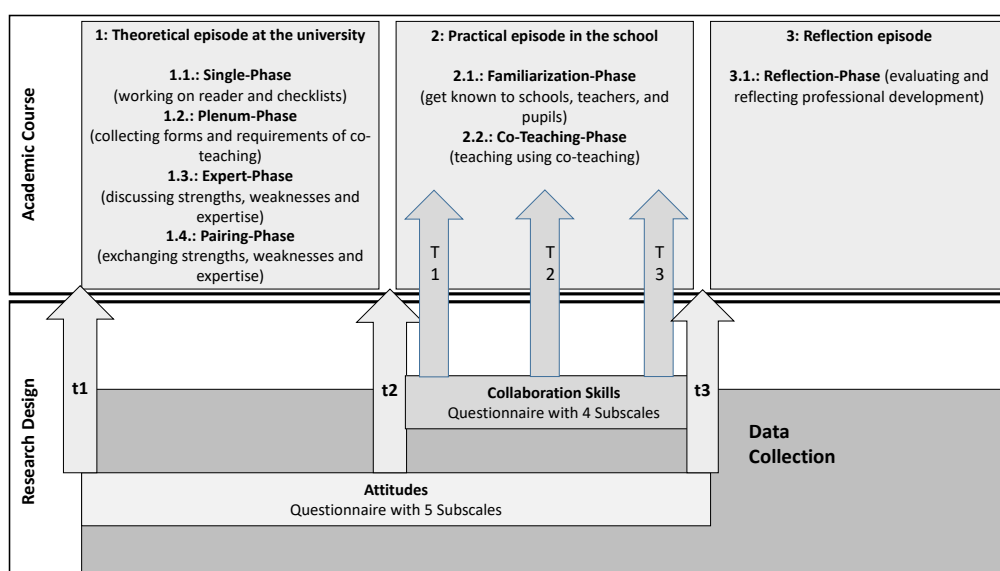


Figure 8: Seminar- and research-design

During the theoretical episode at the university (1), teacher trainees have to deal with topics concerning educational inclusion, such as the theoretical background of co-teaching, subject-specific educational methodologies and strategies for inclusive settings, or mediation techniques and aids for different special educational needs. Additionally, teacher trainees reflect on their personal and professional characteristics and their expectations of themselves and the team-partners. Teacher trainees are then matched into tandems to form either same-discipline (two teacher trainees for GE or two teacher trainees for SEN) or different-discipline (one teacher trainee of GE and one teacher trainee of SEN) teams.

During the practical episode (2), the teaching dyads spend one complete school morning per week in inclusive classes at local schools for a period of twelve consecutive weeks (one complete university term). After having familiarised with the pupils and teachers in the class, they planned and conducted lessons on their own responsibility, but under the guidance of the subject teacher and the teacher for SEN at the schools. Lessons are given in one of the studied subjects of the two teacher trainees in the teaching dyad; they are planned and conducted in co-construction (cf.: Gräsel, Fußangel, & Pröbstel, 2006), meaning that both partners jointly worked out a lesson plan which they then jointly executed. Within that planning phase, the teacher trainee for GE was the expert concerning the content matter and didactics, while the teacher trainee for SEN was the expert for the appropriate teaching methods and differentiation in order to serve all pupils' needs. Within the teaching phase, teacher trainees chose an appropriate form of co-teaching (i.e. one-teach-one-assist, one-teach-one-observe, team-teaching,...). In all cases, however, the responsibility for all pupils in the class was shared between the two partners. Therefore, both partners' expertise was needed to provide access to the subject content for all pupils in the class. The teacher trainee-teams planned and conducted an average of 9 lessons on their own responsibility.

According to Allen and Wright (2014), it is particularly important to maintain accompanying concepts that offer continuous learning opportunities and optimization of the theory-practice relationship. Therefore, the teacher trainees wrote learning diaries for each school-day, which were given to the university instructors. Additionally, the instructors at the university visited the teacher trainees in their schools to sit in on their lessons and give feedback on teaching and collaboration practices.

At the end of the practical phase there is an episode of reflection (3), in which experiences are discussed on a meta-level with the instructors at the university, the intention of this episode being to facilitate the recognition of the knowledge acquired through the practical experience and co-teaching.

3.3.2.2 Research Design

The effect of the academic course on teacher trainees' attitudes towards inclusive education is evaluated at three different points of time during the course. The pre-testing (t1) is conducted before the academic course begins, the post-theory testing (t2) is done after the theoretical episode and the post-practise test (t3) follows after the practical phase and before the reflection episode (see figure 1). The assessment of the development of teacher trainees'

attitudes is done with the help of a questionnaire consisting of five subscales: Subscale (1) *Belief in inclusive education* to assess pre-service teachers' readiness for inclusive education; it was developed and validated by Przibilla et al. (2016). Subscales (2) *Attitudes towards the effect of inclusive education*, (3) *Attitudes towards the organisation of inclusive education*, (4) *Self-efficacy with regard to the organisation of inclusive education* were taken from the KIESEL-instrument developed and validated by Bosse & Spörer (2014). They were chosen to assess attitude and self-efficacy with regard to inclusive education of pre-service teachers as they appeared to be thematically fully appropriate and they are widely used in research on attitude towards inclusive education (e.g.: Lübke, Meyer, & Christiansen, 2016). Moreover, they showed good internal consistencies in their validation (Cronbach's $\alpha > .07$) as well as high factor correlations within the instrument and in comparison with other instruments (cf.: Gorges, Neumann, Grüter, & Weise, 2018). Subscale (5) *Perception of professional roles and function* stems from the TATI-instrument developed by Cullen (2008) to assess attitude towards co-operation in inclusive settings. This subscale was chosen to assess the central facet of attitude of this study, namely the attitude towards different-professional collaboration. Like the KIESEL instrument, the TATI scale showed acceptable internal consistency (average Cronbach's $\alpha .82$) and good factor loadings (cf. Cullen, 2010). Also, like the KIESEL instrument, it is widely used in research, e.g. Sharma and Nuttal (2016). All subscales are Likert-scaled, in the case of subscales (1), (2), (3), and (4), it is a 4-point scaling, in subscale (5), it is a 7-point scaling ranging from 1 = *do not agree at all* to 4 = *completely agree* (table 4).

The effect of the seminar on teacher trainees' collaboration skills is assessed with the help of a collaboration questionnaire (*Fragebogen zur Arbeit im Team FAT [Questionnaire for working in a team]*, Kauffeld, 2004). It consists of 24 items to cover the subscales (1) *goal orientation*, (2) *task-accomplishment*, (3) *cohesion*, and (4) *assumption of responsibility*. The items are 4-point-Likert-scaled from 1 = *always applies* to 4 = *never applies* (table 5). This questionnaire is a diagnostic instrument within the field of work- and organisation psychology; it assesses significant contents of teamwork and as such is used in several international studies (e.g. Figl and Saunders, 2011; Körner, 2008; Gebhard et al., 2014). The questionnaire was completed weekly as part of a learning diary entry. For the evaluation of the development, the first (T1), sixth (T2), and twelfth (T3) completed questionnaires were analysed.

The questionnaires were completed in a paper-and-pencil manner. To maintain anonymity, teacher trainees used individualised codes to label their questionnaires to ensure that the questionnaires of the different testing times can be tracked back to one, unknown person (for a detailed description of the research design and the instruments used please refer to Author et al., 2018).

Table 4. Subscales, example items and internal consistencies (Cohen's alpha, α) for the attitude questionnaire

Subscale	Number of items	Likert-scaling	Example item	α validation	α this study
(1) Welcoming Inclusion	7	1-4	For inclusion to be successful, there has to be cooperation between general teachers and teachers for SEN	.64	.66°
(2) Attitude towards the effect of inclusive education	4	1-4	Pupils with disabilities have higher academic achievements if they are taught in mainstream classrooms	.74	.78
(3) Attitude towards the organization of inclusive education	4	1-4	Lessons can, on principle, be designed so that they meet the needs of all children	.77	.88
(4) Self-efficacy with regard to the organization of inclusive education	4	1-4	I am convinced that I can provide suitable learning opportunities for every child, even with the biggest performance differences	.73	.85
(5) Perception of professional roles and functions	4	1-7	All pupils benefit from team teaching; that is, the pairing of a general and a special education teacher in the same classroom	.68	.65°

Note. °Cronbach's alpha values are slightly below the acceptable value of .7 in two subscales; however, for they are very close to .7, the subscales were used for analysis.

Table 5. Subscales, example items and internal consistencies (Cohen's alpha, α) for the collaboration questionnaire

Subscale	Number of items	Likert-scaling	Example item	α this study
Goal orientation	6	1-4	I identify myself with the goals of the team	.81
Task-accomplishment	4	1-4	The team members know about their tasks	.76
Cohesion	8	1-4	We talk open and freely with each other	.75
Assumption of responsibility	4	1-4	All our team members feel responsible for the results	.71

It is to be noted that internal consistency values are below the acceptable value of .7 in two subscales of the attitude-questionnaire. However, analysis was performed with the data of these subscales as the values are very close to the critical value.

3.3.2.3 Sample

The common seminar for teacher trainees for GE and for SEN was offered in five subsequent terms. Within that time, a total of 97 teacher trainees attended the seminar, 53 of which are teacher trainees for SEN and 44 are teacher trainees for GE; 63 teacher trainees formed a total of 32 different-discipline teams (one teacher trainee of GE was in a team with an in-service teacher for SEN), 34 teacher trainees formed a total of 17 same-discipline teams. 80 participants were female. On average, the participants are 22.9 years old, with a standard deviation of 3.2 years. The teacher trainees for SEN are in their Bachelor's programme in their second or third semester, the teacher trainees for GE are in their Master's programme (semester 2, 3 or 4). 81% of all participants reported to have had practical experience in schools already; 66% reported to have had experience with pupils with SEN in schools and 56 % reported to have had experience with children with SEN in private

contexts. About half of the participants reported to have had attended seminars on inclusion prior to attending this common seminar, 40% reported to have had attended seminars on the topic of co-teaching.

3.3.2.4 Data analysis

As the data structure is hierarchical with regard to the dyads, we calculated a multilevel analysis using hierarchical linear models (Richter & Naumann, 2002) to test whether there is a significant variance of intercepts and slopes when modelling the dyads as level 2 variables (Schmitz, 2019). First of all, empty models, that is models with only level 1 fixed factors, were designed. Then the dyads were modelled as level 2 factor with random intercept; the LogLikelihood-ratio-test of the two models revealed no significant difference between the fit of the two models. This means there is no significant variance for the intercept on level 2 and the model fit could not be improved. Therefore, to test for differences in the mean scores of the individual subscales, and also for differences in the collaboration-skills and attitude changes over time between the different groups and courses of study, the influence of the dyads on the individuals' attitude- and collaboration skills-development was ignored and ANOVAs with repeated measurement were performed to account for the non-independence of the data on time. The significance level was set at $p \leq 0.05$.

3.3.3 Results

Attitudes were assessed at three different testing times to evaluate the effect of both the theoretical and the practical episode of the seminar (before the seminar = t1, after the theoretical episode = t2, after the practical episode = t3). Collaboration skills were assessed at three testing points as well (beginning = T1, middle = T2, and end of the practical episode = T3)

All collected data are normally distributed; the subscales in the two used questionnaires show acceptable to good internal consistencies (Cronbach's alpha between .65 and .88 for the attitude questionnaire and .71 and .81 for the collaboration questionnaire). Even though Cronbach's alpha is below the critical value of .7 for two subscales, they were considered acceptable in this study as (1) one of these less reliable subscales (i.e. *Welcoming inclusion*) does not display significant changes and (2) the value of the other one (i.e. *Perception of Professional Roles*) is fairly close to the critical value of .7. However, interpretation of results for this subscale has to be done in the light of this fact. As questioning is done during obligatory parts of the academic course, the return rate is 100%.

3.3.3.1 Comparison of attitude change of teacher trainees in same- or different-discipline teams

Across all items, there is a significant main effect of time ($F(2, 190) = 5.29, p = .006$) with an estimated effect strength of $\eta^2 = .053 \triangleq$ Cohen's $d = .47$ (medium effect). In addition, there is a significant interaction effect of time and kind of team (different or same-discipline) ($F(2,190) = 3.79, p = .024$) with an effect strength of $\eta^2 = .038 \triangleq$ Cohen's $d = .40$ (small to medium effect).

When looking at the subscales, there are significant effects of time in three of five subscales, a significant effect of group in the subscale *effect of inclusive education*, and a significant interaction effect of time and team-constellation in the subscale *Organization of inclusive education* (table 6).

Table 6

Teacher trainees in different-discipline (DD) vs. same-discipline (SD) teams: comparison of means at t1, t2 and t3

Subscale	T1		T2		T3		P (F if significant)		
	DD M(SD)	SD M(SD)	DD M(SD)	SD M(SD)	DD M(SD)	SD M(SD)	time-effect	group-effect	interaction-effect
Welcoming Inclusion	3.11 (.34)	3.15 (.28)	3.16(.32)	3.13 (.30)	3.07 (.34)	3.13 (.36)	.44	.69	.47
Effect of inclusive education	3.40 (.32)	3.33 (.37)	3.47 (.33)	3.29 (.40)	3.25 (.45)	3.02 (.64)	<.001*** F(2,190)=20.5	.04* F(2,95) = 1.6	.20
Organization of inclusive education	2.99 (.60)	3.18 (.63)	3.19 (.52)	3.02 (.76)	3.25 (.56)	3.19 (.61)	.053	.89	.01* F(2,190)=4.69
Self-efficacy	2.68 (.49)	2.88 (.55)	2.87 (.46)	2.99 (.46)	3.11 (.45)	3.15 (.49)	<.001*** F(2,190)=25.7	.28	.18
Perception of professional roles	3.41 (.39)	3.53 (.38)	3.60 (.33)	3.60 (.40)	3.61 (.35)	3.66 (.34)	.001*** F(2,190)= 7.8	.40	.36

Note. N=63 for DD teams, N=34 for SDteams

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$

For subscale (2) *attitudes towards the effect of inclusive education*, there is a significant change to the less positive, both for the data of members in different- and those in same-discipline teams. This indicates that teacher trainees' expectations regarding the effect of inclusive education were not met in practice.

3.3.3.2 Comparison of attitude change of teacher trainees of SEN and teacher trainees of GE

Across all items and testing times, significant main effects of time ($F(2, 190) = 9.31, p < .001$; $\eta^2 = .089 \triangleq$ Cohen's $d = .63$, medium effect) and group - teacher trainees of SEN or of

GE - ($F(1,95) = 7.00, p = .01$; $\eta^2 = .069 \triangleq$ Cohen's $d = .54$, medium effect) become apparent. There is no interaction effect to be found.

When considering the subscales individually, there are main effects of time in the subscales addressing organization of inclusive education, self-efficacy, and perception of professional roles. The scores in these subscales change to the more positive, while the scores for the subscale addressing the effect of inclusive education significantly changes to the less positive. There are main effects of group (teacher trainees for SEN compared to those for GE) in the subscales addressing organization and self-efficacy. Also, there is a significant interaction effect of time and course of study in the subscale addressing the organisation of inclusive education (table 7).

Table 7

Teacher trainees for SEN vs. for GE: comparison of means at t1, t2 and t3

Subscale	T1		T2		T3		P (F if significant)		
	SEN M(SD)	GE M(SD)	SEN M(SD)	GE M(SD)	SEN M(SD)	GE M(SD)	time-effect	group-effect	interaction-effect
Welcoming Inclusion	3.11 (.30)	3.15 (.33)	3.11 (.32)	3.19 (.30)	3.10 (.39)	3.09 (.31)	.20	.42	.56
Effect of inclusive education	3.45 (.32)	3.29 (.35)	3.43 (.33)	3.38 (.40)	3.24 (.52)	3.09 (.54)	<.001*** F(2,190)=20.2	.39	.09
Organization of inclusive education	3.33 (.45)	2.73 (.64)	3.25 (.52)	2.99 (.63)	3.33 (.60)	3.10 (.61)	.004** F(2,190)=5.6	.001*** F(2,95)=12.5	.002*** F(2,190)=6.5
Self-efficacy	2.92 (.50)	2.54 (.47)	3.05 (.38)	2.75 (.50)	3.33 (.44)	2.87 (.36)	<.001*** F(2,190)=31.2	<.001*** F(2,95)=26.8	.20
Perception of professional roles	3.44 (.41)	3.47 (.36)	3.57 (.38)	3.63 (.32)	3.64 (.36)	3.62 (.34)	<.001*** F(2,190)=9.9	.73	.59

Note. N=53 for SEN, N=44 for GE * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$

3.3.3.3 Comparison of attitude change of teacher trainees for SEN and teacher trainees for GE in dependence of their team-constellation

Across all items and testing times, there are no significant effects, neither main nor interaction, for trainees of SEN, whereas in the data of trainees of GE there is a significant main effect of time ($F(2, 84) = 4.19$; $p = .018$) with an effect strength of $\eta^2 = .091 \triangleq$ Cohen's $d = .63$ (medium effect; figure 9). Additionally, there is an interaction effect of time and kind of team which, although not being significant, shows a medium effect of $\eta^2 = .064 \triangleq$ Cohen's $d = .52$ ($F(2, 84) = 2.88, p = .062$).

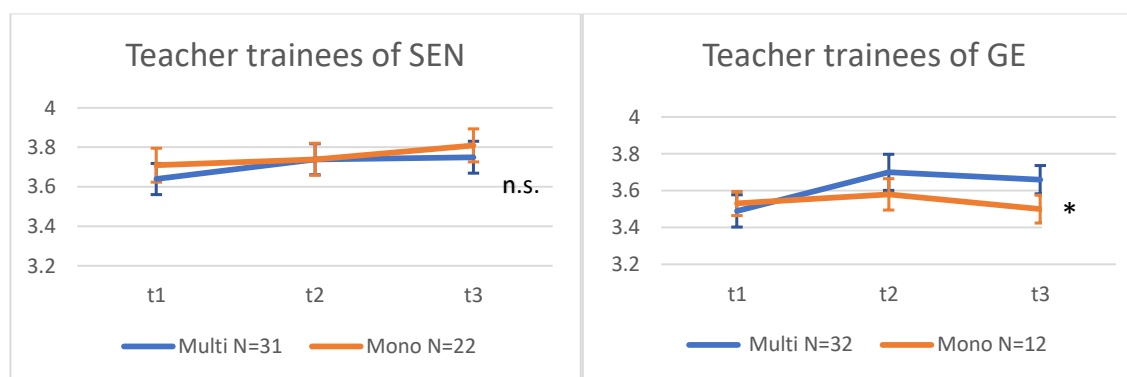


Figure 9: Development of attitude of teacher trainees for SEN and those for GE in different- and same-discipline teams: mean scores across all items and testing times (ANOVA)

When considering trainees of GE only, there are no significant differences between the mean scores of participants in different and those in same-discipline teams before the seminar (t1), which supports that the differences after the seminar are an effect of exactly that. Across the three testing times, there are significant main effects of time in the subscales addressing effect, organization and self-efficacy regarding inclusive education. While scores change to the more positive in the subscale organization and self-efficacy, they change to the less positive in the subscale effect of inclusive education. Additionally, there are two significant interaction effects of time and team constellation, namely in the subscales addressing effect and organization of inclusive education (table 8).

Table 8

Teacher trainees for GE in different-discipline (DD) compared to same-discipline (SD) teams: comparison of means at t1, t2 and t3

Subscale	T1		T2		T3		P (F if significant)		
	DD M(SD)	SD M(SD)	DD M(SD)	SD M(SD)	DD M(SD)	SD M(SD)	time-effect	group-effect	interaction- effect
Welcoming Inclusion	3.13 (.34)	3.17 (.29)	3.20(. 31)	3.17 (.29)	3.09 (.31)	3.05 (.34)	.16	.90	.73
Effect of inclusive education	3.30 (.35)	3.27 (.38)	3.47 (.32)	3.15 (.50)	3.20 (.45)	2.78 (.54)	<.001*** F(2,42)=11.66	.035* F(1,21)=4.76	.027* F(2,42)=3.77)
Organization of inclusive education	2.76 (.63)	2.64 (.71)	3.16 (.54)	2.54 (.85)	3.17 (.57)	2.93 (.71)	.003** F(2,42)=6.43	.081	.031* F(2,42)=3.64
Self-efficacy	2.52 (.43)	2.62 (.59)	2.73 (.49)	2.81 (.55)	2.93 (.39)	2.73 (.25)	.002** F(2,42)=6.57	.973	.082
Perception of professional roles	3.44 (.34)	3.55 (.43)	3.60 (.31)	3.75 (.37)	3.63 (.29)	3.61 (.44)	.012* F(2,42)=4.69	.38	.35

Note. N=32 for trainees of GE in DD teams; , N=12 for students for GE in SD teams

*p≤.05, **p≤.01, ***p≤.001

When looking at the participants in same-discipline teams only, it becomes apparent that besides the main effect of time in the subscale addressing the effect of inclusive education, there are significant main effects of group (teacher trainees for SEN compared to those for GE) for the subscales addressing organization of inclusive education and self-efficacy with regard to inclusive education. For both subscales, teacher trainees for GE score significantly less positive (table 9).

Table 9

Teacher trainees for SEN and GE in same-discipline (SD) teams: comparison of means at t1, t2 and t3

Subscale	T1		T2		T3		P (F if significant)		
	GE M(SD)	SEN M(SD)	GE M(SD)	SEN M(SD)	GE M(SD)	SEN M(SD)	time-effect	group-effect	interaction- effect
Welcoming Inclusion	3.17 (.34)	3.15 (.28)	3.16(. 32)	3.13 (.30)	3.05 (.34)	3.16 (.36)	.74	.93	.35
Effect of inclusive education	3.27 (.37)	3.37 (.37)	3.15 (.50)	3.35 (.31)	2.79 (.68)	3.15 (.60)	<.001*** F(2,32)=7.99	.093	.37
Organization of inclusive education	2.65 (.71)	3.46 (.33)	2.54 (.85)	3.28 (.58)	2.94 (.71)	3.33 (.66)	.082	.002*** F(2, 16)=11.65	.099
Self-efficacy Perception of professional roles	2.63 (.58)	3.02 (.50)	2.81 (.55)	3.09 (.37)	2.73 (.25)	3.38 (.44)	.079	.002*** F(2,16)=11.53	.088
	3.55 (.38)	3.53 (.38)	3.75 (.37)	3.52 (.40)	3.61 (.43)	3.69 (.30)	.22	.63	.096

Note. N=22 for students for SEN, N=12 for students for GE

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$

3.3.3.4 Effect of the common seminar on all participants' collaboration skills and their attitudes towards inclusion

Teacher trainees' collaboration skills significantly improve across all items as well as in the individual subscales; the scores of all subscales change along the three testing times to show lower values and thus higher collaboration skills (table 10).

Table 10:

Development of Collaboration skills: means at T1, T2 and T3

Subscale	T1	T2	T3	F(df)	p
	M (SD)				
(I) Goal-orientation	1.9 (.47)	1.64 (.43)	1.51 (.41)	38.95 (2,192)	<.001***
(II) Accomplishment of tasks	1.8 (.55)	1.64 (.53)	1.58 (.47)	12.37 (2,192)	<.001***
(III) Cohesion	1.3 (.36)	1.25 (.38)	1.16 (.29)	6.55 (2,192)	.002**
(IV) Assumption of responsibility	1.5 (.44)	1.4 (.34)	1.3 (.31)	10.53 (2,192)	<.001***

Note. N=97

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$

As for the change of attitudes during the course of the seminar, the scores for all participants and across all items reveal a significant change to the more positive (table 8). Also, there is a significant change to the more positive when considering teacher trainees in

different-discipline teams only, even when splitting them up into the different courses of study. For teacher trainees in same-discipline teams, there is no significant change of attitude during the course of the seminar (table 11).

Table 11.

All participants, Teacher trainees for GE and for SEN in different-discipline (DD) vs. same-discipline (SD) teams: comparison of means of all items at t1, t2 and t3

	T1	T2	T3	F(df)	p
<i>All participants</i>	3.60(.31)	3.70(.29)	3.71(.29)	8.69 (2, 192)	<.001***
<i>All participants in DD teams</i>	3.56(.29)	3.72(.26)	3.71(.26)	16.01 (2, 124)	<.001***
<i>All participants in SD teams</i>	3.67(.33)	3.67(.34)	3.70(.34)	.17 (2,66)	.84
<i>GE in DD teams</i>	3.49(.26)	3.69(.27)	3.66(.20)	15.48 (2,62)	<.001***
<i>SEN in DD teams</i>	3.64(.31)	3.74(.25)	3.75(.31)	3.73 (2, 60)	.030*
<i>GE in SD teams</i>	3.53(.35)	3.58(.42)	3.50(.33)	.355 (2,22)	.70
<i>SEN in SD teams</i>	3.74(.30)	3.71(.28)	3.80(.33)	.954 (2,42)	.39

Note. N=63 for DD teams, N=34 for SD teams;

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$

3.3.4 Discussion

3.3.4.1 Comparison of attitude change of teacher trainees in mono- or different-discipline teams

The data of the present study clearly indicate that teacher trainees in different-discipline teams develop significantly more positive attitudes during the course of the seminar compared to teacher trainees in same-discipline teams. Both teacher trainees for SEN and those for GE develop more positive attitudes when they co-teach in different-discipline teams, while the scores remain stable for participants in same-discipline teams.

It could be surmised that the experience in a co-teaching team of two different-disciplines and mutual support leads to a transfer of expertise between the two partners, which in turn leads to the belief to be able to influence all pupils' outcomes. This has also been demonstrated by Scruggs et al. (2010) in a metasynthesis of qualitative research on co-teaching in inclusive classrooms. The data show that teachers generally considered different-discipline co-teaching to have contributed positively to their professional development (ibid, p. 401). Hereby, teachers for SEN report an increase on content knowledge, whereas teachers for GE noted a benefit of their skills in classroom management and curriculum adaptation. For the present study it is assumed that by integrating each others' skills and

expertise, teachers are better prepared to serve the needs of all pupils and influence their outcomes. In teams with partners of the same-discipline, a perceived ability gap might emerge, so that neither of the partners feels prepared to serve the needs of all pupils and therefore does not develop a higher self-efficacy expectation.

3.3.4.2 Comparison of attitude change of teacher trainees for SEN and teacher trainees for GE

Teacher trainees for GE develop significantly more positive attitudes concerning the organisation of inclusive education and the respective self-efficacy, indicating that there is a transfer of knowledge and expertise regarding teaching techniques in inclusive education. This is supported by the findings of McHatton and Daniel (2008), who extracted from their qualitative study to evaluate a co-teaching experience of teacher trainees for English and for SEN that the teacher trainees for English gained a greater understanding of supports available to meet the needs of diverse learners, while teacher trainees for SEN gained content knowledge and knowledge about instructional methods. In the present study, teacher trainees for GE seem to have gained knowledge about the available support which leads to more positive attitudes towards the effect and the organisation of inclusive education. For teacher trainees for SEN, it can be assumed that there is also a professional benefit. The cooperation between the two partners can be referred to as co-construction (cf.: Gräsel, Fußangel, & Pröbstel, 2006), in which the partners relate their individual knowledge to each other in such a way that each partner acquires new knowledge in the process. As there is no assessment of content knowledge or knowledge about instructional methods, the effect of the seminar on teacher trainees for SEN cannot be made visible with this study.

3.3.4.3 Comparison of attitude change of teacher trainees for SEN and teacher trainees for GE in dependence of the team-constellation

The attitude change over the course of the seminar does not differ in dependence of the team-constellation for teacher trainees for SEN; for those for GE, however, the attitude develops to the more positive in members of different-discipline teams.

For teacher trainees for SEN, the team constellation has no influence and the theoretical and practical experience have only a small influence on their attitudes towards inclusion. One reason for that is certainly the motivational predisposition which leads to the decision to train to be a teacher for children with special educational needs and inclusion. This predisposition certainly includes more positive attitudes towards this subject, so that there is not much room for improvement. As for the participants in the present study,

attitudes of teacher trainees for SEN are significantly more positive at all three testing times than those of teacher trainees for GE.

Furthermore, teacher trainees for SEN have more opportunity to take courses on topics like inclusive teaching techniques and co-teaching during their teacher preparation programmes (Austin, 2001) and therefore have already developed confidence regarding that. As for the participants in the present study, 75% of the teacher trainees for SEN, but only 20% of those of GE have attended seminars on these topics.

The change to the more positive in attitudes of teacher trainees for GE in different-discipline teams has to be linked to the team constellation, as the data of the first testing show no significant difference between participants in different and those in same-discipline teams. This means that – in terms of attitudes – the same prerequisites were met for all trainees of GE.

In line with the results of Pancsofar and Petroff's (2013) study, it becomes apparent in the present study that co-teaching is associated with teacher confidence. During the course of the seminar, teacher trainees for GE in different-discipline teams develop significantly more positive attitudes towards aspects concerning organisation and effect of inclusive education. Again, this has to be interpreted as an indication of supplementation and transfer of expertise through co-construction (Gräsel, Pröbstel, & Fußangel, 2006), which results in the experience and conviction to be able to master inclusive education.

When looking at same-discipline teams only, the comparison of teacher trainees for GE and those for SEN reveals that the formers' attitude towards the organization of inclusive education and the respective self-efficacy is significantly lower than that of the latter. This supports other findings in this study to indicate that teacher trainees of GE only benefit from this academic programme if working together with teacher trainees for SEN. Therefore, the highest effect of the common seminar assessed and evaluated by the present study must be recorded for teacher trainees for GE in different-discipline teams: in addition to improving collaboration skills, those teacher trainees developed more positive attitudes towards inclusive education. Moreover, there is an enhancement of self-efficacy and perception of professional roles and function. Also, these teacher trainees were able to develop more confidence regarding the organisation and the effect of inclusive education.

Based on the results obtained by this research study, it can be stated that, by pre-service co-teaching, teacher trainees improved their collaboration skills significantly and independent of the course of study or team constellation during the practical episode. This is

in contrast to the findings of Jurkowski and Müller (2018), who infer from their longitudinal study that teacher dyads do not develop a common ground of cooperation during one school year. Furthermore, it is in contrast to the findings of Gavish (2017), who found that special education teachers report feelings of not being wanted in the class. Teacher trainees participating in the present study seem to have developed a common ground and a feeling of shared responsibilities for all pupils in the class, which is beneficial not only for the perception of professional roles, but also for all pupils in the class (Jordan, Schwartz & McGhie-Richmond, 2009). The reason for that is probably the close support and coaching by the university-teachers while forming a team and working collaboratively. Administrative support in both initiation and implementation of collaborative service delivery is essential for it to be successful, as was pointed out by Murawski (2009).

Additionally, there is a significant change of attitude towards inclusion to the more positive of all teacher trainees after the common seminar. This finding is in line with the results of several research studies (e.g. Avramidis & Kalyva, 2007; Kurniawati, de Boer, Minnaert & Mangunson, 2016) which state that specialised training promotes more positive attitudes towards inclusion.

Particularly the subscales that investigate teacher trainees' self-efficacy expectation and their perceived professional role and function with regard to inclusive education show a significant increase in the mean scores, both after the theoretical and the practical episode of the seminar. One reason for that may be the direct linking of theory and practice during the seminar and the hands-on experience in an inclusive classroom, where teacher trainees observe and conduct lessons. Positive experience in providing support for all pupils promotes positive attitudes and higher self-efficacy expectation (Forlin & Chambers, 2011). Another reason could be found in the fact that teacher trainees gain this experience in the company of a team partner and as part of a co-teaching team. McHatton and Daniel (2008) reported that the participants in their qualitative evaluation study attribute their growth as educators to the collaborative experience with a partner of a different-discipline in a practicum. Moreover, Krammer et al. (2017) demonstrated that team characteristics determine teachers' self-efficacy expectation much more than individual characteristics. These team characteristics are aspects like communication and parity within the team as well as enjoyment and pleasure during the co-teaching process. Participants in the present study reported a consistently strong cohesion within the teams, as reflected in the respective subscale of the collaboration-skill questionnaire. This subscale consists of items addressing

team characteristics like communication, parity and mutual support, all of them seeming to be self-efficacy expectation-influencing factors.

Thus, it can be assumed that it is the co-teaching experience that promotes teacher trainees' self-efficacy expectation, which, according to Klassen & Chiu (2010) is related to the beliefs in the ability to influence student outcomes. Bandura (1997) states that people with high assurance in their capabilities approach difficult tasks as challenges to be mastered rather than as threats to be avoided. With regard to the context of inclusive education, teacher trainees develop the belief to be able to influence the outcomes of all students in the inclusive classroom.

3.3.5 Conclusion

The results of the present study affirm that the common seminar has a positive effect on the two prerequisites for successful inclusive education identified by several scholars: attitude and collaboration skills.

All participating teacher trainees benefitted from the seminar, particularly with respect to their collaboration skills. This means that the co-teaching experience of the participating pre-service teachers significantly improved their collaboration skills. With respect to attitudes towards inclusive education, participants in different-discipline teams developed a change to the more positive, while participants in same-discipline teams did not. This means that different-discipline team-members' preparedness for inclusive education has improved considerably. Particularly teacher trainees for GE in different-discipline teams gained professional competence and confidence with regard to inclusive education; however, it is to be surmised that teacher trainees for SEN benefitted as well on the content level.

Therefore, future studies on co-teaching of pre-service and in-service teachers should include measures to assess content knowledge and knowledge about teaching methods to identify a possible benefit for teachers of SEN. Furthermore, future studies should attempt to give a descriptive insight into teacher trainees' beliefs about inclusive education. On the basis of the results of the present research study it is recommended that attendance in such a seminar-design be mandatory for all teacher trainees.

3.3.6 References

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3.4 Concepts of educational inclusion of teacher trainees: development of a system of categories using inductive, summarizing qualitative content analysis (Research Paper 4, peer reviewed)

Summary:

Inclusion in schools is understood as coping with diversity and overcoming the categories *normal* and *different*. But is this also the subjective, action-guiding definition of this concept of teacher trainees?

In order to make the concept of the term *inclusive education* visible, propositions of teacher trainees to define *educational inclusion* were condensed into a system of categories by inductive, summarizing, qualitative content analysis. This system consist of 35 categories, grouped in 7 dimensions; it represents the totality of all possible elements that can form the concept of a teacher trainee's concept of educational inclusion.

The categories with the most propositions coded into are categories of the dimension COLLABORATION AND ROLES and SCHOOL-LIFE AND TEACHING, categories with the least propositions coded into are in dimensions PRE-REQUISITES AND BARRIERS and DISADVANTAGES AND CONSEQUENCES. This means that the participating teacher trainees' conceptualization of educational inclusion is mostly concerned with teaching practices and teachers' roles and responsibilities, and less concerned with disadvantages of inclusion. This is in contrast to the concepts of in-service teachers, whose conceptualization is dominated by categories of negatively connotated dimensions.

Konzepte von schulischer Inklusion bei Lehramtsstudierenden: Entwicklung eines Kategorienschemas durch induktive, zusammenfassende qualitative Inhaltsanalyse

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Abstract:

Schulische Inklusion wird verstanden als Bewältigung von Diversität und Überwindung der Kategorien *Normal* und *Anders*. Ist das aber auch die subjektive, handlungsleitende Definition dieses Begriffs von Lehramtsstudierenden?

Um die Konzeption des Begriffs sichtbar zu machen, wurden Aussagen von Studierenden zu schulischer Inklusion durch induktive, zusammenfassende, qualitative Inhaltsanalyse auf 35 Kategorien, gruppiert in 7 Dimensionen, verdichtet. Dieses Kategoriensystem stellt die Gesamtheit aller möglichen Elemente, die das Konzept einer*s Studierenden von schulischer Inklusion bilden können, dar.

3.4.1 Einleitung

Schulische Inklusion bedeutet die Überwindung der Idee einer*s Normalschülerin*s als Teil einer vermeintlich homogenen Lerngruppe; das stellt eine große Herausforderung für Lehrkräfte und Lehramtsstudierende dar. Die Annahme von Diversität als Normalität bedarf einer neuen Definition von Schule, die sowohl wissenschaftlich als auch subjektiv und individuell konstruiert werden muss.

Zur wissenschaftlichen Theorie von schulischer Inklusion gibt es bislang weder ein allgemein gültiges Verständnis (vgl. Grosche u.a. 2017; Göransson & Nilholm 2014) noch eine einheitliche Definition (vgl. Grosche 2015). Lehrkräfte und Studierende greifen vielmehr auf subjektive Theorien von schulischer Inklusion zurück (vgl. Przibilla u.a. im Druck), um im schulischen Alltag und damit im Spannungsfeld zwischen Normalität und Diversität handeln zu können.

Mandl und Huber (1983, 98) beschreiben subjektive Theorien von Lehrkräften als eine prinzipiell aktualisierbare Kognition, die sich aus (Alltags-) Wissen und Alltagskonzepten

sowie aus individuellen Überzeugungen, subjektiven Interpretationen und naiven Schlussfolgerungen zusammensetzt. Nach Dann (1994, 165ff.) sind subjektive Theorien i.) relativ stabile, wenngleich veränderbare mentale Repräsentationen, die ii.) teilweise implizit sind, aber auch in explizierbarer Form vorliegen können, iii.) ähnliche Formen wie wissenschaftliche Theorien besitzen, iv.) und ebenso vergleichbare Funktionen übernehmen, und v.) sie sind handlungssteuernd. Subjektive Theorien über das Lernen und Lehren gelten neben den Formen des pädagogischen Professionswissens als elementarer Bestandteil zur Beschreibung pädagogischer Kompetenz; insbesondere in neuen und anspruchsvollen Situationen leiten sie das Handeln des Pädagogen (vgl. Helmke 2015). Deshalb sind es vor allem die subjektiven Theorien, die im relativ neuen und anspruchsvollen Kontext der schulischen Inklusion das pädagogische Handeln leiten.

Die bisherige Forschung zu subjektiven Theorien von Lehrkräften fokussiert häufig inhaltlich eng gefasste Kontexte, wie z.B. Unterrichtsstörung (vgl. Dann & Krause 1988) oder Lehrerhandeln in bestimmten Unterrichtssettings (vgl. Haag & Mischo 2003); subjektive Theorien in inklusiven Handlungskontexten hingegen wurden bislang kaum beforscht. Es liegen einige Arbeiten vor, die beispielsweise die Systematisierung unterschiedlicher Verständnisweisen des Inklusionsbegriffs fokussieren (vgl. Göransson & Nilholm 2014), den Begriff zur Evaluation operationalisieren (vgl. Booth & Ainscow 2002) oder versuchen, Definitionen von schulischer Inklusion zu entwickeln (vgl. Krämer u.a. 2016, Grosche u.a. 2017). Grundlage dieser Arbeiten sind aber nicht subjektive Theorien von Lehrkräften oder Lehramtsstudierenden, sondern Expertenurteile.

Przibilla u.a. (im Druck) konnten eine explorative Studie vorlegen, die subjektive Definitionen von schulischer Inklusion von Lehrkräften, also den Experten in der Praxis, untersucht. Dabei wurde aus den offenen Antworten zum Einstiegsitem „Definieren Sie Inklusion mit Ihren eigenen Worten“ einer landesweiten Online-Befragung von Lehrkräften an Schulen in Nordrhein-Westfalen ein Kategoriensystem, bestehend aus 27 Kategorien und 9 Dimensionen, entwickelt. Diese 27 Kategorien stellen die Gesamtheit aller möglichen Elemente einer subjektiven Definition von schulischer Inklusion bei Lehrkräften dar. Auch Lehramtsstudierende haben bereits ein subjektives Konzept von schulischer Inklusion. Ziel dieser Arbeit ist es daher, diese subjektiven Definitionen zu explorieren. Vor allem die Zusammensetzung der inhaltlichen Aspekte für die Definitionsversuche sind dabei von besonderem Interesse, da diese Hinweise auf die Barrieren für die Bewältigung von Diversität im schulischen Kontext geben können.

3.4.2 Material und Methode

Die subjektiven Theorien von schulischer Inklusion bei Lehramtsstudierenden werden mithilfe eines Kategoriensystems beschrieben. Die Kategorien beschreiben Elemente einer möglichen subjektiven Theorie, das Kategoriensystem bildet die Gesamtheit aller möglichen Elemente.

Die Entwicklung des Kategoriensystems in der vorliegenden Studie beruht auf den Daten aus der Evaluation eines gemeinsamen Seminars für Lehramtsstudierende der Sonderpädagogik und der Regelschulpädagogik an der Bergischen Universität Wuppertal (vgl. Ritter u.a. 2018). Dabei planen und gestalten die Studierenden in bi-professionellen Tandems nach einer theoretischen Vorbereitung an der Universität Unterricht in inklusiven Klassen der Sekundarstufe I. Die Studierenden erstellen zu drei Messzeitpunkten (vor dem Seminar, nach der theoretischen Einführung und nach der Praxis) Concept Maps (vgl. Novak & Cañas 2008) zu der Fokusfrage *Was ist schulische Inklusion?*. Für die Erstellung der Concept Maps waren weder Nomen noch Prädikate vorgegeben, sodass die Studierenden ihr eigenes (Alltags-) Wissen, ihre Überzeugungen und Interpretationen visualisieren konnten. Die daraus entstandenen Propositionen, d.h. zwei durch ein Prädikat verbundene Nomen, dienten als Datengrundlage und Analyseeinheiten für eine induktive, zusammenfassende, qualitative Inhaltsanalyse nach Mayring (2015) mit dem Ziel, die Daten zu einem übersichtlichen System zu verdichten.

Jede Concept Map eines*r jeden Studierenden repräsentiert dessen/deren subjektives Konzept von schulischer Inklusion. Gemäß der Arbeitsdefinition stellt ein Konzept (Alltags-) Wissen und Alltagskonzepte, individuelle Überzeugungen und Schlussfolgerungen sowie Interpretationen dar. Damit beinhaltet ein Konzept sowohl kognitive als auch affektive Merkmale. In dieser Arbeit werden die Begriffe *Konzept* und *subjektive Theorie/subjektive Definition* synonym verwendet.

3.4.2.1 Stichprobe

Das Gesamtdatenmaterial stammt von insgesamt 65 Studierenden im durchschnittlichen Alter von 23 Jahren, wovon 10 männlich sind. 31 Probanden sind Studierende der Regelschulpädagogik, 34 Studierende der sonderpädagogischen Förderung. Die angehenden Sonderpädagogen befinden sich im dritten oder vierten Semester des Bachelorstudiums (BE), die angehenden Regelschulpädagogen befinden sich im zweiten oder dritten Semester des Masterstudiums (ME). Die Studierenden besuchten das o.g. Seminar in vier konsekutiven Semestern.

3.4.2.2 Generierung der Analyseeinheiten

Die von den Studierenden erstellten Concept Maps wurden in einzelne Propositionen, die je eine sinnhafte Aussage zu einem einzigen Gegenstand beinhalten (=Subjekt- und Prädikatsterm), transferiert; dabei entstanden insgesamt 2985 Propositionen. Von dieser Datenmenge wurde bei 1013 Propositionen (ca. 1/3 des Gesamtmaterials) eine Sättigung der zu bildenden Kategorien erreicht (vgl. Mayring 2015, 76), sodass das System aus dieser Teilmenge entwickelt wurde. Die Auswahl der Teilmenge erfolgte systematisch und randomisiert: es wurden sowohl Propositionen von angehenden Sonder- sowie Regelschulpädagogen als auch aus den verschiedenen Testzeitpunkten in gleicher Anzahl, jedoch jeweils zufällig gewählt.

3.4.2.3 Inhaltsanalyse

Mithilfe einer induktiven, zusammenfassenden, qualitativen Inhaltsanalyse nach Mayring (2015, 2016) wurden die Einheiten analysiert und systematisch zusammengefasst. Ziel der Inhaltsanalyse ist eine regelgeleitete Zusammenfassung und Verdichtung des Ausgangsmaterials, ohne den Informationsgehalt einzuschränken. Dabei erfolgt die Analyse und Reduktion des Ausgangsmaterials durch Anwendung der Interpretationsschritte Z1-Z4 (vgl. Mayring 2015, 59ff.).

Zur Paraphrasierung (Z1) wurden zunächst wenig inhaltstragende Elemente eliminiert und die sinntragenden Elemente paraphrasiert. Anschließend wurden die Paraphrasen generalisiert und auf ein einheitliches Abstraktionsniveau gebracht (Z2), um dann durch die Streichung bedeutungsgleicher Paraphrasen eine erste Reduktion des Datenmaterials herbeizuführen (Z3). Durch anschließende Bündelung und Integration von Paraphrasen auf dem angestrebten Abstraktionsniveau (Z4) fand eine weitere Reduktion und Verdichtung des Materials zu einem Kategoriensystem statt. Das so entwickelte System wurde anschließend in sieben Dimensionen aus je inhaltlich aufeinander bezogenen Kategorien gebündelt.

3.4.2.4 Gütekriterien

In dieser Studie wurden die Gütekriterien *Regelgeleitetheit*, *Verfahrensdokumentation*, *Gegenstandsnahe* und *Interpretationsabsicherung* (vgl.: Mayring 2015) beachtet und befolgt. Die Analyseeinheiten wurden sequenziell und systematisch nach zuvor festgelegten Regeln analysiert und selektiert/gebündelt, sämtliche Analyseschritte und Entscheidungen zur Reduktion des Datenmaterials wurden in Regelwerken und tabellarisch dokumentiert. Die Codierung erfolgte mithilfe der Software MAXQDA, die eine lückenlose Dokumentation der einzelnen Schritte beinhaltet. Die Gegenstandsnahe ist dadurch gegeben,

dass die Stichprobe ausschließlich aus Studierenden, die das o.g. Seminar besuchten, bestand und so ein Bezug zum Gegenstand der schulischen Inklusion geschaffen wurde.

Die Beurteilung der Interrater-Reliabilität wurde in zwei Schritten durchgeführt. 1.) Zur Überprüfung der Transformationsschritte wurde $\frac{1}{4}$ des Datenmaterials zufällig gewählt und einem zweiten Rater (Letztautor) zur Nachvollziehbarkeit der Schritte zur Verfügung gestellt. Der Rater konnte den Schritten entweder zustimmen oder sie ablehnen; die Übereinstimmung wurde in % gemessen. 2.) Die ursprünglichen Analyseeinheiten wurden von zwei Ratern (Erstautorin und Letztautor) unabhängig voneinander in das entwickelte Kategoriensystem codiert, um dessen Güte zu überprüfen. Die Interrater-Reliabilität wurde dann mithilfe der entsprechenden Funktion in der Software als Kappa-Koeffizienten nach Cohen (κ) ausgegeben. Hierbei erfolgt eine Bereinigung um die Wahrscheinlichkeit zufälliger Übereinstimmungen.

3.4.3 Ergebnisse

Das hier entwickelte Kategoriensystem zur subjektiven Definition von schulischer Inklusion beruht auf einem Drittel des gesamten Datenmaterials. Die Interraterreliabilität des Reduktionsprozesses beträgt 85% Übereinstimmung der unabhängigen Interrater. Die Interraterreliabilität des Kategoriensystems beträgt $\kappa = 0.70$ (Cohen's Kappa).

Nach den Reduktionsschritten konnte das Material auf 35 Kategorien verdichtet werden, die sich wiederum in 7 Dimensionen bündeln lassen. Eine Dimension beschreibt hierbei eine Gruppe von thematisch ähnlichen Kategorien, die aber z.T. gegensätzlich sind und daher keine inhaltliche Einheit darstellen. Die Dimension 2, zum Beispiel, enthält sowohl die Kategorie *Schulische Inklusion fördert alle SuS⁶ [...]* als auch die Kategorie *Schulische Inklusion ist für SuS mit Förderbedarf*.

Auf Grundlage der Anzahl der Analyseeinheiten (N), die zu einer entsprechenden Kategorie zusammengefasst wurden, wurden den einzelnen Kategorien Rangplätze (Rang) zugeordnet. Kategorien mit gleicher Anzahl an zusammengefassten Analyseeinheiten wurden Verbundränge zugeordnet, diese werden mit .5 bezeichnet (vgl. Bortz & Döring 2006). Tabelle 12 stellt das finale Kategoriensystem dar.

⁶ SuS steht hier und im Folgenden als Abkürzung für Schülerinnen und Schüler

Table 12. System of Categories

Tabelle 2: Finales Kategoriensystem mit Anzahl der zusammengefassten Analyseeinheiten und Rangplätze

Anmerkung: N bezeichnet die Anzahl der Analyseeinheiten, die zu der entsprechenden Kategorie zusammengefasst wurden.

Rang bezeichnet den Rangplatz, der den Kategorien entsprechend der Anzahl der Analyseeinheiten zugeordnet wurde

(Verbundränge sind mit .5 bezeichnet).

Nummer	Dimensionen und Kategorien	N	Rang
Dimension 1: Werte und Haltungen		121	
1.1	Schulische Inklusion bedeutet Gleichberechtigung, Gleichbehandlung und Chancengleichheit für alle	16	15
1.2	Schulische Inklusion bedeutet Integration und Teilhabe aller	15	16.5
1.3	Schulische Inklusion benötigt und fördert Akzeptanz, Toleranz, Rücksichtnahme, Wertschätzung sowie soziale Kompetenzen und moralische Werte	58	6
1.4	Schulische Inklusion benötigt und fördert positive Einstellungen, Bereitschaft, Engagement und Motivation aller beteiligten Akteure (z.B. Lehrkräfte, Eltern)	24	11
1.5	Schulische Inklusion verändert die Gesellschaft	8	22
Dimension 2: Heterogenität		86	

2.1	Schulische Inklusion bedeutet Vielfalt und/oder Bereicherung durch Heterogenität	11	20.5
2.2	Schulische Inklusion bedeutet eine Vielzahl an unterschiedlichen Förderbedarfen, Bedürfnissen und Anforderungen	19	14
2.3	Schulische Inklusion bedeutet, dass sich die Schulen an die SuS anpassen (z.B. durch Barrierefreiheit)	11	20.5
2.4	Schulische Inklusion fördert alle SuS (z.B. mit und ohne Förderbedarf, starke und schwache SuS)	30	8
2.5	Schulische Inklusion ist für SuS mit Förderbedarf	15	16.5
Dimension 3: Schulleben und Unterricht		289	
3.1	Schulische Inklusion betrifft alle beteiligten Akteure (z.B. SuS, Lehrkräfte, Eltern)	102	2
3.2	Schulische Inklusion findet im gemeinsamen Schulleben und/oder im gesamten Kontext Schule statt	29	9
3.3	Schulische Inklusion bedeutet gemeinsamer Unterricht und/oder dass alle SuS voneinander profitieren, sich helfen und unterstützen	68	5

3.4	Schulische Inklusion meint guten Unterricht, erfolgreiche Individualisierung und angepasste Differenzierung (z.B. durch Materialien, Methoden, Konzepte, Co-Teaching)	90	3
Dimension 4: Zusammenarbeit und Rollen		221	
4.1	Schulische Inklusion braucht die Zusammenarbeit und Kooperation aller beteiligten Akteure (z.B. Lehrkräften, Eltern, SuS)	80	4
4.2	Schulische Inklusion bedeutet, dass alle Lehrkräfte alle Zuständigkeiten und Verantwortlichkeiten für alle SuS gemeinsam gestalten (z.B. Unterrichten, Betreuen, Differenzieren, Unterstützen)	105	1
14.3	Schulische Inklusion bedeutet, dass Sonderpädagogen mit ihrer Expertise Schulen und Regelschullehrkräfte unterstützen und beraten	20	13
4.4	Schulische Inklusion bedeutet, dass der Sonderpädagoge SuS mit Förderbedarf diagnostiziert, unterrichtet, unterstützt und fördert	13	17
4.5	Schulische Inklusion bezieht Zeit, Rolle und Expertise der Sonderpädagogen zu wenig ein	3	24

Dimension 5: Institutionen und Vorgaben		45	
5.1	Schulische Inklusion wird durch den Staat/Gesetzgeber vorgegeben, beeinflusst und ermöglicht	9	21
5.2	Schulische Inklusion fokussiert Bildungsstandards und Kompetenzentwicklung	4	22
5.3	Schulische Inklusion bedeutet, dass Staat/Gesetzgeber und/oder Schulen für die Ressourcen verantwortlich sind	21	12.5
5.4	Schulische Inklusion meint Austausch und/oder Beeinflussung zwischen Gesetzgeber, Schulen und Lehrkräften	11	20.5
Dimension 6: Voraussetzungen und Barrieren		159	
6.1	Schulische Inklusion braucht generell Ressourcen (z.B. Zeit, Geld,...)	52	7.5
6.2	Schulische Inklusion hat mit schlechten Rahmenbedingungen und unzureichend vorbereiteten Schulen zu kämpfen	13	18.5
6.3	Schulische Inklusion benötigt eine gute Schulorganisation und ein funktionierendes Schulsystem	21	12.5
6.4	Schulische Inklusion benötigt gut aus- und fortgebildete Lehrkräfte mit	52	7.5

	unterschiedlichen Expertisen (z.B. Methoden)		
6.5	Schulische Inklusion benötige Lehrkräfte mit und ohne Behinderung	2	25.5
6.6	Schulische Inklusion benötigt mehr Sonderpädagogen	12	19.5
6.7	Schulische Inklusion braucht Zeit für den Unterricht	7	23
Dimension 7: Nachteile und Folgen		54	
7.1	Schulische Inklusion steht erst am Anfang, bereitet Probleme und Schwierigkeiten	13	18.5
7.2	Schulische Inklusion ist widersprüchlich, scheitert und kann negative Folgen haben (z.B. für SuS mit Förderbedarf)	25	10
7.3	Schulische Inklusion wird von Lehrkräften nicht richtig umgesetzt und/oder abgelehnt	2	25.5
7.4	Schulische Inklusion überfordert Lehrkräfte und Lehrkräften fehlt es an Wissen	12	19.5
7.5	Schulische Inklusion ist zu wenig wissenschaftlich	2	25.5

Kategorie 4.2. *Schulische Inklusion bedeutet, dass alle Lehrkräfte alle Zuständigkeiten und Verantwortlichkeiten für alle SuS gemeinsam gestalten (z.B. Unterrichten, Betreuen, Differenzieren, Unterstützen)* steht mit insgesamt 105 zusammengeführten Analyseeinheiten auf Rangplatz 1, gefolgt von Kategorie 3.1 *Schulische Inklusion betrifft alle beteiligten Akteure (z.B. SuS, Lehrkräfte, Eltern)* (102 Analyseeinheiten) und 3.4 *Schulische Inklusion meint guten Unterricht, erfolgreiche Individualisierung und angepasste Differenzierung (z.B. durch Materialien, Methoden, Konzepte, Co-Teaching)* (90 Analyseeinheiten). Damit stellen diese drei Kategorien sowie insgesamt auch die beiden Dimension *Schulleben und Unterricht* sowie *Zusammenarbeit und Rollen* den zentralsten und gewichtigsten Aspekt der subjektiven Definition von schulischer Inklusion dar. Kategorie 1.3 *Schulische Inklusion benötigt und fördert Akzeptanz, Toleranz, Rücksichtnahme, Wertschätzung sowie soziale Kompetenzen und moralische Werte* liegt mit 58 Analyseeinheiten auf Rang 6 und gehört damit ebenso zu den zentralen Aspekten der subjektiven Definition. Die am wenigsten wichtigen Aspekte stellen mit je zwei Analyseeinheiten die Kategorien 7.5 *Schulische Inklusion ist zu wenig wissenschaftlich*, 7.3 *Schulische Inklusion wird von Lehrkräften nicht richtig umgesetzt und/oder abgelehnt* und 6.5 *Schulische Inklusion benötigt Lehrkräfte mit und ohne Behinderung* dar.

3.4.4 Diskussion

Das Anliegen dieser Arbeit war es, die subjektiven Konzepte von Lehramtsstudierenden zu schulischer Inklusion zu erfassen und zu einem Kategoriensystem zu verdichten, um die inhaltlichen Aspekte dieser subjektiven Definition zu explorieren.

Durch eine induktive, zusammenfassende, qualitative Inhaltsanalyse konnten die Propositionen zu 35 Kategorien verdichtet werden, die sich in sieben Dimensionen bündeln lassen: 1) *Werte und Haltungen*, 2) *Heterogenität*, 3) *Schulleben und Unterricht*, 4) *Zusammenarbeit und Rollen*, 5) *Institutionen und Vorgaben*, 6) *Voraussetzungen und Barrieren* sowie 7) *Nachteile und Folgen*. Das Kategoriensystem enthält die Gesamtheit aller möglichen Elemente, die ein Konzept einer*s Lehramtsstudierenden bilden können. Das Konzept einer*s Studierenden setzt sich durchschnittlich aus sieben Kategorien zusammen.

Das hier entwickelte Kategoriensystem hat einen thematisch und methodisch ähnlichen Ansatz, jedoch mit anderem Fokus, wie das System von Przibilla (im Druck). Es enthält eine Vielzahl ähnlicher Kategorien und Dimensionen. Vor allem die - eher positiv konnotierten - Kategorien in den Dimensionen *Werte und Haltungen*, *Heterogenität* und *Schulleben und Unterricht* finden sich in beiden Arbeiten mit ähnlicher Rangplatzierung.

Kategorie 4.2 *Schulische Inklusion bedeutet, dass alle Lehrkräfte alle Zuständigkeiten und Verantwortlichkeiten für alle SuS gemeinsam gestalten* aus der Dimension *Zusammenarbeit und Rolle* steht in dieser Studie auf Rangplatz 1, während eine entsprechende Kategorie in der subjektiven Definition der Lehrkräfte nur auf Rangplatz 21 liegt. Dies ist sicherlich auf das Seminarkonzept, das die Lehramtsstudierenden als Basis für diese Studie besuchen, zurückzuführen. Die Lehramtsstudierenden gehen als bi-professionelle Tandems in die inklusiven Klassen, d.h. Kooperation nimmt einen sehr hohen Stellenwert in der Wahrnehmung der Studierenden ein. In der Praxis ist die Kooperation jedoch oftmals mit interpersonellen, strukturellen und/oder organisatorischen Schwierigkeiten verbunden (Arndt & Werning, 2014), sodass sie nur eine untergeordnete Rolle in der subjektiven Definition der Lehrkräfte spielt.

Kategorien aus der - negativ konnotierten - Dimension *Nachteile und Folgen* wurden in dieser Studie mit den Rangplätzen 18.5 und niedriger belegt, während die negativen Kategorien in dem von Przibilla u.a. entwickelten System z.T. auf Rangplatz 4 bzw. 7 stehen. Dies bedeutet, dass die subjektive Definition schulischer Inklusion von Lehrkräften deutlich häufiger inhaltlich negative Aspekte beinhaltet als die der Lehramtsstudierenden. Hier könnte die Schwierigkeit der Umsetzung der Inklusion in den Schulen und die inadäquate Vorbereitung der Lehrkräfte (vgl.: forsa Politik- und Sozialforschung 2017) entscheidend dafür sein, dass inhaltlich negative Aspekte einen höheren Stellenwert bei der subjektiven Definition des Begriffs einnehmen.

Forlin & Chambers (2011, 28) fanden einen negativen Zusammenhang zwischen Selbstvertrauen in Bezug auf inklusiven Unterricht und Bedenken gegenüber Inklusion: je mehr Selbstvertrauen die Lehramtsstudierenden hatten, desto geringer sind die Bedenken. Dieser Annahme folgend wäre es auch denkbar, dass die Einbeziehung von Inklusion als Thema in der Lehramtsausbildung positivere Konzepte prägt und die negativen Kategorien, wie z.B. *schulische Inklusion wird von Lehrkräften nicht richtig umgesetzt und/oder abgelehnt* und *schulische Inklusion ist zu wenig wissenschaftlich*, nur durch je zwei Analyseeinheiten gebildet werden konnten.

Die rangplatzhöchsten Kategorien 4.2 *Schulische Inklusion bedeutet, dass alle Lehrkräfte alle Zuständigkeiten und Verantwortlichkeiten für alle SuS gemeinsam gestalten [...]*, 3.1 *Schulische Inklusion betrifft alle beteiligten Akteure [...]* und 3.4 *Schulische Inklusion meint guten Unterricht, erfolgreiche Individualisierung und angepasste Differenzierung [...]* beinhalten idealtypische Aspekte von schulischer Inklusion und stellen damit Indikatoren für schulische Inklusion dar (vgl. Krämer u.a. 2016). Vor allem Kategorie 3.4 fokussiert auf Individualisierung und Anerkennung der Diversität als Normalzustand im schulischen Kontext.

3.4.5 Limitation

Das hier vorliegende Kategoriensystem wurde aus dem Datenmaterial von 65 Lehramtsstudierenden entwickelt, die alle ihr Studium an der Bergischen Universität Wuppertal absolvieren. Eine Verallgemeinerung auf die Gesamtheit der Studierenden ist daher mit diesen Daten nicht möglich. Es müsste dafür anhand von Replikationen, möglicherweise mit einer anderen Stichprobe, überprüft und bestätigt werden.

Die hier dargestellten subjektiven Definitionen von schulischer Inklusion bei Lehramtsstudierenden zeigen inhaltlich überwiegend positive und idealtypisch geprägte Aspekte. Da aber in der hier vorliegenden Studie auf das Gütekriterium der intersubjektiven Validierung verzichtet wurde, stellt das Kategoriensystem nicht subjektive Theorien im engeren, sondern lediglich im weiteren Sinne (vgl.: Blömeke u.a. 2003) dar. Folglich kann hiermit der Zusammenhang zwischen subjektiver Definition und Handlungsmuster nicht geklärt werden; d.h. es ist nicht überprüfbar, inwieweit die subjektiven Definitionen tatsächlich handlungsleitend sind.

Für die Überwindung der kategorialen Annahme von *Normal* und *Anders* ist aber gerade die Handlung im Unterricht essentiell; deshalb sollte in einer Folgestudie geklärt werden, ob die vorliegenden subjektiven Theorien auch entsprechende Handlungsmuster bedingen.

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3.5 Pre-service teachers' beliefs about inclusive education before and after multi- compared to mono-professional co-teaching: An exploratory study (*Research Paper 5, peer-reviewed*)

Pre-service teachers' beliefs about inclusive education before and after multi- compared to mono-professional co-teaching: An exploratory study

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Abstract

Teacher beliefs are action guiding in the classrooms. Teacher beliefs about inclusive education are thus a crucial pre-requisite for its success. Therefore, those beliefs have to be addressed during the first phase of teacher training. Generally accepted concepts or operationalized definitions would be valuable guidelines for pre-service teachers and their educators. However, neither the ones nor the others are available at present. Therefore, pre-service teachers have to fall back on their own beliefs, a rather unexplored notion so far.

Within the present study, pre-service teachers' beliefs about inclusive education were assessed before and after an academic seminar. During this academic seminar, participants co-taught in either multi-professional (i.e. one pre-service teacher for special educational needs and one for general education) or mono-professional (i.e. both pre-service teachers for special educational needs or both for general education) teams in inclusive classes of secondary schools. Pre-service teachers' beliefs were assessed with the help of concept-maps, which were created by the participants at two testing times. The concept-maps were analyzed employing graph-theoretical approaches as well as qualitative, summarizing content analysis methods.

Results show that pre-service teachers who worked in multi-professional teams expanded their conceptualization of inclusive education to include facets like individualization and differentiation, while pre-service teachers who worked in mono-professional teams displayed no such expansion. Also, the conceptualization of pre-service teachers who

worked in mono-professional teams contained a larger percentage of propositions addressing disadvantages and negative consequences of inclusive education.

Therefore, it is concluded that multi-professional co-teaching during teacher training helps prepare teachers for successful inclusive education.

3.5.1 Introduction

The United Nations Convention on the Rights of Persons with Disabilities states that children must not be excluded from the general education system on the basis of disability (United Nations, 2006, p.17). The Convention orders that “State Parties shall ensure an inclusive education system at all levels [...]” (ibid., p16). In Germany, the UN-Convention was ratified in 2007 and incepted in 2009. Since then, parents of children with special needs have the right to choose either mainstream or special needs schools. Consequently, there has to be inclusive education in mainstream schools. For it to be successful, teachers’ beliefs are a crucial factor.

Therefore, it is essential that pre-service teachers’ beliefs be addressed during teacher training, and an operationalized definition or generally accepted concept of inclusive education could serve as a guideline for that. However, there is no such commonly agreed upon operationalized definition or concept of it. Therefore, pre-service teachers have to fall back onto their own beliefs about inclusive education, a notion that is rather undiscovered.

Many scholarly works emphasize that co-teaching is a crucial pre-requisite for successful inclusive education. Co-teaching in multi-professional teams at the pre-service level entails that the team partners have to reflect on and discuss about their beliefs when negotiating different teaching strategies. Exactly that may lead to a transformation of individual beliefs to facilitate successful inclusive education, and thus may serve as an appropriate means to address pre-service teachers’ beliefs.

In the international research context, teacher beliefs are defined as being a psychological concept describing a person’s views and propositions about the world which are accepted as being true. Hereby, it is the person’s individual decision to create criteria for the relevance and importance of these views and propositions; they don’t have to follow logical orders. For the individual person, however, they are informative and action guiding (Kagan, 1992; Richardson, 1996; Richardson & Placier, 2002).

Beliefs can be clearly separated from the theoretical notion of knowledge, as they don’t have to comply with any criteria of truth (Richardson, 1996). Moreover, beliefs are dealt with as being action guiding in educational processes, particularly in poorly defined and complex situations, because they help simplify situations and identify aims and objectives (Nespor, 1987). As this work is concerned with teaching and teacher action, beliefs are also understood to refer to both beliefs about the ability to teach and design learning processes as well as beliefs about generating and organizing knowledge (i.e.

epistemological beliefs).

Beliefs are of particular importance for teachers as they constitute the grounds for professional everyday actions, which – in the case of teachers – many a time consist of influencing other people in interpersonal relationships (Mandl & Huber, 1983). Teachers tend to create hypotheses about the learning processes of their pupils and the necessary (individual) support on the basis of their beliefs. In other words, beliefs constitute the expert knowledge on the ground of which teachers draw decisions concerning teaching and interaction (Biesta, Priestley, & Robinson, 2015).

Gale, Mills, and Cross (2017) drew on Bourdieu and Passeron's (1990) concept of "pedagogic work" to identify three principles as an indicator of inclusive pedagogy: (a) a belief that all students are of value for the learning environment, (b) a design that values differences, and (c) actions that work with rather than act on students. This means that there has to be an interaction of these three principles, with beliefs being the ideas or principles that "name and frame good teaching". Beliefs about teaching inform pedagogic design and action (*ibid*, p. 349). It is particularly the belief about inclusive teaching that informs teachers' actions with respect to valuing heterogeneity, designing adequate learning environments, and taking appropriate measures. As a consequence, these beliefs have to be addressed within teacher training to prepare future teachers to be able to deliver successful inclusive teaching. In order to do so, an operationalized definition or a generally accepted concept of inclusive education could be a valuable guideline.

However, despite the UN demand for State Parties to ensure an inclusive education system, there is neither a generally accepted concept nor an operationalized definition of the term inclusive education (*cf.*: Farell, 2004; Göransson & Nilholm, 2014). So far, there have been several first attempts to provide common bases for the conceptualization of the term.

Artiles et al. (2006) state that inclusive education is an ambitious and far-reaching notion with multiple meaning ranging from physical integration in general education classrooms to transformation of school-buildings and reconfiguration of educational systems.

In line with that, Göransson and Nilholm (2014) provided four different types of definition:

- (1) the placement definition, denoting that inclusive education is achieved by the mere placement of pupils with and without special educational needs in mainstream classrooms

- (2) the specified individualized definition, which identifies inclusion as meeting the social and academic needs of pupils with disabilities
- (3) the general individualized definition, regarding inclusion as meeting the social and academic needs of all pupils in the classroom
- (4) the community definition, which expects educational inclusion to create social communities and companionships.

However, Artiles as well as Göransson and Nilholm agree that there is no operationalized definition or generally accepted concept. This is supported by Nilhom and Göransson (2017), who concluded from their analysis of journal articles that there is a lack of clarity concerning the definition of inclusion. This is the more troublesome as the concept is being used to define research and practice. Particularly teacher trainers and future practitioners in inclusive settings need guidelines as to what inclusive education is and how it can be implemented. As a consequence, instead of relying on a clear definition of inclusion they have to rely on beliefs about and the individual concepts of inclusive education (Grosche, 2015).

So far, little is known about pre-service teachers' beliefs about and individual concepts of inclusive education, important aspects of its definition, and communalities or differences between teachers' subjective conceptualization and definitions derived from experts' statements. Makoelle (2014) qualitatively analyzed six interviews with South-African teachers and deduced three themes which contribute to the explanation of different understandings of inclusive education. The first theme states that conceptualization of inclusive pedagogy appears not to be universal, but depends on the context. The second theme addresses two divergent discourses about inclusive education, namely a special needs discourse and a discourse of full inclusion; these two discourses influence the understanding of inclusion. Theme number three addresses the operationalizing of inclusive pedagogy, which ranges from strategy-oriented, and therefore teacher-centered, to creativity and flexible teaching, which is learner centered. These three themes provide first insights into teachers' conceptualization of inclusion and basically confirm the above-mentioned vagueness of the definition; they do not, however, operationalize the term inclusive education. Nor can they be generalized due to the small and specific sample group.

Przibilla, Linderkamp, and Krämer (2018) analyzed the answers of 182 in-service-teachers to the task *Define inclusive education in your own words* as part of an online survey to investigate these teachers' beliefs about inclusive education. An inductive, summarizing,

qualitative content analysis resulted in a system of 27 categories grouped in 9 dimensions, which address topics ranging from politics and educational system to attitude, participation, cooperation, differentiation as well as problems and barriers. This system of categories represents the aggregate belief of all teachers involved; it consists of a variety of possible facets, as exemplified by the topics of the dimensions. However, the authors emphasize that the results provide first insights into teachers' ideas and beliefs about inclusive education only, and they strongly recommend extended research on the conceptualization of inclusion. Hereby, it is of particular importance to extend research on pre-service teachers' conceptualizations of inclusive education and the means and methods to address them during teacher training.

One possibility to address pre-service teachers' beliefs may be to provide opportunities in which pre-service teachers of different courses of study collaborate in inclusive classrooms and reflect on and discuss about their beliefs. Scruggs, Mastropieri, & McDuffie (2007) found that co-teaching leads to professionalizing of both participating team partners. The authors state that co-teachers benefitted from their collaboration as they reported to have learned from each other and adapted their teaching to the needs of their pupils. In other words, co-teachers enhanced their beliefs about self-efficacy and teaching abilities.

In the context of inclusive education, not only beliefs about the capability to teach groups of heterogeneous pupils, but also beliefs about pupils' knowledge and learning (i.e. epistemological belief), particularly beliefs in improvable learning abilities and effortful learning, are key factors. Silverman (2007) identified an urgent need to develop high-level (epistemological) beliefs during preservice teacher training, as there is evidence that new teachers are lacking in this area. Jordan et al. (2009), however, extracted from their literature review that it is challenging to transform teachers' beliefs; rather, their development is almost entirely left to the field experiences, a component beyond the control of teacher educators. Therefore, the authors conclude, it is essential for teacher educators to ensure that pre-service teachers have practicum experience in which there are opportunities to examine and foster their beliefs. This is also supported by the findings of Hopkins, Round, and Barley (2018) who demonstrated in their study that, through elective-compulsory participation in supplementary fieldwork, pre-service teachers restructured their beliefs about pupils with learning difficulties as well as about their ability to teach them. To a great deal, this was found to be due to pre-service teachers having their preconceived ideas about people with

intellectual disabilities challenged and to their seeing progress of their pupils. Exactly that – academic progress of the pupils – was also demonstrated for co-taught classes, where pupils with and without disabilities benefitted greatly from there being two teachers in the classroom (Scruggs, Mastropieri, & McDuffie, 2007).

Additionally, for beliefs to be changed it is essential that teachers make explicit their implicit beliefs (Bendixen & Rule, 2004). Howard, McGee, Schwartz, and Purcell (2000) state that tacit beliefs can become explicit when teachers reflect on them and discuss them, and when they are challenged by feedback from colleagues and peers. Also, teachers need to acquire evidence of improvement in their pupils' outcomes in order to transform their beliefs (Guskey, 2002).

Consequently, co-teaching in the pre-service level not only includes practicum experience, it also facilitates transfer of expertise and extension of teaching skills, which leads to higher self-efficacy beliefs. Moreover, it leads to the acquisition of the experience that pupils improve academically, which leads to higher epistemological beliefs. Furthermore, co-teachers make explicit their implicit beliefs, reflect on them, may find them challenged through negotiation about teaching strategies, and also receive feedback on them from their partners and their mentors. Therefore, it is to be assumed that co-teaching in the pre-service level can influence and transform pre-service teachers' beliefs and thus contribute to preparing future teachers for successful inclusive education.

Adequate action in inclusive classrooms highly depends on teacher beliefs; therefore, they have to be addressed during teacher training. Generally accepted concepts or operationalized definitions of inclusive education could be valuable guidelines to address these beliefs; however, neither the one nor the other are available. Therefore, pre-service teachers have to fall back on their own beliefs. So far, there is scarce knowledge about the composition of pre-service teachers' beliefs about inclusive education as well as their influencing factors. Therefore, the first research question within this study is:

- What are pre-service teachers' beliefs about inclusive education before as well as after a period of practical experience?

Co-teaching is one of the pre-requisites for successful inclusive education. There is evidence to suggest that it triggers reflection and therefore transformation of teachers' beliefs. Thus, the second research question is:

- Is there a difference between the beliefs of teacher trainees working in mono- and those working in multi-professional co-teaching teams after the practical experience?

3.5.2 Material and Method

3.5.2.1 *Academic course*

Basis for the investigation is an elective-compulsory academic course for teacher trainees for Special educational Needs (henceforth referred to as SEN) and those for General education (henceforth referred to as GE) within the teacher education program at the University of Wuppertal, Germany. The course consists of three episodes: an introductory theoretical one, one of practical experience in inclusive classes in secondary schools, and one of reflection.

During the theoretical episode, teacher trainees are introduced to topics concerning inclusive education, such as the theoretical background of co-teaching, educational methodologies and strategies for inclusive settings, or instructional techniques (e.g. direct instruction, peer-tutoring, etc.) and aids for different special educational needs. Teacher trainees were then matched into tandems to form either mono-professional (two teacher trainees for GE or two teacher trainees for SEN) or multi-professional (one teacher trainee for GE and one teacher trainee for SEN) teams after the partners had had the opportunity to extensively introduce themselves to each other (e.g. by transferring expertise via jigsaw-activities, by sharing personal strengths and weaknesses as well expectations of each other).

During the practical episode, these tandems spent one complete school morning per week in inclusive classes at local schools for a period of twelve consecutive weeks. After having familiarized with the pupils and teachers in the class, they planned and conducted lessons on their own responsibility, but under the guidance of the subject teacher and the teacher for SEN at the schools. Lessons were given in one of the studied subjects of the two teacher trainees in the tandem; they were planned and conducted collaboratively, meaning that both partners' expertise was needed to provide access to the subject content for all pupils in the class.

At the end of the practical phase there was an episode of reflection, in which experiences were discussed on a meta-level with the instructors at the university, the intention of this episode being to facilitate a reflection of beliefs about inclusive education and pupils with exceptional needs (for a detailed description see Ritter et al., 2018).

3.5.1.2 *Participants*

The elective-compulsory academic course for teacher trainees for GE and for SEN was first offered in the summer term 2016 (April to September) and following that in four subsequent terms, i.e. five consecutive terms until summer term 2018. Within that time, a total of 97 teacher trainees attended the seminar, 53 of which were teacher trainees for SEN and 44

were teacher trainees for GE; 63 teacher trainees formed a total of 32 multi-professional teams (one teacher trainee of GE was in a team with an in-service teacher for SEN), 34 teacher trainees formed a total of 17 mono-professional teams. 80 participants were female. On average, the participants were 22.9 years old, with a standard deviation of 3.2 years. The teacher trainees for SEN were in their Bachelor's program in their second or third semester, the teacher trainees for GE were in their Master's program (semester 2, 3 or 4). 81% of all participants reported to have had practical experience in schools already; 66% reported to have had experience with pupils with SEN in schools and 56 % reported to have had experience with children with SEN in private contexts. About half of the participants reported to have attended seminars on inclusion prior to attending this elective-compulsory seminar, 40% reported to have attended seminars on the topic of co-teaching.

3.5.1.3 Data collection and analysis

The participating teacher trainees (N=97) created concept maps before (t1) and after (t2) the elective-compulsory seminar. Concept maps were originally invented to structure and visualize children's responses in clinical interviews (Novak & Cañas, 2008), and later advanced to a general technique for learning, teaching, and assessing structural knowledge (Novak & Cañas, 2010). They consist of labelled entities that represent concepts; the concepts are connected by directed arrows which carry a predicate to form propositions of two linked concepts and their linking-word. These propositions are fundamental units of meaning stored in our cognitive structure (Novak & Cañas, 2010).

The structure of the concept-map represents the structure and composition of knowledge of a person. In order to analyze concept maps using algorithmic methods, they have to be modelled as mathematical graphs. Each graph consists of nodes (concepts) and edges (links), which allows for the usage of graph-theoretical techniques for analysis. There are additional techniques to not only analyze individual concept maps, but also concept maps of whole groups of test persons together. Mühling (2017) summarizes different appropriate techniques to define the procedure of *Concept Landscaping*, which combines all concept maps of a group of people with all the contained nodes and edges to one common graph. This common graph can then be analyzed using statistical or graph-theoretical techniques, one of them being the technique of *pathfinder-analysis* (Mühling, 2014). Pathfinder networks only contain links made by very many participants. Very many in this context means that for the chosen parameters, the total amount of the used links is maximal (parameters p = total number of concepts -1; q = infinite); there is no other possibility to

connect all concepts and achieve a higher number of links. The lengths and paths of pathfinder networks contain information about how similar the connected concepts are in the original data. Thus, the pathfinder network is an algorithmic method of edge-pruning a graph by keeping all nodes and systematically remove edges (Mühling, 2017).

This strategy determines the most important structural characteristics of a group of concept maps, thus generating a network consisting of the most frequently used nodes and edges. The less frequently used nodes and edges, however, are not merely eliminated; instead, there are different parameters to govern the algorithm to render networks that are representative of all conflated concept maps (Mühling, 2014).

The resulting pathfinder networks can then be analyzed according to their structure. Kinchin, Hay, and Adams (2000) determined three different organization types of concept maps: (1) the chain structure, the simplest connection of one concept with the respective next, shows a linear connection of several concepts; (2) the spoke structure, slightly more elaborate, shows a central concept connected with several others; (3) the net-structure, where all the concepts are interconnected several times. The chain structure represents linear knowledge, without interconnection, the spoke-structure is a representation of slightly more elaborate and interconnected knowledge, and the net-structure represents a whole set of puzzle-pieces belonging to a knowledge domain. These puzzle-pieces are interconnected and mutually essential to make for the whole.

Furthermore, statistical measures such as betweenness centrality, degrees, or communalities can be applied to capture the characteristics of the landscape-graph. Analyses were carried out using the package *comato* for the statistical program *R*.

When creating these concept maps, teacher trainees were entirely free to choose any concept or linking word that they considered important to elicit on the guiding question *What is inclusive education?* There was neither a limit to the concepts nor to the linkings; linking-arrows could be uni- or bidirectional. In order to be able to conflate the individual concept maps to create landscape graphs, the original concepts used by the participants in their concept-maps had to be standardized prior to analysis. For that purpose, a summarizing content analysis of all the used concepts was performed, resulting in a set of 34 concepts.

In addition to the analysis of the structure and composition of the participants' knowledge, the propositions, i.e. two concepts and their linking predicate as the smallest units of analysis of the concept maps, were analyzed in order to gain insight into the semantic context of the concepts. For this purpose, an inductive, summarizing qualitative

content analysis (cf.: Mayring, 2015) was performed. Approximately half of all 2049 propositions were used to create a system of categories (for a detailed description see Ritter et al., in press), which then built the basis to code all the propositions using the software MAXQDA. Thereupon followed statistical analyses of the number of codings in given categories at the different testing times and also for participants in different team-constellation (multi- or mono-professional teams) using Excel and SPSS.

Thus, comparisons can be drawn between the different testing times as well as between the maps originating from teacher trainees in multi- with those in mono-professional teams at testing time t2. Thereby it can be explored (1) which concepts of inclusive education exist among teacher trainees and (2) whether there is a change of these concepts during the course of the seminar and also (3) whether there is a difference between teacher trainees in multi- and those in mono-professional teams.

3.5.3 Results

3.5.3.1 *Graph-theoretical analysis*

As a first step, all 97 concept maps of testing time t1 (before the seminar) and testing time t2 (after the practical episode) were standardized, transferred into mathematical graphs and amalgamated to render landscape-graphs. Of these graphs, pathfinder networks were created to visualize any differences before and after the seminar.

Furthermore, pathfinder networks were created from the concept-maps originating from participants in mono- and those in multi-professional teams at t2 to depict shared or different knowledge of a given group of participants.

The pathfinder network of all participants at testing time t1 shows the common belief about inclusive education before the seminar. (see figure 10).

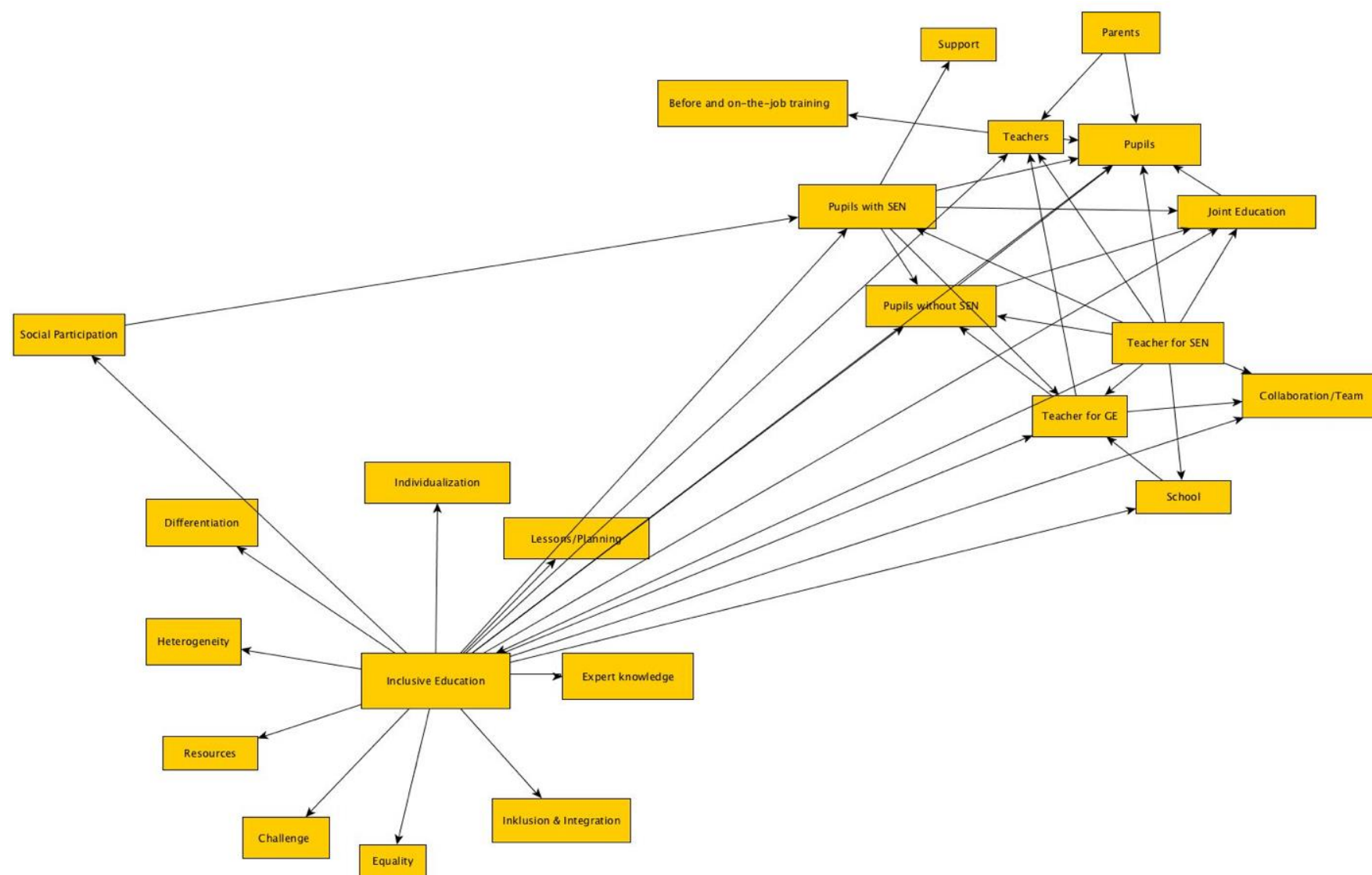


Figure 10. Pathfinder network of all teacher trainees at t1 (N=97)

As the visual impression conveys, the concept *Inclusive Education* is the most central one. This can be supported by calculating the *degree*, a measure that shows how many connections a given node has. Concepts that are very central in the network receive a high degree measure, marginal concepts receive low numbers. For the concept *Inclusive Education*, the degree measure is 19, followed – with a big difference – by the concepts *Teacher for SEN* (9), *Pupils with SEN* (8), and *Teacher for GE* (7). Among the least central nodes with a degree measure of 1 each are *Heterogeneity*, *Individualizing*, *Support*, and *Equality*.

After the seminar, at testing time t2, the pathfinder network again visualizes that the concept *Inclusive Education* is the most central one, meaning that this node has the highest number of connections (figure 11). Again, this is supported by the degree measure, which renders a value of 22, followed by the concept *Teacher for SEN* (13), *Teacher for GE* (12), and *Pupils with SEN*, *Teachers*, *Pupils* and *Collaboration/Team* (8 each). The least central concepts with a degree of 1 are *Challenge*, *Heterogeneity*, *Resources*, and *Lessons/Planning*.

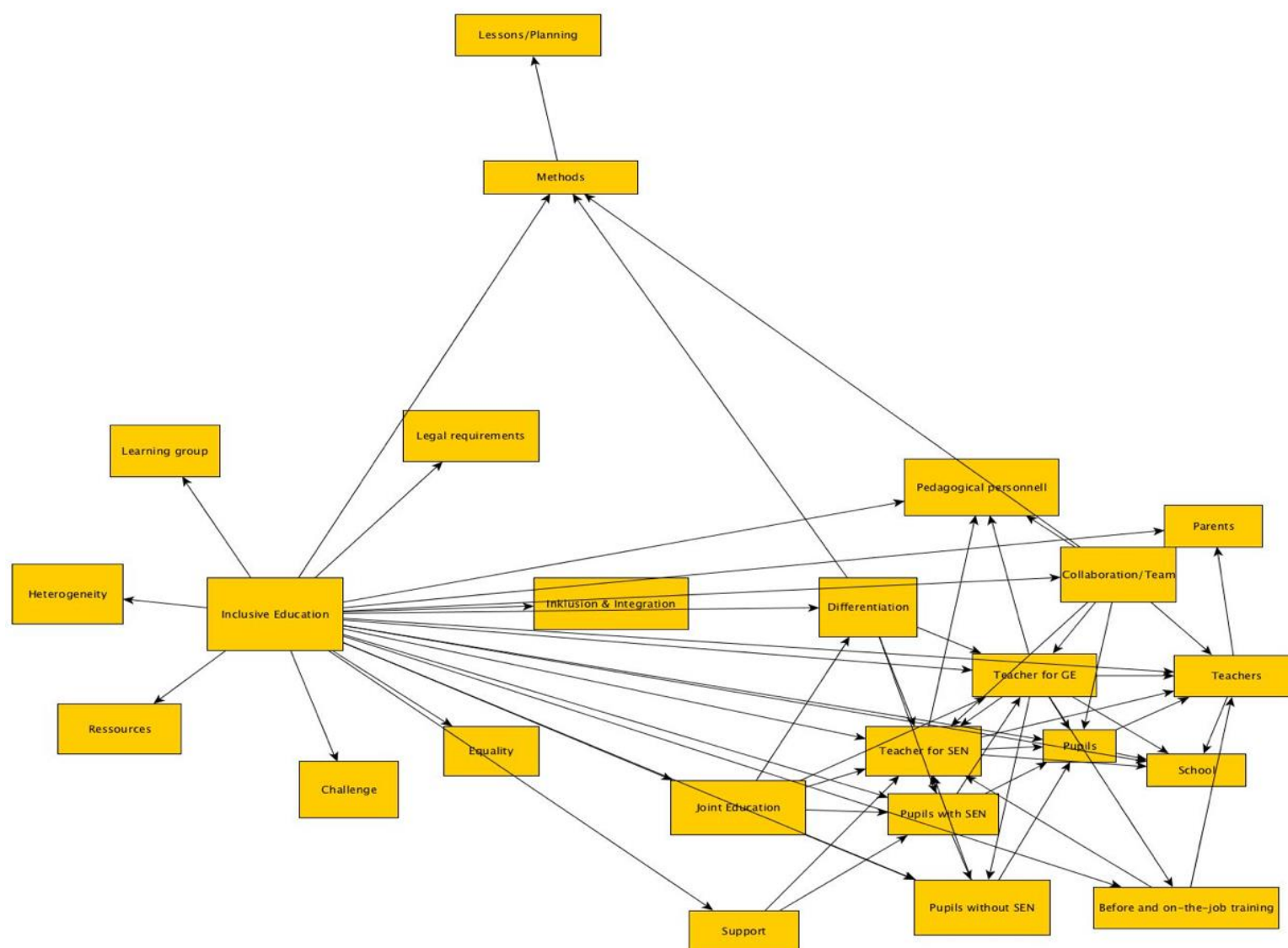


Figure 11. Pathfinder network of teacher trainees at t2 (N=97)

To determine whether there is a difference in the conception of inclusive education at testing time t2 between participants in multi- and those in mono-professional teams, pathfinder networks were created for each group. The pathfinder network created from the concept maps of participants in multi-professional teams (figure 12) shows that the concept *Inclusive Education* is connected with every other concept in the network. This is also supported by the degree measure: For *Inclusive Education*, the calculated degree is 19 (total number of concepts -1), followed – again with a big difference – by the concepts *Pupils with SEN*, *All Pupils*, and *Teacher for SEN* (degree measure of 8 each).

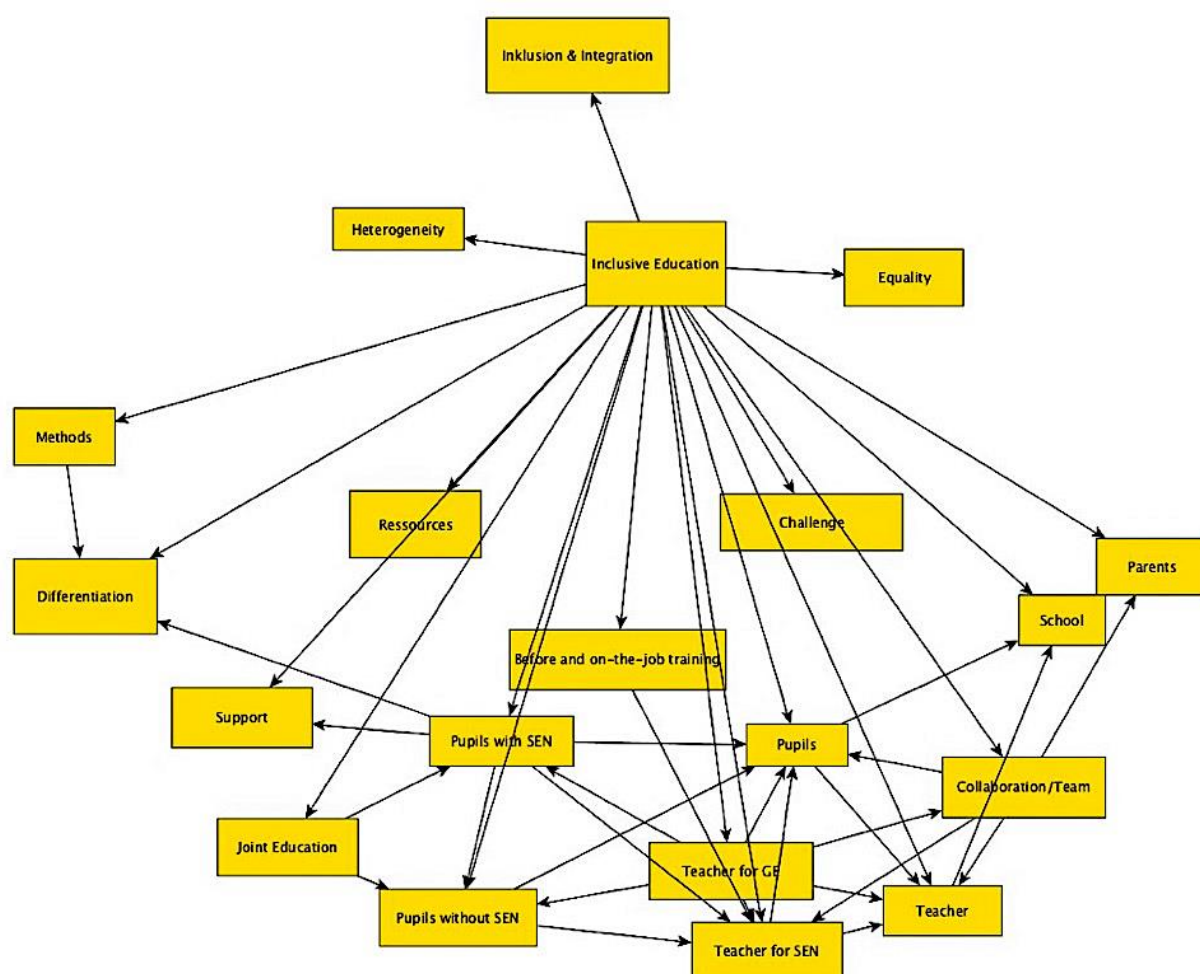


Figure 12. Pathfinder network of participants in multi-professional teams at t2 (N=63)

As for the pathfinder network created from the concept maps of participants in mono-professional teams (figure 13), the concept *Inclusive Education* is the one with the most connections; it is, however not connected with every other concept in the network (10 connections within 12 concepts). Concerning the number of connections, the concept

Teacher for SEN is ranked 2 (8 connections within 12 concepts), followed by *Teacher for GE* (7 connections within 12 concepts). The least connected concepts are *Resources* and *Parents* (1 connection each).

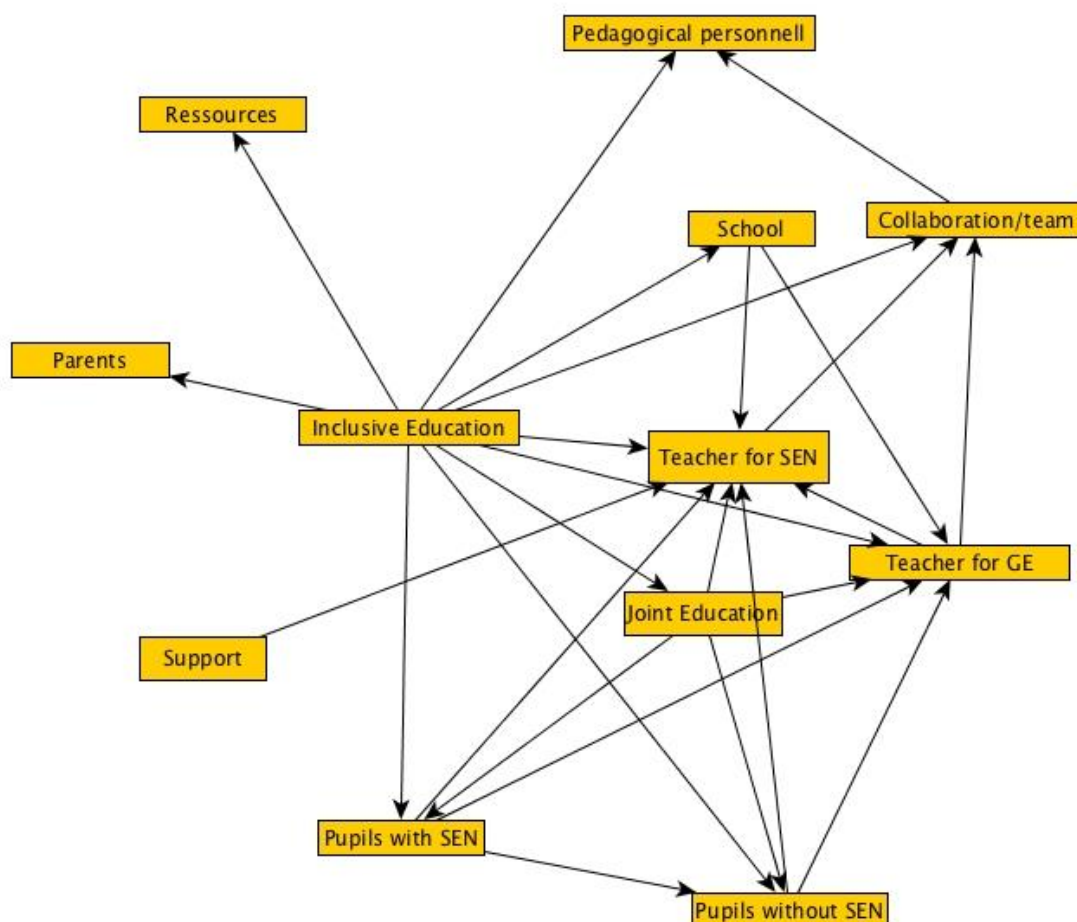


Figure 13. Pathfinder network of participants in mono-professional teams at t2 (N=34)

It is also important to note that the pathfinder network from participants in multi-professional teams contains 20 nodes, whereas the network from participants in mono-professional teams only contains 12 nodes. This is also represented by the measure *diameter*, which expresses the longest shortest path between any two nodes. For the pathfinder network of participants in multi-professional teams, the measure is 236, for the one of participants in mono-professional teams, it is 194. Among the concepts in the pathfinder network of participants in multi-professional teams are the concepts *Inclusion and Integration, Differentiation, Methods, or Equality*; these concepts are totally absent in the pathfinder network of participants in mono-professional teams. Moreover, in the pathfinder network created from the concept-maps of participants in mono-professional teams only

concepts addressing school, teachers and pupils are densely interconnected, the others are in a spoke structure solely connected to the concept *Inclusive Education*.

3.5.3.2 Content analysis

Before being able to analyze the obtained propositions from the concept maps, a system of categories had to be compiled by performing an inductive, summarizing qualitative content analysis (Mayring, 2008, 2015) from approximately half of the data material. For this purpose, the propositions were paraphrased, generalized, selected and reduced to result in a final system of 35 categories grouped in 7 dimensions (for a detailed description see Ritter et al., in press). An excerpt of the system of categories is displayed in table 13.

Table 13. Excerpt of Final System of Categories

NOTE: as this is an excerpt, only categories that are relevant for this study are listed for the complete system, please refer to Ritter et al., 2019)

Number	Dimensions and Categories
Dimension 1: VALUES AND ATTITUDES	
1.1	Inclusive education means equal rights, equal treatment and equal opportunities for everyone
1.3	Inclusive education needs and promotes acceptance, tolerance, consideration, esteem as well as social skills and moral values
1.4	Inclusive education needs and promotes positive attitudes, willingness, commitment, and motivation of all actors involved (e.g. teachers, parents)
Dimension 2: HETEROGENEITY	
2.4	Inclusive education is beneficial for all pupils (e.g. with and without need for support, high and low performing pupils, etc.)
Dimension 3: SCHOOL-LIFE AND TEACHING	

3.1	Inclusive education affects all actors involved (e.g. pupils, teachers, parents)
3.2	Inclusive education takes place in the common school life and/or in the whole school context
3.3	Inclusive education means joint teaching and/or that all pupils benefit from each other, help each other and support each other
3.4	Inclusive education denotes good teaching, successful individualization and adapted differentiation (e.g. through materials, methods, concepts, co-teaching)
Dimension 4: COLLABORATION AND PROFESSIONAL ROLES	
4.1	Inclusive education requires the collaboration and cooperation of all actors involved (e.g. teachers, parents, pupils)
4.2	Inclusive education means that all teachers have the same accountability and responsibilities for all pupils (e.g. teaching, caring, differentiating, supporting)
4.4	Inclusive education means that the special needs teacher diagnoses, teaches, supports, and fosters pupils with special educational needs
Dimension 5: INSTITUTIONS AND REQUIREMENTS	
Dimension 6: PREREQUISITES AND BARRIERS	
6.1	Inclusive education needs resources in general (e.g. time, money,...)
6.4	Inclusive education well-trained and qualified teachers with different expertise (e.g. methods)
Dimension 7: DISADVANTAGES AND CONSEQUENCES	

7.1	Inclusive education is only in its infancy, causing problems and difficulties
7.2	Inclusive education is contradictory, fails and can have negative consequences (e.g. for pupils with a special need)
7.3	Inclusive education is not properly implemented and/or rejected by teachers

This system of categories was then used to code the complete data material (2049 propositions) of the concept maps. On average, a teacher trainee's subjective concept of inclusive education consisted of 10 propositions. Therefore, the 10 categories into which the most propositions were coded, were determined for the testing times t1 and t2 for all participants to investigate whether there is a change of beliefs about inclusive education after having attended the seminar (table 14, for reasons of economic use of space, only the numbers of the categories are given in this and all subsequent tables. To find the corresponding categories, please refer to table 13). For t2, these 10 categories were then established for multi- and for mono-professional team members separately to investigate whether there is a difference of belief-change depending on the respective team partner.

For t1, roughly half of all propositions (47.9%) were coded into the categories of dimensions 3 *SCHOOL-LIFE AND TEACHING* and 4 *COLLABORATION AND PROFESSIONAL ROLES*, which shows that teacher trainees' beliefs about inclusive education concentrate on the aspects of schooling and teaching. Categories of these two dimensions are on rank 1 to rank 5 of the ones containing the most codings. Additionally, about 10% of the propositions were coded into categories of dimension 6 *PREREQUISITES AND BARRIERS*, about 7% of the propositions were coded into categories of dimension 1 *VALUES AND ATTITUDES*.

The numbers of propositions coded into a given category were then analyzed to compare the different testing times and team-constellations. For that purpose, only differences in the relative numbers of propositions coded into a given category greater than 2% were considered. This limit was chosen based on the distribution of the results and the spacing between the numbers of codings. Furthermore, student's *t*-tests were performed to test for statistical significance of the differences.

Table 14. Most frequent categories for t1 and t2
all participants and, in t2, divided into multi- and mono-professional teams

All participants t1 (N=97)	All participants t2 (N=97)	Participants in mono- professional teams, t2 (N=34)	Participants in multi-professional teams, t2 (N=63)
3.4 (9.5%)	4.2* (13.0%)	4.2 (13.3%)	3.4 (13.1%)
4.1 (9.4%)	3.4*, 4.1 (11.4%)	4.1 (11.3%)	4.2 (12.8%)
4.2 (9.2%)	3.1 (9.9%)	3.1, 3.4 (8.1%)	4.1 (11.4%)
3.3 (8.9%)	3.3* (6.3%)	3.3, 6.1 (7.2%)	3.1 (10.8%)
3.1 (7.5%)	6.1 (5.0%)	7.2 (4.9%)	3.3 (5.8%)
6.4 (6.6%)	7.2* (4.2%)	7.1 (4.1%)	6.4 (4.0%)
2.4 (4.5%)	6.4 (3.8%)	6.4 (3.5%)	6.1, 7.2 (3.9%)
6.1 (3.8%)	2.4 (3.0%)	3.2 (2.9%)	2.4 (3.4%)
1.1 (3.5%)	7.1, 7.3* (2.6%)	1.1 (2.6%)	7.3 (2.8%)
1.3, 3.2 (3.4%)	3.2 (2.5%)	7.4, 4.4, 2.4 (2.3%)	1.4 (2.4%)

Note. Categories are shown according to their relative number of codings (% of total codings).

Significant differences are marked with * (*p<.05, **p<.01, ***p<.001)

For t2, there are also categories among the top 10 that stem from the dimensions 6 *PREREQUISITES AND BARRIERS* and 7 *DISADVANTAGES AND CONSEQUENCES*, a fact that discloses a shift of the beliefs to the problems and barriers of inclusive education. Also, the category 3.4 *Inclusive education denotes good teaching, successful individualization and adapted differentiation (e.g. through materials, methods, concepts, co-teaching)* contains significantly more codings than at t1. Moreover, the categories of dimension 3 *School-life and teaching* and dimension 4 *COLLABORATION AND PROFESSIONAL ROLES* contain more than half of all propositions at t2; the proportion of propositions in dimension 6 *PREREQUISITES AND BARRIERS* and 7 *DISADVANTAGES AND CONSEQUENCES* increased to about 1/5 of all propositions. No category of dimension 1 *VALUES AND ATTITUDES* is among the 10 most frequently mentioned ones.

Considering the belief change from t1 to t2 of participants in multi-professional teams only (table 15), there are differences of more than 2% of the codings in 8 categories, including categories from dimension 6 *PREREQUISITES AND BARRIERS* and 7 *DISADVANTAGES AND CONSEQUENCES*; only one difference (category 3.3 of the dimension 3 *SCHOOL-LIFE AND TEACHING*) is significant. When looking at the belief change of participants in mono-

professional teams (table 16), however, there are 10 categories that show a difference of more than 2%, 6 of these differences are significant. It is interesting to note that the number of codings into categories of dimension 1 *VALUES AND ATTITUDES* decreased significantly, while the number of codings into categories of dimensions 6 *PREREQUISITES AND BARRIERS* and 7 *DISADVANTAGES AND CONSEQUENCES* increased significantly. There are differences, albeit not significant, in the number of codings between participants in multi- and those in mono-professional teams at t1 and also at t2 (tables 17 and 18).

Among the 10 categories with the most codings for multi-professional team-members are the categories 3.4 *Inclusive education denotes good teaching, successful individualization and adapted differentiation (e.g. through materials, methods, concepts, co-teaching)*, 2.4 *Inclusive education is beneficial for all pupils (e.g. with and without need for support, high and low performing pupils, etc.)*, and 1.4 *Inclusive education needs and promotes positive attitudes, willingness, commitment, and motivation of all actors involved (e.g. teachers, parents)*. Categories 2.4 and 1.4 are not among the 10 most frequently coded ones for the propositions of participants in mono-professional teams (table 16). Although the shares of codings in dimensions 3 *SCHOOL-LIFE AND TEACHING* and dimension 4 *COLLABORATION AND PROFESSIONAL ROLES* are comparable between participants in mono-professional and those in multi-professional teams, there are about twice as many codings in the dimensions 6 *PREREQUISITES AND BARRIERS* and 7 *DISADVANTAGES AND CONSEQUENCES* for the propositions of participants in mono-professional compared to multi-professional teams at T2 (table 18). Also, the share of propositions coded into dimensions 1 *VALUES AND ATTITUDES* and 2 *HETEROGENEITY* is higher in concept maps from participants in multi-professional compared to those in mono-professional teams.

Table 15. Teacher trainees in multi-professional teams at t1 compared to t2

relative frequency of propositions coded into the respective categories

Category	Percentage of propositions coded into category		Difference in %	<i>p</i>
	t1	t2		
2.4	5.5	3.4	2.0	.075
3.1	7.4	10.8	3.4	.126
3.3	8.5	5.8	2.7	.027*
3.4	10.1	13.1	2.9	.178
4.2	9.2	12.8	3.6	.085
6.2	9.1	2.2	2.1	.063
6.4	6.5	4.0	2.5	.229
7.2	1.7	3.9	2.2	.147

Note. Only categories with differences greater than 2 percent are shown

(* $p < .05$, ** $p < .01$, *** $p < .001$)

Table 16. Teacher trainees in mono-professional teams at t1 compared to t2

relative frequency of propositions coded into the respective categories

Category	Percentage of propositions coded into category		Difference in %	<i>p</i>
	t1	t2		
1.1	6.2	2.6	3.6	.638
1.3	4.3	1.2	3.2	.031*
2.3	2.2	0.00	2.2	.032*
4.1	6.5	11.3	4.8	.008**
4.2	9.2	13.3	4.1	.212
4.3	4.8	1.2	3.7	.039*
6.1	5.1	7.2	2.1	.354
6.4	6.7	3.5	3.3	.033*
7.1	1.6	4.1	2.4	.304
7.2	1.4	4.9	3.6	.046*

Note. Only categories with differences greater than 2 percent are shown
(* $p < .05$, ** $p < .01$, *** $p < .001$)

Table 17. Teacher trainees in multi-compared to mono-professional teams at t1

relative frequency of propositions coded into the respective categories

Category	Percentage of propositions coded into category		Difference in %	<i>p</i>
	Multi-professional	Mono- professional		
1.1	2.0	6.2	4.2	.976
2.4	5.5	2.7	2.8	.059
4.1	11.0	6.5	4.6	.095
4.3	1.5	4.9	3.3	.155
6.1	3.0	5.1	2.1	.481

Note. Only categories with differences greater than 2 percent are shown
(* $p < .05$, ** $p < .01$, *** $p < .001$)

Table 18. Teacher trainees in multi- compared to mono-professional teams at t2

relative frequency of propositions coded into the respective categories				
Category	Percentage of propositions coded into category		Difference in %	p
	Multi-professional	Mono-professional		
3.1	10.9	8.1	2.8	.263
3.4	13.1	8.1	5.0	.071
6.1	3.9	7.2	3.4	.114
7.1	1.9	4.1	2.1	.399

Note. Only categories with differences greater than 2 percent are shown.

(*p<.05, **p<.01, ***p<.001)

3.5.4 Discussion

3.5.4.1 Beliefs about inclusive education

The aim of the present study is to investigate what teacher trainees' beliefs about inclusive education are and whether multi- and mono-professional co-teaching in inclusive classes leads to a different change of these beliefs.

3.5.4.1.1 Pre-service teachers' beliefs before and after the seminar

When looking at the pathfinder network of all participants before the seminar, it becomes obvious that the concepts addressing teachers, pupils, and school in general are interconnected, meaning that all the concepts are interlinked. In contrast, concepts addressing requirements or effects of inclusive education are depicted in a spoke-structure, with *Inclusive Education* being the 'wheel hub' and the connected requirements and effects are the spokes, meaning that requirements and effects have only a single connection to *Inclusive Education*. This wheel is 'detached' from the net-structure *school*. This means that teacher trainees' knowledge/beliefs about school in general is a network of all relevant concepts, while the beliefs about inclusive education are not as elaborate (Kinchin, Hay & Adams, 2000). While teacher trainees are aware that *Expert Knowledge*, *Resources*, or *Individualization* are sections of the concept *Inclusive Education*, they stand disconnected from the sections that represent the concept *school*. There seem to be two compartments in the participants' belief system: one concerning school and one concerning requirements and effects of inclusive education. However, the concept *Inclusive Education* itself is the most

central one connected with almost every other concept in the network. This is not particularly surprising as the guiding question for the creation of the concept maps was *What is inclusive education?*.

The results of the qualitative analysis of the propositions also reveal that teacher trainees' beliefs about inclusive education is mainly composed of aspects regarding teaching adapted to the needs of pupils as well as the roles of teachers. In addition to that, there are aspects regarding equal rights and tolerance as well as the necessity of external resources and well-trained teachers.

This stands in contrast to Przibilla, Linderkamp, and Krämer's (2018) findings according to which the majority of utterances of in-service teachers was coded into the category addressing integration, participation, and belonging (rank 1). Additionally, the category addressing community of all people in the social area of life received the third most codings. This means that in-service teachers' subjective conceptualization of inclusive education represents Göransson and Nilholms (2014) definition-type 4, the community definition, which expects educational inclusion to create social communities and companionships, whereas teacher trainees' subjective conceptualization represents type 2, the specified individualized definition, which identifies inclusion as meeting the social and academic needs of pupils with disabilities. One explanation of that may be that pre-service teachers' primary concern is to meet the needs of pupils with disabilities by differentiating and individualizing their teaching, whereas in-service teachers are more experienced in doing that. Their focus lays on ensuring participation of all pupils and enhancing feelings of community. This can be supported by the study of Hopkin, Round, and Barley (2018), who state that teacher professionalism is a composition of knowledge about self, action, and understanding of one's role in work and society. Experienced teachers see and understand their role such that they have to contribute to a functioning society.

The pathfinder network for testing time t2, again, shows the net-structure with concepts addressing school in general and the spoke-structure containing requirements and effects; however, the concept *differentiation* is now part of the net-structure, connected with *Teachers for SEN* and *Teachers for GE* as well as *Pupils with SEN* and *Joint education*. Furthermore, it is connected with an additional concept, namely *Methods*. This finding allows for the assumption that participants' conception of inclusive education expanded to include aspects of joint as well as individualized teaching by both the teacher for SEN and

that for GE. It is both teachers' responsibility to deliver teaching adapted to the needs of pupils with SEN.

Moreover, the pathfinder network shows a denser interconnectedness of the concepts; particularly the concepts *Differentiation* and *Support*, concepts that show a single connection in the pathfinder map of testing time t1, are much more interconnected with concepts concerning schooling and teaching. This means these concepts have become part of the network-structure and are therefore part of a network-knowledge. The practical experience of teaching in inclusive classes seems to change pre-service teachers' awareness to conceive of differentiation and individual support as being an inherent part of teaching and schooling.

The qualitative analysis of the propositions supports the structural analysis: Pre-service teachers' beliefs about inclusive education are mainly composed of aspects around school and teaching as well as aspects addressing problems and barriers; aspects concerning things like equality, participation and the like only make for a very small proportion in the composition.

This is in line with the findings of Hopkins, Round, and Barley (2018), who came to discover that teacher trainees, who participated in a field-work program, developed effective strategies for differentiating tasks and promoting motivation and task engagement. Differentiation strategies are not only essential for teaching in inclusive classrooms, but also contribute to an increased self-efficacy expectation of teacher (trainee)s, as the experience to be able to motivate students and provide alternative explanations when students are confused are important contexts for its development (Tschannen-Moran & Hoy, 2007). Just as well, Jordan, Schwartz and McGhie-Richmond (2009) concluded from their literature review that initial teachers' beliefs are malleable through teachers' direct experience with children in their classrooms, where pre-service teachers acquire evidence of improvement in student learning. This conclusion seems to be confirmed with the data of the present study.

However, the practical experience also leads to the recognition of barriers and possible disadvantages of inclusive education. This is in contrast to the findings of Gökdere (2012), Boyle, Topping, and Jindal-Snape (2013), and Specht et al. (2015), who state that new teachers seem to be more positive toward inclusive education than those with years of experience. They also found out that direct experience in teaching students with special needs increases self-efficacy expectations, particularly experience that is of longer duration. For the participants in this study, the opposite seems to be the case, and the reason for this may either be the poor implementation of inclusive education in some German schools (cf.

VBE, 2017) or inadequate instruction during the practical experience (cf. Peebles & Mendaglio, 2014).

3.5.4.1.2 Multi- and mono-professional teams: comparison of beliefs

A comparison of the pathfinder networks of participants in multi-professional teams with that of participants in mono-professional teams at t2 reveals that the latter is much less elaborate, lacking concepts like heterogeneity, equality, differentiation, and methods, which are constituents of the subjective theories of participants in multi-professional teams. The subjective belief about inclusive education of teacher trainees in mono-professional teams only includes concepts addressing school in general, all the related actors, and – additionally – the concepts collaboration/team and resources. In other words, beliefs of teacher trainees in mono-professional teams do not expand to include concepts that should actually constitute inclusive education: equality, heterogeneity, and differentiation, as is the case for participants in multi-professional teams. Additionally, the concept Methods, Legal requirements, and Learning groups are included in the pathfinder network of participants in multi-professional teams at t2, but not in the network of all participants at t1. This means that the pre-service teachers working in multi-professional teams conceive of inclusive education as teaching that has to fulfil certain legal requirements, affects different learning groups, and requires different methods.

Again, this is supported by the qualitative analysis of the propositions: Teacher trainees who work in mono-professional teams conceive of inclusive education as only concerning school in general and as being problematic, whereas teacher trainees working in multi-professional teams conceive of inclusive education as also addressing equality and heterogeneity.

One explanation for that may be that there is a transfer of expertise between the two partners of different disciplines. In Scruggs, Mastropieri, and McDuffy's (2007) meta analysis, teachers who were members in multi-professional teams reported to have benefitted from their partners' expertise and to have gained higher levels of self-efficacy. This is also supported by the findings of Alvarez-McHatton and Daniel (2008), which indicate that both the special education majors and the English education majors gained knowledge about the respective other's expertise by a co-teaching experience at the pre-service level. As for the results of the present study, this means that the teacher trainees in multi-professional teams made use of both partners' expertise to expand their beliefs of inclusive education to include aspects like differentiation, equality, and heterogeneity. Additionally, teacher trainees in

multi-professional teams may have had more opportunities to discuss their beliefs with their partners of different disciplines while talking about each partners' expertise. Discussing beliefs entails reflecting on them; and just this has been shown by several scholars to facilitate change (Howard et al. 2000; Brownlee, Purdie, & Boulton-Lewis, 2001).

For the teacher trainees in mono-professional teams, there was no such 'other' expertise and therefore probably little need to make explicit their implicit beliefs, reflect on them, negotiate different strategies and attempts to inclusive education. In other words, there was no challenging of beliefs concerning teaching strategies or learning abilities. For members in multi-professional teams, on the other hand, these negotiations may have been reason for conflict, and by trying to resolve them, there might be restructuring of the belief system. According to Stein (2011), it is not the development of competencies that makes up professionalism for inclusive education, but it is predominantly learning on and in contradiction. The contradiction the teacher trainees encountered here may ignite the critical approach to an inclusive pedagogy and thus add to their expansion of beliefs.

3.5.4.2 Limitations

The present study is of exploratory nature, the purpose of which is to provide insight into the complex field of teacher beliefs about inclusive education and its transformation through multi- or mono-professional co-teaching. Moreover, it constitutes qualitative research that does not strive to produce generalizable results.

The authors are aware that there are several confounding factors in the research study. For one, teacher trainees were in different semesters and programs of their study, which means that the study was performed with a very heterogeneous group of pre-service teachers at very different levels of expertise.

Furthermore, the practical experience was gained in non-standardized environments at different schools and school-types. Although the mentoring teachers at the schools were instructed regarding the pre-service teachers' tasks in class, university teachers' expectations, the scope of the research study and the like, there are still non-comparable framework conditions during the practicum.

Moreover, as the basis is an elective-compulsory seminar, participants are not neutral towards inclusive education; rather, they opted to attend this seminar because they are positive toward it. Therefore, the results are not representative of the basic population of pre-service teachers at the University of Wuppertal.

Another confounding factor may be the research methodology. Pre-service teachers were to construct concept maps, a method which may not be familiar. Therefore, pre-service teachers may have been too distracted by the creation and thus may have not been able to fully visualize their subjective concept. Consequently, it is possible that the results do not represent pre-service teachers' beliefs in its entirety.

3.5.4. Conclusion and Implementation

Despite the above-mentioned and further limitations, the results are of value for teacher training and future research. The evaluation of the concept maps using graph-theoretical as well as content-analysis methods provides insight into pre-service teachers' concepts of inclusive education, the interconnectedness of the composing concepts, and lacks of connections between specific concepts.

Pre-service teachers' beliefs appear to be mainly composed of aspects concerning schooling and teaching. Furthermore, the results reveal that, through practical experience in multi-professional co-teaching teams, teacher trainees' beliefs about inclusive education expand to include concepts denoting good inclusive education, i.e. differentiation, equality, and heterogeneity. Practical experience in mono-professional teams, however, does not lead to the expansion of beliefs; rather, beliefs are and remain confined to constituents regarding school in general as well as disadvantages and barriers of inclusive education.

The objective of this study is to explore teacher trainees' conceptualization of inclusion before and after practical experience in one of a co-teaching-constellation (multi- or mono-professional). However, the applied mixed-method-analysis also allows for the deduction of a definition of inclusive education. On the basis of multi-professionally working teacher trainees' conceptualization, the following definition is proposed: 'Inclusive Education is the joint education of all pupils; it calls for adequate methods to facilitate differentiated instruction and support for all pupils. Additionally, it calls for the collaboration and teamwork of all teachers, parents, and all pupils to result in equality and appreciation of heterogeneity; in that, it constitutes a challenge and calls for the provision of suitable resources.' This means, the definition proposed here covers not only the academic success of pupils with SEN, but that of all the pupils in the class. In addition, it covers that the aim of inclusion be to value heterogeneity and equal opportunities, an aspect that goes beyond academic success pointing at the need for social change.

It is essential that pre-service teachers be prepared to act adequately to meet the needs of all pupils. Therefore, as beliefs are action guiding in the classrooms, it is also essential to expand those beliefs to include supportive measures. Multi-professional co-teaching during teacher training seems to be a probate method to meet this requirement.

3.5.5 Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

3.5.6 Ethic Statement

This study was carried out in accordance with the ethical guidelines of the German Association for Educational Sciences. The study has not been subjected to review by an ethical committee since, according to German legislation regarding research on human subjects, research needs approval from an ethical committee only in cases where personal and sensitive information is handled, when physical interventions are made, or when the subjects may be harmed. In line with this, approval from an ethical committee is not required by the university where the research was conducted. All subjects have been informed about the purpose of the research, that their participation is voluntary, and that they can interrupt their participation at any time. Written informed consent have been given by all subjects. Within the study, responses were given in anonymized form, the authors did not have access to identifiable information.

3.5.7 Author Contributions

RR conducted the research study including data collection and analysis

AW contributed significantly to designing and conducting the academic seminar and also to critical reading of the manuscript

GL is the head of the department and supervisor

PK contributed significantly to the methodologies used in the study

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3.5.11 Data Availability Statement

The raw data supporting the conclusions of this manuscript will be made available by the authors, without undue reservation, to any qualified researcher.

3.6 Cluster Analysis of the Propositions

The propositions from the concept maps were qualitatively analyzed using the previously composed system of categories. This system served to code the propositions into the respective categories and dimensions. Of these numbers of codings in the respective categories and from the different testing times, cluster-analyses were performed. For that, an initial hierarchical cluster-analysis was conducted to estimate the number of clusters within the data. The visual impressions from the dendrograms (see Appendix 6 and 7) suggest to build 2 clusters for the data of the pre-test (t1) and 4 clusters for the data of the post-practice (t2) test.

Calculations of test-statistics to support these numbers of clusters were performed. For the testing time t1, a two-cluster solution is optimal as the relative improvement of elucidated distribution (PRE_k) as well as the optimal variance relation (FMX_k) show their highest value at the two-cluster solution (Appendix 8). For the testing time t2, a six-cluster solution would provide the most elucidated distribution (ETA_k); however, when also considering the relative improvement of elucidated distribution (PRE) and the optimal variance-relation (FMX) as well as the visual impression from the dendrogram, a four-cluster solution seems appropriate (Appendix 9). This is also supported by the content-related interpretability: each of the clusters shows a distinct and characteristic cluster center.

The subsequent *k-means* Cluster-Analysis shows that, for the pre-test (t1), 10 of 35 categories contribute significantly to the cluster-formation, 6 of which are from the dimensions 3 (SCHOOL-LIFE AND TEACHING), 4 (COLLABORATION AND ROLES), and 5 (INSTITUTION AND REQUIREMENT). 4 categories are from the dimension 6 (PRE-REQUISITES AND BARRIERS) and 7 (DISADVANTAGES AND CONSEQUENCES). Figure 14 shows the cluster-composition and the respective categories.

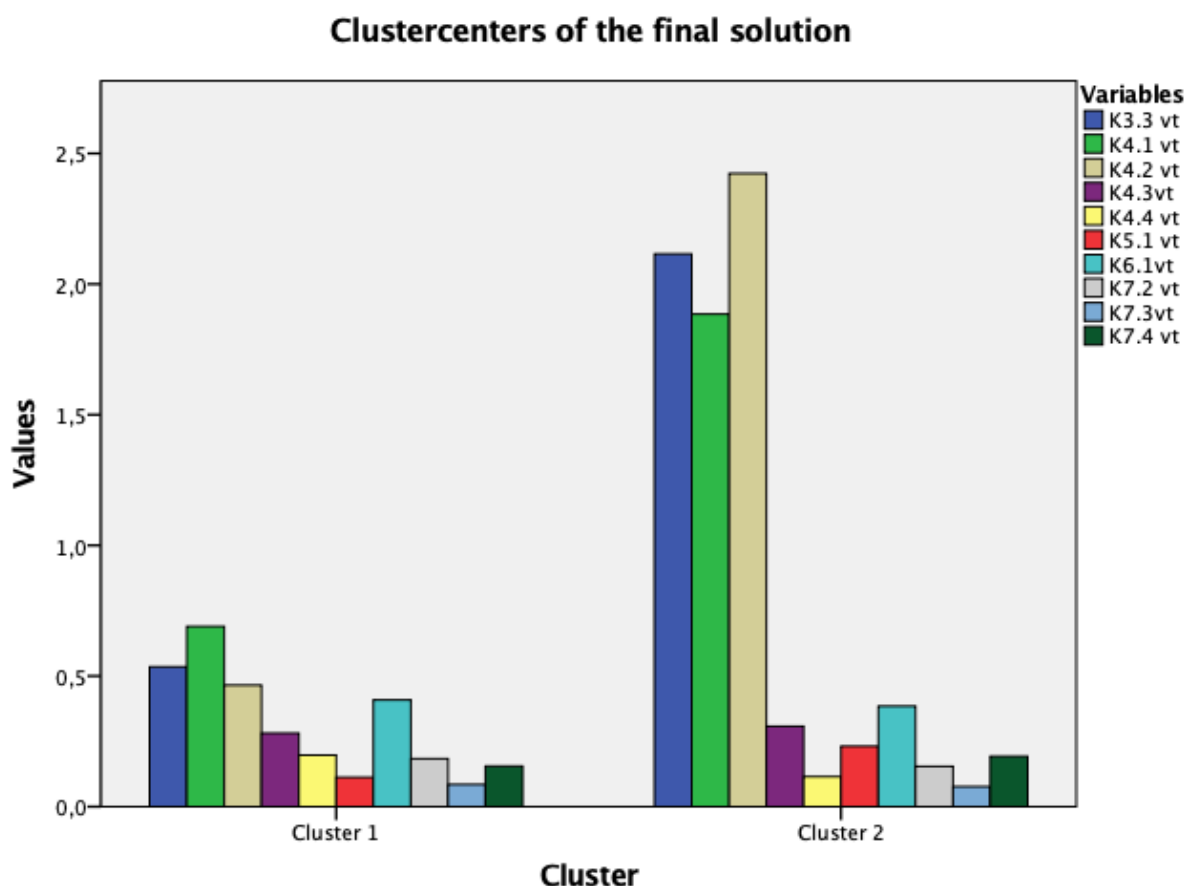


Figure 14. Cluster centers for a two-cluster solution; Pre-test

When looking at the two-cluster solution, it becomes obvious that cluster 1 shows no dominant category. Rather, all 10 categories are represented in comparably low values. This cluster represents the “Generalists”, participants who state no particular aspect of inclusive education. Cluster 2 shows three categories that are represented in higher values, namely category 3.3 *Inclusive education means joint teaching and/or that all pupils benefit from each other, help each other and support each other*, 4.1 *Inclusive education requires the collaboration and cooperation of all actors involved (e.g. teachers, parents, pupils)*, and 4.2 *Inclusive education means that all teachers have the same accountability and responsibilities for all pupils (e.g. teaching, caring, differentiating, supporting)*. This cluster, therefore, represents the “Joint education and shared responsibility”- stressing participants.

For the testing-time post-practice (t2), there are 13 categories that significantly contribute to the cluster-formation, five of which are from the dimensions 3 (SCHOOL-LIFE

AND TEACHING) and 4 (COLLABORATION AND ROLES). Five categories are from the dimension 6 (PRE-REQUISITES AND BARRIERS) and 7 (DISADVANTAGES AND CONSEQUENCES). Figure 15 shows the cluster composition and the contribution of the respective categories.

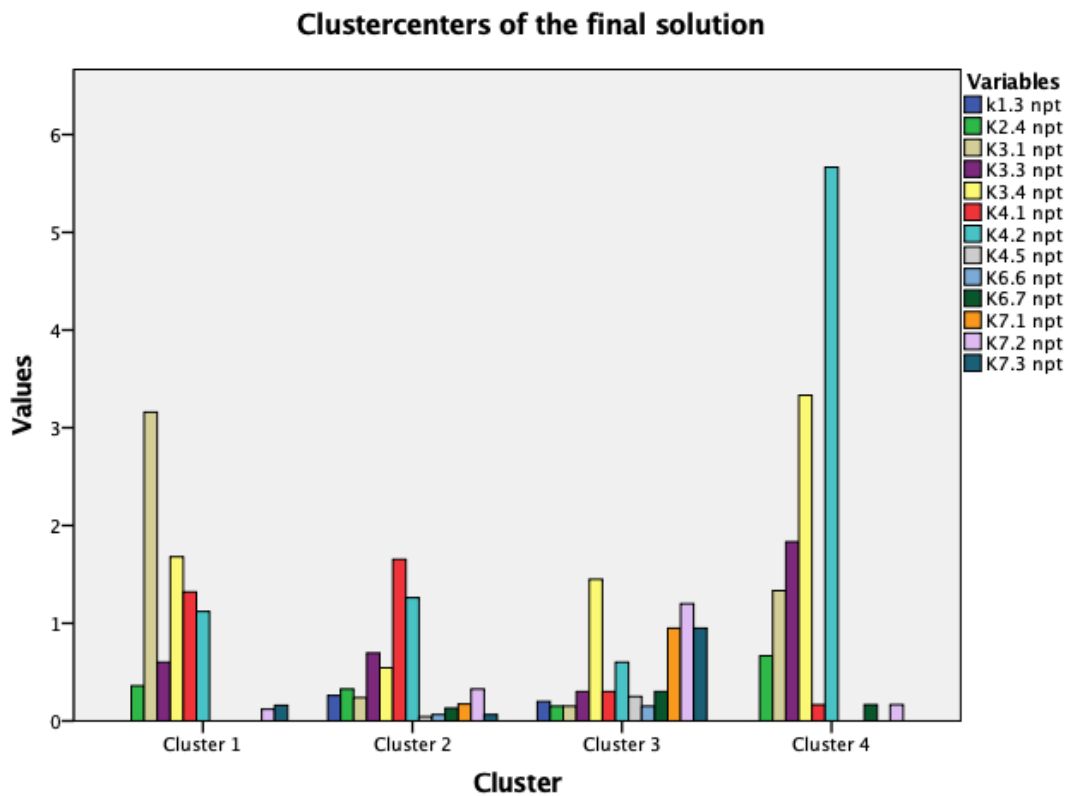


Figure 15. Cluster-centers of a four-cluster-solution, post-practice test

This 4-Cluster solution shows that every cluster contains dominant categories. For cluster 1, this dominant category is 3.1 *Inclusive education affects all actors involved (e.g. pupils, teachers, parents)*. Therefore, this cluster represents the participants seeing that educational inclusion not only affects teachers and pupils with SEN, but everyone involved in the school system.

Cluster 2 shows two dominant categories, 4.1 *Inclusive education requires the collaboration and cooperation of all actors involved (e.g. teachers, parents, pupils)* and 4.2 *Inclusive education means that all teachers have the same accountability and responsibilities for all pupils (e.g. teaching, caring, differentiating, supporting)*. Hence, the cluster represents participants stressing on cooperation of all those involved.

In Cluster 3, there are 4 dominant categories: 3.4 *Inclusive education denotes good teaching, successful individualization and adapted differentiation (e.g. through materials, methods, concepts, co-teaching)*, 7.1 *Inclusive education is only in its infancy, causing problems and difficulties*, 7.2 *Inclusive education is contradictory, fails and can have negative consequences (e.g. for pupils with a special need)*, and 7.3 *Inclusive education is not properly implemented and/or rejected by teachers*. This cluster, therefore, represents participants who are convinced that inclusion means individualized instruction, but also see that inclusion is contradictory and not properly implemented (“differentiation and difficulties”).

Cluster 4 is clearly dominated by the category 4.2 *Inclusive education means that all teachers have the same accountability and responsibilities for all pupils (e.g. teaching, caring, differentiating, supporting)*, therefore it is a representation of the participants stressing on the shared responsibility when implementing inclusive education.

Figure 16 shows the cluster affiliation of the teacher trainees at t1 and t2.

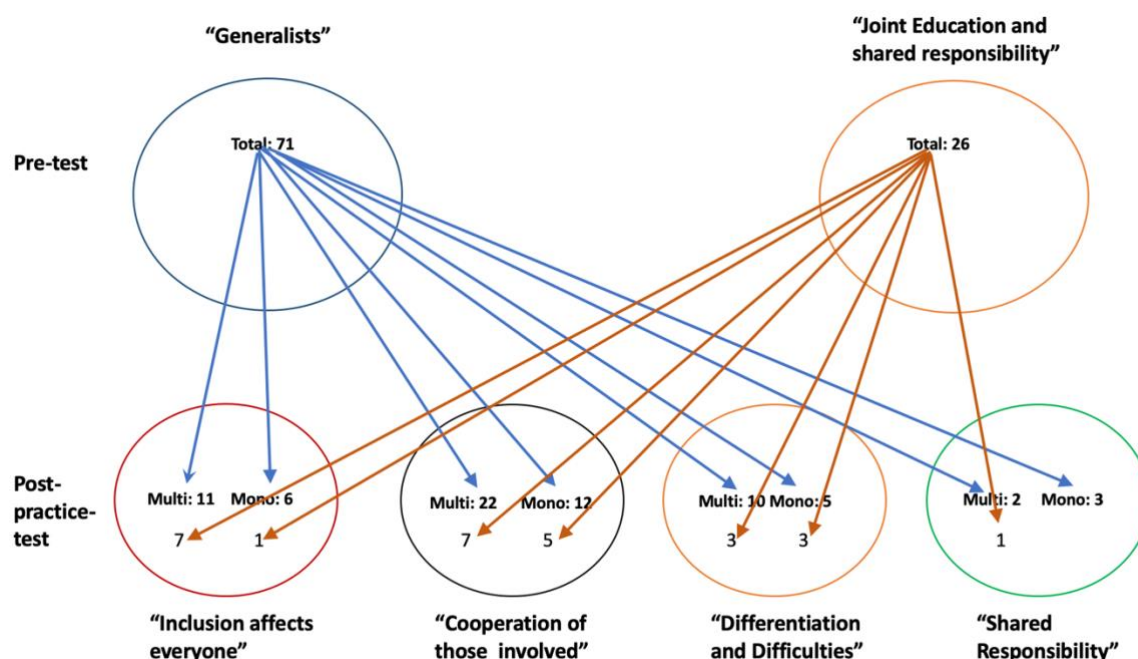


Figure 16. Cluster affiliation of teacher trainees in mono- and those in multi-professional teams at t1 and t2

In the pre-testing, the “generalist” cluster is by far the biggest with 71 teacher trainees; only 26 teacher trainees stress the importance of joint education and shared responsibility. In the post-practice-test, 29 teacher trainees who worked in multi-professional teams and 17 who worked in mono-professional teams changed to the cluster “cooperation

of those involved”. This means that a total of 46 and with that almost half the participating teacher trainees stress the importance of cooperation after the practical experience in a co-teaching team. It is important to note that the ratio multi- to mono-professionally working teacher trainees in this cluster roughly resembles that of all participants (1.8 for all participants, 1.7 for this cluster).

The second biggest cluster in the data of the post-practice test is “Inclusion affects everyone”, representing the propositions of 25 teacher trainees. Here, the ratio multi- to mono-professionally working teacher trainees is 2.6 and with that higher than in the other clusters. This means that more teacher trainees working in multi-professional teams stress the fact that inclusion affects everyone involved in the school-system.

“Differentiation and difficulties”, the cluster on the third rank, represents a total of 20 teacher trainees, with the ratio multi- to mono-professional again roughly resembling that of the whole sample (1.7). The smallest cluster represents only 6 teacher trainees in equal shares of multi- and mono-professionally working team members.

In summary, it can be said that, after the practical experience in co-teaching in inclusive classrooms, 73% of the participating teacher trainees stress the importance of cooperation of those involved and the affectedness of everyone by educational inclusion. Only 20% lay the emphasis on differentiation and difficulties of educational inclusion, and 6% emphasize, that educational inclusion mainly means shared responsibility.

3.7 In-service teachers' beliefs about inclusive education

In addition to evaluating concept maps created by pre-service teachers, also concept maps created by in-service teachers were analyzed. This sample of in-service teachers consist of teachers for SEN (7) as well as teachers for GE (10). These teachers have been in service for between 2 and 28 years; all of them reported to have experience with inclusive education. The concept maps were analyzed using summarizing, inductive qualitative content analysis as well as graph-theoretical analysis techniques. The graph-theoretical analysis enables the researcher to investigate the complexity of a person's knowledge about a given state of affairs. In that context, Kinchin, Hay, and Adams (2000) determined three different organization types of concept maps: (1) the chain structure, the simplest connection of one concept with the respective next, shows a linear connection of several concepts; (2) the spoke structure, slightly more elaborate, shows a central concept connected with several

others; (3) the net-structure, where all the concepts are interconnected several times. The chain structure represents linear knowledge, without interconnection, the spoke-structure is a representation of slightly more elaborate and interconnected knowledge, and the net-structure represents a whole set of puzzle-pieces belonging to a knowledge domain. These puzzle-pieces are interconnected and mutually essential to make for the whole.

The amalgamed pathfinder network combining all teachers' individual concept maps shows that the concept "Inclusive Education" is the wheel-hub of a spoke structure composed of the concepts Heterogeneity, Pupils, Pedagogical Personnel, and Legal Requirements. These concepts are not connected with any other concept in the network. Moreover, there is a chain structure of the concepts Inclusive education → parents → Pupils with SEN → Support. There is no genuine net structure to be found in this pathfinder network. This means that in-service teachers' conceptualization of inclusive education is not particularly elaborate; the necessity to collaborate in a team of teachers for SEN and teachers in general, however, is part of the conceptualization (figure 17).

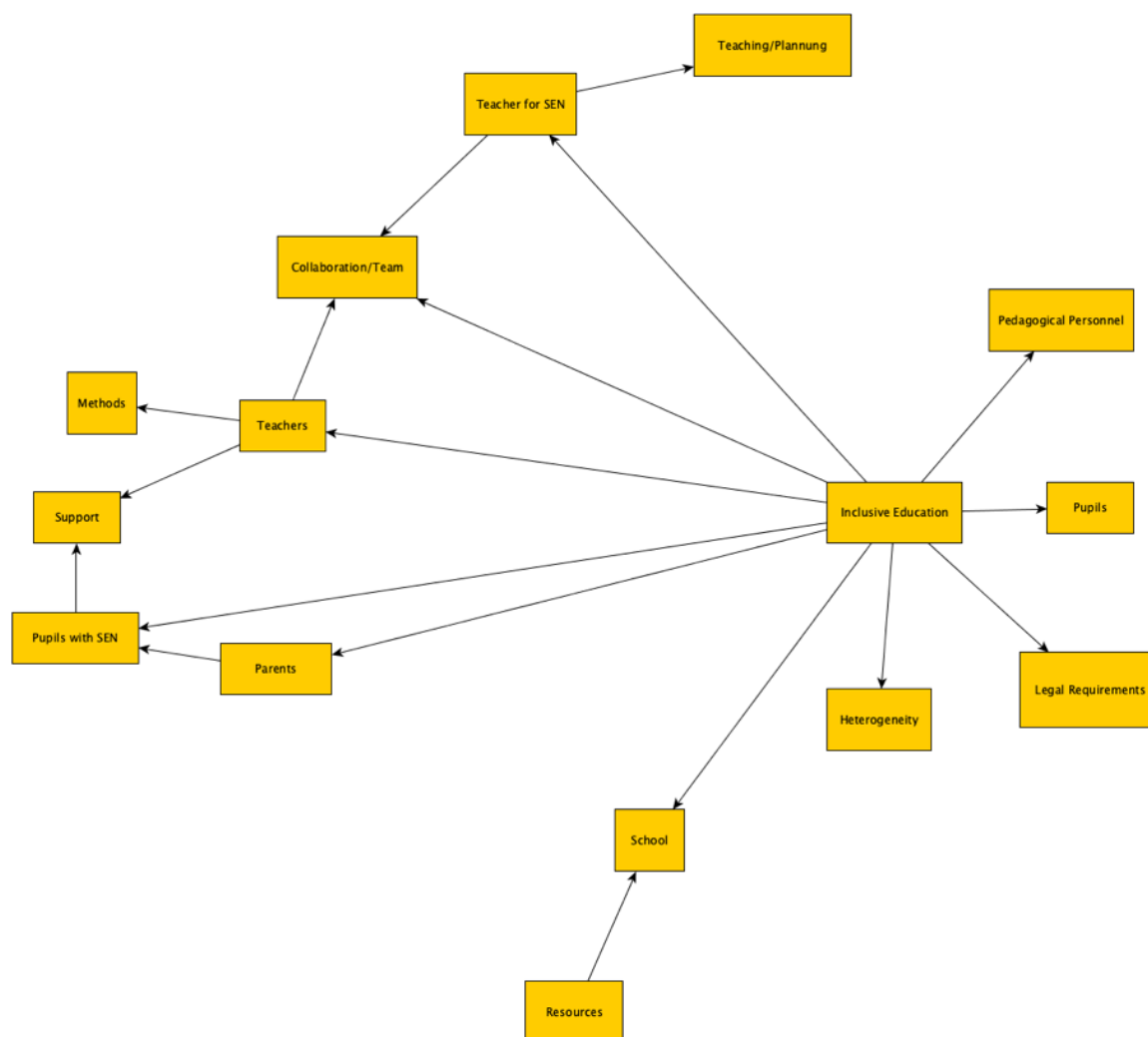


Figure 17. Pathfinder network of in-service teachers

Looking at the concept maps of in-service teachers for SEN and those for GE individually, it also becomes obvious that the conceptualization of inclusive education is not really elaborate in either of the two groups. In-service teachers for GE include the concepts “Support” and “Collaboration/Team” in their conceptualization, while in-service teachers for SEN do not. Instead, the pathfinder network of that group contains the concepts “Legal Requirements” and “Resources”, which indicates that this group of teachers focusses more on external requirements and frame conditions for inclusive education (figures 18 and 19).

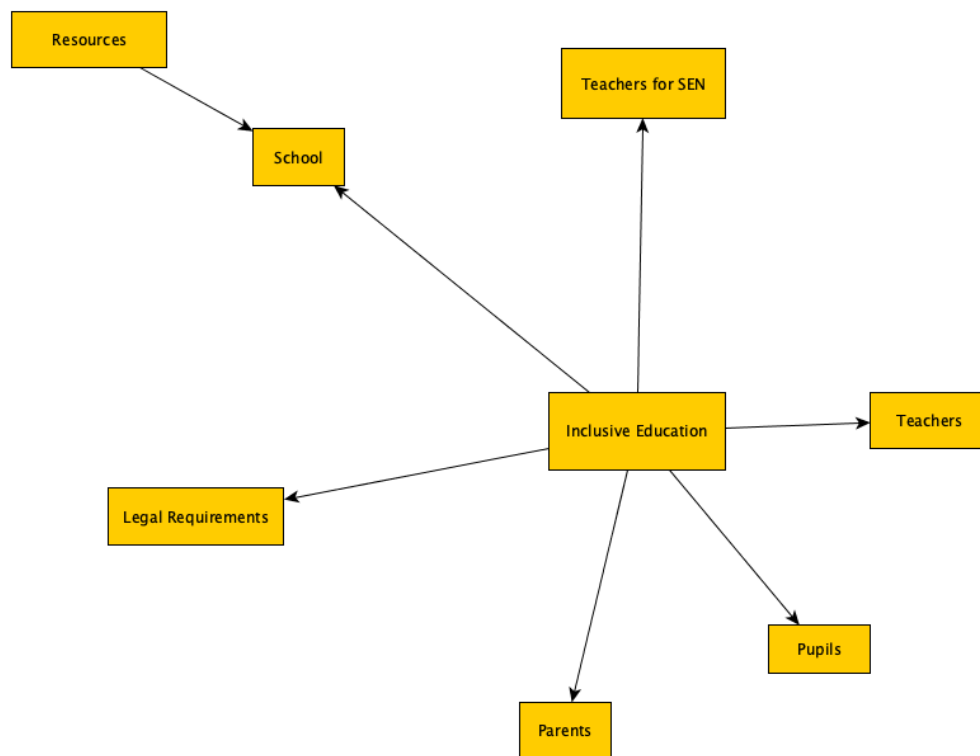


Figure 18. Pathfinder network for in-service teachers for SEN

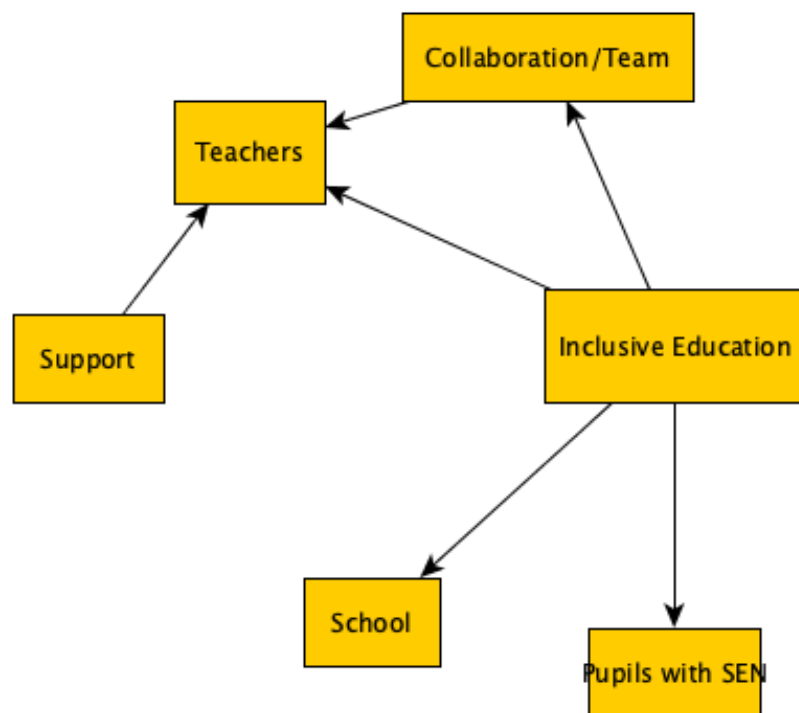


Figure 19. Pathfinder network of in-service teachers for GE

The qualitative analysis of the propositions also supports this visual impression. The most frequently coded category of all participants is 3.4 *Inclusive education denotes good teaching, successful individualization and adapted differentiation (e.g. through materials, methods, concepts, co-teaching)*, followed by category 6.1 *Inclusive education needs resources (e.g. time, money, ...)*. In the pathfinder network, these categories are represented by the concepts *Support, Methods, and Teacher/Planning* as well as *Resources*. The third-position-category 4.1 *Inclusive education requires the collaboration and cooperation of all actors involved (e.g. teachers, parents, pupils)* contains 9.8% of all propositions. Overall, considering all participants, a total of 25.5% of all propositions refer to schooling, teaching, and differentiation, while 23.6% refer to the need of resources, difficult frame-conditions, and the need of well-trained teachers.

Considering teachers for SEN only, the most frequently coded category is 6.1 *Inclusive education needs resources (e.g. time, money, ...)*, followed by categories 3.4 on rank 2, and 3.1, 4.1, and 5.4 on rank 3. All these categories refer to schooling, teaching, and individualization. A total of 29.4% of all propositions are considered with schooling and teaching, while a total of 38.2% are concerned with categories from dimension 6 PREREQUISITES AND BARRIERS and 7 DISADVANTAGES AND CONSEQUENCES.

As for the teachers for GE, 13.8% of all propositions were coded into category 3.4 *Inclusive education denotes good teaching, successful individualization and adapted differentiation (e.g. through materials, methods, concepts, co-teaching)*, followed by category 4.1 *Inclusive education requires the collaboration and cooperation of all actors involved (e.g. teachers, parents, pupils)* and 6.1 *Inclusive education needs general resources (e.g. time, money, ...)*. A total of 39.5% of all propositions are considered with the topics schooling, teaching, differentiation, and collaboration, and 39.6% are considered with barriers and disadvantages of inclusive education (table 19).

In sum, this means that for teachers for GE, schooling and teaching are equally important as barriers and disadvantages in the subjective definition of the term inclusive education. For teacher for SEN, the proportion of propositions considering barriers and disadvantages is much higher, which means that the subjective definition of inclusive education is dominated by them.

Table 19. Most frequent categories of in-service teachers

All participants t1 (N=16)	Teachers for SEN (N=6)	Teachers for GE (N=10)
3.4 (11.3%)	6.1 (9.5%)	3.4 (13.8%)
6.1 (10.8%)	3.4 (8.4%)	4.1, 6.1 (11.9%)
4.1 (9.8%)	3.1, 4.1, 5.4 (7.4%)	6.4 (8.3%)
6.4 (6.9%)	3.3, 6.1 (7.2%)	4.4, 6.2 (5.5%)
6.2 (5.9%)	6.2 (6.3%)	6.7 (4.6%)
3.1 (4.9%)	6.4 (5.3%)	3.3, 7.1 (3.7%)
4.4 (4.4%)	6.4 (3.5%)	1.4, 2.2, 3.1, 3.2, 6.6, 7.2 (2.8%)
5.4 (3.9%)	1.3, 2.2, 4.3, 4.4, 6.3, 7.3 (3.2%)	1.1, 1.3, 2.1, 2.4, 2.5, 4.2 (1.8%)

3.8 Summary of the results

In summary of all results of the quantitative and qualitative research, the following can be stated:

1. All participating teacher trainees improve their collaboration skills through the practice of co-teaching with a partner – independent of his or her course of study – during the practical experience in inclusive classrooms.
2. Teacher trainees in multi-professional teams develop more positive attitudes towards inclusive education than teacher trainees in mono-professional teams.
3. Teacher trainees for GE in mono-professional teams do not develop more positive attitudes, while those in multi-professional teams do develop more positive attitudes.
4. For teacher trainees for SEN, there is no significant difference between participants in mono- and those in multi-professional teams.
5. When considering all participants after the practical experience, there is an expansion of concepts and denser interconnectedness.
6. Teacher trainees in multi-professional teams expand their concepts to include aspects like differentiation, support, and methods. These concepts become part of the network around schooling and teaching.
7. Teacher trainees in mono-professional teams do not expand their concepts of inclusive education; only concepts around schooling and teaching are densely interconnected, the others remain in a spoke-structure.

8. The mono-professionally working teacher trainees' concepts of inclusive education contains about twice as many codings into the categories denoting *PREREQUISITES AND BARRIERS* and *DISADVANTAGES AND CONSEQUENCES*, while the concepts of multi-professionally working teacher trainees are dominated by propositions coded into the dimensions *SCHOOL-LIFE AND TEACHING* and *COLLABORATION AND ROLES*.
9. The share of propositions coded into dimensions 1 *VALUES AND ATTITUDES* and 2 *HETEROGENEITY* is higher in concept maps from participants in multi-professional teams than those in mono-professional teams.
10. Before the seminar, 73% of all participating teacher trainees are to be found in the cluster "Generalist". After the seminar, 35% of those generalists are to be clustered in "Cooperation of those involved". The ratio of teacher trainees working in multi- and mono-professional teams roughly resembles that of all participating teacher trainees (1.7).
11. The second biggest cluster is "Inclusion affects everyone" with 23% of the initial "Generalists". Here, the ratio of multi- and mono-professionally working teacher trainees is higher than that of the complete sample (2.6), meaning that more teacher trainees from multi-professional teams stressed the importance of everyone being affected by inclusion.
12. In-service teachers' concepts of inclusive education are not as elaborate as pre-service teachers' concepts after the seminar. The concept maps of in-service teachers reveal only chain- or spoke-structured conceptualization of inclusion; there is no real network to be found.
13. In-service teachers' concepts of inclusive education contain roughly equal proportions (about 25%) of propositions referring to teaching and schooling and propositions referring to difficulties and problems.
14. The concepts of inclusive education of in-service teachers for SEN are dominated by propositions referring to barriers and disadvantages of inclusive education (38,9%), while the concepts of in-service teachers for GE show an equal proportion of propositions referring to teaching and schooling and to disadvantages and barriers.

In a nutshell, it can be stated that the co-teaching of two teacher trainees of different courses of study provokes a change of attitude toward inclusive education to the more positive, expands the concepts of inclusive education to include the concepts "support",

“differentiation”, and “heterogeneity”, and reveals a conceptualization of inclusive education that mainly consists of aspects around teaching and schooling and equal chances through heterogeneity. Teacher trainees in mono-professional teams, however, include aspects around barriers and disadvantages of inclusion in their conceptualization.

Also, teacher trainees in multi-professional teams stress the fact that inclusion affects everyone more than teacher trainees in mono-professional teams. Of all participants, teacher trainees for GE in multi-professional teams benefit the most from this seminar in terms of attitude change and expansion of concepts.

4. Discussion

In the following section, results are being discussed in the sequence of their presentation and in supplement to the discussions in the individual research papers. The first part comprises a discussion of teacher trainees' attitudes and its development (4.1), followed by a discussion of collaboration skills (4.2). Following that will be a discussion of teacher trainees' concepts of inclusive education (4.3) and its development over the course of the seminar (4.4), as well as the clustering of teacher trainees according to their concept constellation (4.5). The results of the analysis of in-service teachers' concepts will be discussed in the following paragraph (4.6), before a discussion of limitations (4.7) and the conclusions and implications (4.8) close this section.

4.1 Effect of the co-teaching seminar on teacher trainees' attitudes towards inclusive education

The data of the present study clearly support the hypothesis that teacher trainees in multi-professional teams develop more positive attitudes than those in mono-professional teams, independent of their courses of study. Particularly teacher trainees for GE in multi-professional teams show significantly more positive attitudes and higher self-efficacy expectations after the seminar, while teacher trainees for SEN or GE in mono-professional teams do not show a significant change of attitude to the more positive after the co-teaching experience. This change to the more positive of teacher trainees in multi-professional teams is presumably due to a transfer of knowledge and exchange of expertise. As the planning and conducting of the lessons is done in collaboration and co-construction (cf. Gräsel et al., 2006), there is discussion and mutual support between the partners, and that leads to changed perspectives and expansion of professionalism. This has also been demonstrated by several scholars (e.g. Scuggs et al., 2010; Alvarez-McHatton & Daniel, 2008) who state that different discipline partners in a team exchange expertise; i.e. teacher trainees for SEN gain content knowledge and knowledge about instructional methods and teacher trainees for GE enhance their knowledge about curriculum adaptation and supports available.

In a team with two partners of the same discipline, there is a perceived ability gap, which leads to the feeling of not being able to serve the needs of all pupils in the classroom. Pancsofar and Petroff (2013) stated that co-teaching is associated with teacher confidence. In

a team of two teachers with different expertise, the needs of all pupils in the classroom can be served better than in a team with two teachers of the same expertise. This leads to a higher self-confidence and with that to a more positive attitude. Positive experience in providing support for all pupils promotes positive attitudes and higher self-efficacy expectations, as Forlin and Chambers (2011) concluded from their study on the effect of a seminar on pre-service teachers' perception of inclusion.

However, considering teacher trainees for SEN only, there is no significant change of attitude during the course of the seminar; neither the team constellation nor the practical experience seem to have an influence on their attitudes. Although there is not much change in the development of these teacher trainees' attitude, it appears to be significantly more positive than that of teacher trainees for GE at all testing times. This is not particularly surprising, as teacher trainees for SEN opted to be trained to teach pupils with special needs and therefore have a more positive motivational predisposition. In general, Teacher trainees for SEN also are given the opportunity to take courses on topics like inclusive teaching techniques and co-teaching during their preparation programs (Austin, 2010); therefore, they develop confidence regarding teaching a heterogeneous group of pupils. As for this study, however, teacher trainees for SEN are at the beginning of their training; therefore, it is to be assumed that they had not had abundant opportunity to take respective courses and it is probably more the predisposition than the experience that leads to a more positive attitude.

4.2 Effect of the co-teaching seminar on teacher trainees' collaboration skills

Based on the results of this study, it can be stated that all participating teacher trainees improved their collaboration skills significantly, independent of their courses of study or the team constellation. All participants report a significantly better goal orientation, accomplishment of tasks, cohesion, and assumption of responsibilities with regard to their collaboration. This is in contrast to several research studies, which indicate that even after a year of collaboration, there is no development of a common ground of cooperation between teachers for GE and teachers for SEN (e.g. Jurkowski & Müller, 2018) and that teachers for SEN sometimes have a feeling of not being wanted in the classroom (Gavish, 2017). Furthermore, the majority of teachers do not seem to be prepared for co-teaching (Chitiyo & Brinda, 2018), which means that "[...] they are not fully committed to the implementation of the practice" and "[...] they may not use the practice but adopt other practices that are not grounded within the philosophy of inclusive education" (ibid., p.42).

A probable reason for this discrepancy is the close supervision of the teacher trainees in practice by the in-service teachers at the schools and the lecturers of the university. As Murawski (2009) emphasizes, administrative support in both initiation and implementation of collaborative service delivery is essential for it to be successful. Moreover, there are indications to support that successful co-teaching needs commitment, engagement, and negotiation of both partners (Rytivaara, Pulkkinen & deBruin, 2019). Participants of the present study attended this seminar entitled ‘co-teaching in inclusive classrooms’, which entails that these teacher trainees are committed and prepared to engage in this practice, at least with the partners they worked together in this experience. The success of co-teaching always depends on the partners’ personalities and characteristics (Murawski, 2009) as well as on the knowledge about it and experience in its practice; therefore, the opportunity to experience positive co-teaching practices within this seminar is a valuable pre-requisite for future preparedness to co-teach with partners from different disciplines.

4.3 Participating teacher trainees’ concepts of inclusive education

All participating teacher trainees’ propositions were condensed to render a system of 35 categories grouped in 7 dimensions. This system represents the entirety of all possible elements that can make up the concept of a teacher trainee. The number of propositions that could be combined to make a category indicates the importance of this category in concept formation.

The category referring to the necessity to share all responsibilities for all pupils in an inclusive classroom between all those teaching is the one with the most propositions coded into and, therefore, the top rank category in the concepts of inclusion. This means that the shared responsibility is the most important aspect for teacher trainees when subjectively defining inclusive education. Negatively connotated categories are on rank 18 or lower, which means that for the participating teacher trainees, the concept of inclusive education is predominantly composed of aspects around schooling and teaching as well as sharing responsibilities for all pupils.

In contrast to that, in-service teachers’ subjective definition of educational inclusion is predominantly composed of negative and problematic aspects; aspects referring to teaching and sharing responsibilities for all pupils are to be found on rather low ranks (cf. Przibilla et al. 2018).

On the one hand, the reason for that is to be seen in the proximity or distance to the practice: while pre-service teachers judge inclusion from a rather theoretical standpoint, in-service teachers are in midst of the field of inclusion and experience all imponderables and uncertainties of its implementation. Just that seems to leave room for improvement and many teachers complain about the lack of materials and resources (VBE, 2017).

On the other hand, it could be argued that pre-service teachers participating in this study feel more confident and effective to teach a class of heterogeneous pupils, as inclusion is being addressed in current programs of teacher training. The teacher training programs that in-service teachers attended did not contain elements around inclusive education, therefore, they may have concerns and as a result of that lower self-confidence and a more negatively dominated perception of it (cf. Forlin and Chambers 2011).

Another possible explanation of this difference is that the underlying academic course is entitled *Co-teaching in inclusive classrooms*, which means that the participating teacher trainees see inclusion in the light of co-teaching. In-service teachers, on the other hand, may have to deal with a heterogeneous learning group without a co-teaching partner and see inclusion detached from the setting of co-teaching, which might entail overstraining at times. This could also lead to a less favorable perception of inclusion.

The highest ranked categories in this study are all around the topic of schooling and teaching in inclusive classrooms. They contain ideal-typical aspects of inclusion and thus could serve as indicators for inclusive education (cf.: Krämer et al., 2016). The category addressing the necessity of individualization and differentiation in inclusive classrooms, an essential part of teaching a heterogeneous group of students, ranks on position 3 and with that makes for a very important aspect of inclusive education for the participating teacher trainees.

4.4 Effect of the co-teaching seminar on teacher trainees' concepts and beliefs about inclusive education

Before the co-teaching seminar, the participating teacher trainees' beliefs about inclusive education is mainly composed of aspects around schooling and teaching. This can be extracted from the pathfinder networks as well as from the qualitative analysis of the propositions. The ranking positions of the category system support that visual judgement as well. After the seminar, the pathfinder network as well as the qualitative analysis show that the teacher trainees' beliefs about inclusive education expanded to include aspects like

Differentiation and Support. The field experience in inclusive classrooms with a teaching partner seems to have triggered the development of awareness and strategies for differentiation tasks.

When comparing pathfinder networks of teacher trainees in multi- and those in mono-professional teams at t2, it becomes obvious that the latter is much less elaborate and only composed of concepts addressing school in general and all the related actors. The networks of the former, on the other hand, additionally contain the concepts *heterogeneity*, *equality*, *differentiation*, and *methods*, all constituents of good inclusive teaching practices.

This is in line with the findings of Hopkins, Round, and Barley (2018), which illustrate this development of teacher trainees after field experiences. Awareness and strategy-development during field experience leads to an expansion of the conceptualization on inclusion. The fact that teacher trainees who worked in multi-professional teams exhibit a much more elaborate and interconnected network of knowledge can be associated with a transfer of expertise between the two partners of different disciplines, as was already demonstrated in several research studies (e.g. Scruggs et al., 2007; Alvarez-McHatton & Daniel, 2008). Teacher trainees in multi-professional teams discuss about and reflect on their subjective beliefs, as they are confronted with different points of view. Discussing beliefs entails reflecting on them, which in turn entails revising them (Howard et al., 2000; Brownlee, Purdie, & Boulton-Lewis, 2001). Teacher trainees working in mono-professional teams, in contrast, are not confronted with different standpoints and approaches, there is no need for discussion and therefore little reflection of one's own conception of inclusive education.

The qualitative analysis of the propositions supports the structural analysis: Pre-service teachers' beliefs about inclusive education are mainly composed of aspects around schooling and teaching as well as aspects addressing problems and barriers; aspects concerning things like equality, participation and the like only make for a very small proportion in the composition.

This is in line with the findings of Hopkins, Round, and Barley (2018), who came to discover that teacher trainees, who participated in a field-work programs, developed effective strategies for differentiating tasks and promoting motivation and task engagement. Differentiation strategies are not only essential for teaching in inclusive classrooms, but also contribute to an increased self-efficacy expectation of teacher (trainee)s, as the experience to be able to motivate students and provide alternative explanations when students are confused

are important contexts for its development (Tschannen-Moran & Hoy, 2007). Just as well, Jordan, Schwartz and McGhie-Richmond (2009) concluded from their literature review that initial teachers' beliefs are malleable through teachers' direct experience with children in their classrooms, where pre-service teachers acquire evidence of improvement in student learning. This conclusion seems to be confirmed with the data of the present study.

However, the practical experience also leads to the recognition of barriers and possible disadvantages of inclusive education, which contradicts the findings of Gökdere (2012), Boyle, Topping, and Jindal-Snape (2013), and Specht et al. (2015) who state that new teachers seem to be more positive toward inclusive education than those with years of experience. They also found that direct experience in teaching students with special needs increases self-efficacy expectations, particularly experience that is of longer duration. For the participants in this study, the opposite seems to be the case, and the reason for this may either be the poor implementation of inclusive education in some German schools (cf. VBE, 2017) or inadequate instruction during the practical experience (cf. Peebles & Mendaglio, 2014). It could also be the case that the participating teacher trainees undergo a kind of practical shock in that they discover that their ideas of inclusion do not correspond to the reality in schools.

4.5 Cluster affiliation of teacher trainees before and after the seminar

When clustering the propositions of all concept maps before and after the seminar, it becomes obvious that, initially, teacher trainees are relatively homogeneous with only two distinct clusters, and after the seminar, there is a higher deviation among the teacher trainees with four distinct clusters. The clusters have been calculated using only these categories that contributed significantly to the cluster formation.

The biggest cluster at t1, comprising 71 and with that 73% of all participating teacher trainees, represents the “generalists”, a cluster with no distinct center. Members of this cluster have no distinct idea and no knowledge about inclusive education, neither with respect to requirements for teachers nor with respect to negative aspects of it. Didactic and methodological requirements are unfamiliar to them. The participating teacher trainees had not yet had the opportunity to build and expand their knowledge on inclusive education.

The second cluster at t1 represents the 26 teacher trainees focusing on joint education and cooperation with shared responsibility. Although the focus of the subjective definition is on these aspects, there is also an awareness of the disadvantages and negative sides of

inclusion. Teacher trainees seem to be informed about the requirements for successful inclusive education; they have, however, also doubts about its meaningfulness. Interestingly, these 26 teacher trainees do not share a distinct previous experience with inclusion; just like the members of the other cluster, some of them have had previous experience and others have not.

After the seminar, there are four clusters with distinct centers, which means that, by experiencing inclusive education in practice, teacher trainees develop an accentuated subjective definition. Interestingly, the cluster analysis of this study roughly resembles the results of a cluster analysis performed on statements about inclusive education of pre-service teachers conducted by Schön, Stark & Stark in 2018. Here and there, four clusters could have been established with roughly the same cluster centers depicting roughly the same types of perceptions of inclusive education.

The biggest cluster with about half of all teacher trainees focus on the need of cooperation and therefore cluster into “cooperation of all those involved”. The distribution of teachers for SEN and those for GE, and also of teacher trainees in multi- and those in mono-professional teams, in this cluster represents the distribution of the entire sample. Despite the fact that the teacher trainees affiliated with this cluster focus on cooperation of all those involved in inclusion, they are also aware of the barriers and disadvantages of inclusion. Within this interpretation, this cluster seems to resemble the smaller of the two clusters at t1, namely “joint education and shared responsibility”. Participants of both the clusters are informed about the requirements of inclusive education, they also, however, focus on the disadvantages and barriers. This supports Hodkinson’s (2005) finding that more specific ideas in particular go hand in hand with more negative attitudes. It is to be assumed that participants affiliated with this cluster recognize and address more problems through more specific knowledge (Schön, Stark & Stark, 2018).

The second biggest cluster at t2 is the one labelled “Inclusion affects everyone”, with 25 members. Here, the categories with the highest values are all categories addressing all actors in inclusive education, including all pupils. Members of this cluster have distinct ideas about inclusive education, particularly with respect to requirements for teachers and expected outcomes for pupils. In that respect, members of this cluster are the closest to the “ideal type” of teacher for inclusion, as they identify with the modern picture of teachers in inclusive classrooms (cf. Terhart, 2014). It is noteworthy that in this cluster, there is a higher ratio of multi- to mono-professionally working teacher trainees, while the ratio of teacher

trainees for GE vs. SEN represents that of the entire sample. This means that, in relation, more partners in multi-professional than in mono-professional teams cluster here. Thus, it can be assumed that partners with different expertise are more pupil-oriented than partners with the same area of expertise, as the mutual supplementation of the two partners' knowledge steers the focus on pupils' outcomes rather than on difficulties or extra work (cf. Scruggs et al. 2007; Solis, et al., 2012).

The next size cluster with 20 members (roughly 21%) focuses, in addition to the category addressing differentiated teaching, on negative aspects and downsides of inclusion. Teacher trainees in this cluster stress the fact that inclusion is contradictory, can have negative consequences, and it overstrains teachers. Therefore, this cluster is defined as "Differentiation and Difficulties". In this cluster, there is a higher ration of teacher trainees for GE vs. those for SEN than in the entire sample, meaning that more teacher trainees for GE cluster here. Again, this is not particularly surprising, as teacher trainees for SEN opted to be trained for inclusive education and, therefore, they are more favorable of it.

Members of this cluster seem to have knowledge about overriding principles of differentiated teaching; their focus, however, is on problems and extra burdens for teachers rather than on the support for pupils. Basic knowledge of the aims and characteristics of inclusion is partly available, and this seems to be sufficient to fuel any fears of the loss of traditional teacher autonomy (Terhart, 2014; Reusser, Pauli & Elmer, 2011). Consequently, this type does not seek more information on inclusion; they reject it on principle. Changing the attitudes of this type of pre-service teachers and inspiring them for the idea of inclusion should be a challenge (Schön, Stark & Stark, 2018)

The smallest cluster with only 6 members is the one focusing on shared responsibility in addition to differentiated teaching. It is rather surprising that this cluster is the smallest, as the main concern of the whole seminar structure was on co-teaching and shared responsibility. It can be assumed that teacher trainees affiliated with this cluster did not really encounter shared responsibilities between their supervising in-service teachers in practice and, therefore, perceived it as non-existent. It could also be speculated that members in this cluster did not share responsibilities themselves when planning and conducting lessons. Further analysis would be necessary to determine the team-constellation and the type of co-operation of these members.

4.6 In-service teachers' beliefs about inclusion: similarities and differences to pre-service teachers' beliefs

The analysis of the concept maps created by in-service teachers reveals a rather critical picture of inclusion of the participating teachers. Their knowledge about inclusion, as depicted in the pathfinder network, does not seem to be very elaborate, as there is no genuine, densely interconnected net to be found. Rather, concepts are organized in chain or spoke-structures, meaning that concepts referring to inclusive teaching are not part of the knowledge domain of teaching and schooling. The qualitative analysis also displays a rather negatively connotated definition of inclusion.

This is in line with several research studies which underline that many teachers equate inclusive education with additional tasks, extra burdens, and the need for external resources (e.g. Pülschen & Pülschen, 2015; Navarro et al., 2016). However, in the international research it seems to become obvious that in-service teachers for GE hold more negative attitudes towards inclusion than teachers for SEN (e.g. Desombre, Lamotte, & Jury 2019). In the present study, the contrary is the case: SEN-teachers' subjective definition is dominated by negatively connotated aspects. One reason for this could be the factual difficulty to serve the pupils with special educational needs due to unfavorable frame conditions. Teachers for SEN are committed to deliver strictly individualized support, a practice that is difficult to achieve in a classroom with more than 20 pupils. Being forced to lag behind one's own aspirations may lead to negative and problematic subjective theories.

Moreover, it has been demonstrated that teachers' mindsets of inclusive education depend on the extent to which teaching practice should be modified to support all pupils (Center & Ward, 1987). Additionally, attitude and beliefs have been shown to also depend on the educational policy (Savolainen, Engelbrecht, Nel, & Malinen, 2012) as well as on the resources and support for inclusive practices (Urton, Wilbert, & Hennemann, 2014). Additionally, a connection between the implementation of inclusion and the perceived stress has been identified (Weiss et al. 2019): teachers who reported inclusion being implemented only to a limited extent perceived the highest stress.

As in-service teachers experience individualized modification of teaching practices more than pre-service teachers did, and educational policy and implementation of inclusion may leave room for desires and a lack of resources, it may not be surprising that in-service teachers' beliefs are more negative than those of pre-service teachers in this study. As a consequence, this means that, in addition to preparing pre-service teachers for inclusion and

addressing their attitudes and beliefs during teacher training, it would be necessary that the educational policy be reconsidered and resources be provided in order for teachers to be favorable of inclusion.

4.7 Limitations

In addition to limitations already discussed in the research paper sections, the discussion of limitations here shall focus on the overall research design and its validity.

Generally, and in particular for this study, it is important for future teachers to be given the opportunity to directly apply theory in practice and thus establish a linking of the two (Fraefel, 2012, Fraefel et al., 2018)). For teacher trainees to experience co-teaching and inclusion in practice was, therefore, an important issue for this study. However, for teacher trainees to work in different schools and different settings also entails that they gain their practical experience at very different frame conditions. Every school has its differing individual conception of inclusion, every supervising teacher has differing expectations, and, of course, every learning group has its inherently different dynamics. This makes it impossible to compare experiences and resulting learning progresses of teacher trainees. Yet, this resembles teaching reality for all teachers and therefore it was deliberately decided to not choose only one cooperative school and inclusive class, but to choose different schools and different forms of schools.

The participants of the present study are teacher trainees for SEN and for GE. For teacher trainees of both courses of study, the seminar is elective-compulsory, which means that teacher trainees would have had the opportunity to choose another seminar to comply with the curriculum. As a consequence, those trainees who chose to attend this seminar are presumably the ones who are particularly interested in inclusive education and therefore hold relatively positive attitudes and beliefs to begin with. Therefore, results of this study have to be interpreted in the light of that fact.

Moreover, participating teacher trainees for GE were in their Master's program already, while participating teacher trainees for SEN were in their Bachelor's program. Therefore, there was an imbalance in terms of level of training and expertise which, however, could not have been avoided for organizational reasons. At the time this study was carried out, the Special Needs Education program at the University of Wuppertal was still

too young to have students in their Master's program. Therefore, this imbalance had to be put up with; this circumstance has to be kept in mind when interpreting the results of this study.

Attitudes were assessed using questionnaires consisting of 5 subscales and a total of 23 Likert-scaled items. Although there are several disadvantages performing a questionnaire-research-study to assess attitudes (e.g. only explicit attitudes are assessed, answers may be given according to the social norm, participants may give random answers, ...), it was considered a probate means for this study. The reason for this decision is that a relatively large sample could have been surveyed at three different testing times to investigate the development of attitudes. Besides, conducting questionnaire-studies to capture attitudes is quite common in national and international research; therefore, results of this study are still comparable to results of other studies. In order to additionally assess implicit and behavioral aspects of attitudes, qualitative research methods like (group-) interviews, (group-) discussions or video-graphical analyses of lesson sequences would be advisable.

Beliefs were assessed using the method of concept mapping. This method was originally invented to structure and visualize children's responses in clinical interviews (Novak & Cañas, 2008), and later advanced to a general technique for learning, teaching, and assessing structural knowledge (Novak & Cañas, 2010). As participants were entirely free to choose any concept they considered important and connect it with other concepts in the map, they engaged in a cognitively relatively demanding activity which ties up some capacity. The consequence may be that this activity results in a product that does not entirely represent their cognitive structure, but rather a "creation" of it. This circumstance may have some effect on the precision of measurement. To verify that the structures represent teacher trainees' beliefs, a subsequent communicative validation would be helpful (e.g. dialog-hermeneutic methods; Dann, 1988, 1994; Groeben & Scheele, 2000). Alternatively, beliefs could have been assessed using the structure-laying technique (Flick, 2009) or a simplified form of it, in which a structure representing the cognitive structure is created while discussing and debating with an interviewer. As the scope of the present study is to explore into teacher trainees' beliefs about inclusion, the method of concept mapping seemed to be the best means to examine a relatively large number of teacher trainees at three different testing times. In retrospect, this method can be regarded as valid and reliable, which is reflected in the reliability values.

A cluster analysis was carried out on the basis of the codings of the propositions of the participants' concept maps using the method *Quick Cluster* within the software IBM

SPSS. This is a partitioning algorithm which determines centroids or means for k clusters (*k-means-clustering*) in an iterative process. The disadvantage is that the number of clusters has to be determined beforehand, which means that statistical tests and visual examinations of the variations have to be performed to determine the numbers of clusters. As these statistical tests are influenced by the number of clusters tested, they may lead to the assumption of a less than optimal number of clusters. Also, clustering depends of the sequence of the data, meaning that – when randomly changing the data sequence – results may vary. For the present study, this means that the determined clusters should be considered as first exploratory results. Further analyses would be necessary to confirm these data.

4.8 Conclusion and Implication

Positive attitudes and the ability to collaborate in a team have been demonstrated to be crucial prerequisites for successful inclusion in several research studies. Based on the data of this study, the conclusion can be drawn that particularly teacher trainees for GE having had the opportunity to work in a team with teacher trainees for SEN in a real inclusive setting during the training program develop significantly better collaboration skills and more positive attitudes. Therefore, it can be assumed that they are better prepared for the task of teaching a heterogeneous group of pupils. Additionally, teacher trainees having worked in multi-professional teams expand their concepts and with that their knowledge about inclusive education to include crucial prerequisites for individualized teaching. This allows for the recommendation that a seminar form of this kind be a mandatory part of the curriculum in teacher training for GE. For the University of Wuppertal, this is being realized by implementing a theoretical part on co-teaching and inclusive teaching practices in the preparation seminars for the practical semester for the teacher trainees of both courses of study. Following that will be the opportunity to complete the practical semester as a multi-professional team.

As for the teacher trainees for SEN, no positive development could be observed in this study, neither for those working in multi- nor for those working in mono-professional teams. It is assumed that these teacher trainees, particularly those working in multi-professional teams, benefit professionally in terms of gaining knowledge about instructional methods as well as content knowledge. Whether this is actually the case should be investigated in further studies. It is conceivable to carry out such an investigation with those students who complete the practical semester as a team.

The results of this study suggest that teacher trainees having worked in multi-professional teams are better prepared for inclusion. However, there is no knowledge about whether this is the case indeed and whether these teachers really adapt their future teaching so that it is beneficial for all pupils. To investigate that, longitudinal studies should be carried out to analyze the actual teaching practice of these future teachers to see whether it is inclusion-promoting and whether it serves the needs of all pupils on the long run. For that, both the teachers' attitudes and beliefs should be assessed on a regular basis along their professional life. Furthermore, their teaching practice should be analyzed and related to all pupils' outcomes.

The analysis of in-service teachers' beliefs in this study reveals a rather negative picture of inclusive education; this is also supported by the system of categories developed by Przibilla et al. (2018). As inclusive education is current legislation and all pupils have the fundamental right to attend schooling that suits them best, implementation of it has to be done adequately. Therefore, it is essential that also in-service teachers be supported to be able to serve all pupils' needs. To achieve that, it is indispensable to draw up, evaluate, and provide in-service trainings and job-embedded coaching as well as ongoing support for principals and teachers to enable them to reflect on their practice and thus support the pupils.

The latest development in the legislation for schools in the federal states of Germany suggests that the inclusion of pupils with disabilities in regular lessons is no longer so emphatically enforced. At least for the state of North-Rhein-Westphalia, a return to education in special schools can be observed for pupils with certain disabilities. This could lead to the assumption that inclusion does not necessarily have to be a topic in teacher training anymore. However, heterogeneity is not only found where pupils with and without disability are taught together. Instead, the increasing trend towards individualization in society since the 1970s and the stronger emphasis on the subject and its concerns in pedagogical contexts since the 1980s have increasingly brought heterogeneity among pupils into the focus of attention. Additionally, the diversification of social models and life understandings, such as the growing immigration of people from very different biographical contexts to Germany, has led to an increase in the pluralization of lifestyles. Heterogeneity, understood as 'multiform diversity', represents the fundamental normality of every group of people. This affects every school class at the same time and therefore "dealing with heterogeneity (...) must be a natural part of the professionalism of teachers" (Bertelsmann Stiftung, 2014).

Therefore, training teachers to welcome heterogeneity in the classrooms, to develop an understanding of the individuals' needs and the respective teaching practice to achieve the best outcome for everyone, and to accept heterogeneity as a normal state must be an essential part of teacher training. For that it is essential that teachers abandon the role of being a lone fighter and turn to be a team player within the professional community. Seminars like the one designed for this study could be one way to achieve that.

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Appendix 1: List of all participating schools

1. Hauptschule⁷ Hügelstraße, Hügelstraße 8, 42277 Wuppertal
2. Realschule⁸ Vohwinkel, Blücherstraße 19, 42329 Wuppertal
3. Realschule Helmholtzstraße, Helmholtzstraße 40, 42105 Wuppertal
4. Realschule Max-Planck, Max-Planck-Straße 10, 42277 Wuppertal
5. Realschule Neue Friedrichstraße, Neue Friedrichstraße 19, 42105 Wuppertal
6. Realschule Albert Schweitzer, Hackenberger Straße 105, 42897 Remscheid
7. Realschule Albert Schweitzer, Kornstraße 6, 42719 Solingen
8. Gymnasium⁹ Bayreuther Straße, Bayreuther Straße 35, 42115 Wuppertal
9. Gymnasium Sedanstraße, Sedanstraße 4-14, 42275 Wuppertal
10. Gymnasium Vohwinkel, Nocken 6, 42329 Wuppertal
11. Gymnasium am Kothen, Schulchtstraße 34, 42285 Wuppertal
12. Gesamtschule¹⁰ Langerfeld, Heinrich-Böll-Straße 240-250, 42277 Wuppertal
13. Erich-Fried-Gesamtschule, An der Blutfinke 70, 42369 Wuppertal

⁷ Secondary school on the lower level; 6 years of schooling; Degree: Lower School Certificate

⁸ Secondary school on the middle level; also 6 years of schooling; degree: Middle school Certificate

⁹ Secondary school at the highest level; 8-9 years of schooling; degree: High School Diploma (A-level)

¹⁰ Secondary school for all levels; 6 or 9 years of schooling; all degrees possible

Meine Einstellung zur Inklusion

Im folgenden Fragebogen würden wir gerne Ihre persönliche Einstellung und Meinung zum Thema inklusive Schule erfragen.

Sie haben bei den folgenden Aussagen die Möglichkeit, diese durch Ankreuzen kenntlich zu machen.

Dabei gibt es natürlich keine richtigen oder falschen Antworten, wir möchten Ihre ganz persönliche Sichtweise erfahren. Diese kann sich natürlich im Laufe der Zeit auch in die eine oder andere Richtung verändern; um das erfassen zu können, werden wir diese Befragung in größeren Abständen wiederholen.

Um dabei Ihre Antworten korrekt zuordnen zu können, bitten wir Sie, den folgenden Identifikationscode zu erstellen. Dieser gewährleistet die Anonymität der Person, ermöglicht aber trotzdem bei wiederholter Befragung die Zuordnung von Antworten:

(z.B. 01012016)				15.7.16 (Z=12)

Wir danken Ihnen sehr für Ihre Teilnahme an dieser Befragung. Ihre Meinung ist uns sehr wichtig und wir freuen uns, wenn Sie sich an der Verbesserung der Inklusion beteiligen können.

Rosi Ritter, Philipp Krämer, Antje Wehner

Bitte beantworten Sie die folgenden Fragen:

1. Geschlecht: ☐ männlich ☐ weiblich

2. Alter: _____ Jahre

3. Welches Studium absolvieren sie derzeit?

LA=Lehramt

- ☐ LA Sonderpädagogische Förderung
- ☐ LA, Haupt-, Real-, Gesamtschule
- ☐ LA, GymGe
- ☐ LA, Berufskolleg

In welchem Fachsemester sind Sie: _____ B.Ed. _____ M.Ed.

Was sind Ihre Teilstudiengänge: _____

4. In welcher Schulform möchten Sie/haben Sie das Seminar absolvieren/-t?

5. Welche berufliche Vorerfahrung haben Sie?

- ☐ Ich habe schon einmal ein Lehramtsstudium absolviert und als Lehrkraft gearbeitet
- ☐ Ich habe das Praxissemester absolviert
- ☐ Ich arbeite oder habe in einer Schule als Aushilfs-/Vertretungslehrer gearbeitet
- ☐ Ich arbeite oder habe als Nachhilfelehrer gearbeitet
- ☐ Ich habe kürzere Praktika in Schulen absolviert
- ☐ Keine

6. Wieviel Kontaktzeit hatten Sie schon mit Schülerinnen und Schülern mit sonderpädagogischem Förderbedarf im schulischen Kontext, z.B. in Praktika, Nachhilfe o.ä.?

☐ Gar keine ☐ Weniger als 4 Wochen ☐ mehr als 4 Wochen

Wenn sie bereits Kontakt hatten, spezifizieren sie bitte die Anzahl der Stunden/Woche und die Anzahl der SuS mit sonderpädagogischem Förderbedarf:

7. Wieviel Kontaktzeit hatten Sie schon mit Kindern mit sonderpädagogischem Förderbedarf in Ihrer Freizeit, z.B. in der Familie, im Sportverein oder

Jugendgruppen o.ä.?

☐ Gar keine ☐ weniger als 4 Wochen ☐ mehr als 4 Wochen

Wenn Sie bereits Kontakt hatten, spezifizieren Sie bitte die Anzahl der Stunden/Woche und die Anzahl der Kinder mit sonderpädagogischen Förderbedarf:

- 8. Haben Sie während Ihres Studiums ein Seminar zum Thema Inklusion oder inklusiven Unterricht besucht, bzw. war inklusiver Unterricht Inhalt eines Seminars der Fachdidaktik?**

☐ Ja ☐ nein

Falls Sie ein Seminar besucht haben, welches war es?

- 9. Haben Sie schon einmal theoretische oder praktische Erfahrung mit Co-teaching gemacht?**

☐ Ja ☐ nein

Falls ja, in welcher Form:

☐ Seminar ☐ Unterrichtshospitation ☐ eigenes Unterrichten

☐ sonstiges

Bitte versuchen Sie, jede der folgenden Aussagen gemäß Ihrer eigenen Einstellung zur Inklusion zu bewerten.

Dieser Aussage kann ich ...	... gar nicht zustimmen	... kaum zustimme n	... eher zustimme n	... voll und ganz zustimmen
	1	2	3	4
10. Inklusion bedeutet, dass Schülerinnen und Schüler mit Behinderungen in einem Klassenraum mit Schülerinnen und Schülern ohne Behinderungen platziert werden	☐	☐	☐	☐
11. Inklusion bedeutet, dass Schülerinnen und Schüler mit Behinderungen in altersgemäßen Regelschulen gefördert werden und sie die notwendigen speziellen Instruktionen erhalten, um exakt dasselbe Lernziel wie ihre Mitschüler ohne Behinderung erreichen zu können	☐	☐	☐	☐
12. Schülerinnen und Schüler mit Behinderungen sollten an allen schulischen Aktivitäten mit ihren Mitschülern ohne Behinderungen beteiligt sein	☐	☐	☐	☐
13. Damit Inklusion erfolgreich sein kann, müssen Förderschul- und Regelschullehrer/-innen zusammenarbeiten.	☐	☐	☐	☐
14. Schülerinnen und Schüler ohne Behinderung möchten Schülerinnen und Schüler mit Behinderung in ihrer Regelschulklasse haben	☐	☐	☐	☐
15. Ich benötige zusätzliche Fortbildung und Unterstützung im Dienst, um in adäquater Weise auf das Unterrichten von Schülerinnen und Schülern mit Behinderungen in einer Regelschulklasse vorbereitet zu sein.	☐	☐	☐	☐
16. Alle Schülerinnen und Schüler mit den Behinderungen <i>Spezifische Lernstörung, Sozial-emotionale Störung, geistige Behinderung, Lernbehinderung und Autismus</i> sollten im Stande sein, eine	☐	☐	☐	☐

Dieser Aussage kann ich ...	... gar nicht zustimmen	... kaum zustimme n	... eher zustimme n	... voll und ganz zustimmen
	1	2	3	4
Arbeitsstelle in einem regulären Unternehmen zu bekommen und zu behalten				
17. Die Inklusion von Schülerinnen und Schülern mit Behinderungen kann gewinnbringend für die Schülerinnen und Schüler ohne Behinderung sein	☐	☐	☐	☐
18. Schülerinnen und Schüler mit Behinderungen können die Entwicklung ihrer Selbständigkeit in Regelklassen nicht verbessern	☐	☐	☐	☐
19. Schülerinnen und Schüler mit Behinderungen haben höhere Lernzuwächse, wenn sie in Regelklassen unterrichtet werden	☐	☐	☐	☐
20. Schülerinnen und Schüler mit Behinderungen sollten jede Möglichkeit bekommen, am üblichen Klassenleben teilzunehmen.	☐	☐	☐	☐
21. Ein gemeinsamer Unterricht behinderter und nicht behinderter Kinder kann durch entsprechende Methoden allen Kindern gerecht werden	☐	☐	☐	☐
22. Wenn Kinder mit einer geistigen Entwicklungsverzögerung eine Regelklasse besuchen, dann leidet die Qualität des Unterrichts für die Kinder ohne Behinderung	☐	☐	☐	☐
23. Unterricht kann grundsätzlich so gestaltet werden, dass er allen Kindern gerecht wird	☐	☐	☐	☐
24. Der Leistungsstand kann in Klassen mit behinderten Kindern nicht so hoch gehalten werden wie in Klassen ohne Kinder mit Behinderung	☐	☐	☐	☐

Im Folgenden finden sie Aussagen zur Einschätzung Ihrer Selbstwirksamkeit als Lehrperson. Bitte versuchen Sie, Ihre Einschätzung zu den Aussagen möglichst präzise anzugeben.

Dieser Aussage kann ich ...	... gar nicht zustimmen	... kaum zustimme n	... eher zustimme n	... voll und ganz zustimm en
	1	2	3	4
25. Ich traue mir zu, Unterricht so zu organisieren, dass auch Kinder mit geistiger Entwicklungsverzögerung in ihrem eigenen Lerntempo zum Ziel kommen können.	☐	☐	☐	☐
26. Ich weiß, dass ich ein Unterrichtsthema so vielfältig aufbereiten kann, dass auch Kinder mit geistigem Förderbedarf aktiv am Unterricht teilnehmen können.	☐	☐	☐	☐
27. Ich bin mir sicher, dass ich auch bei größten Leistungsunterschieden für jedes Kind ein angemessenes Lernangebot bereithalten kann.	☐	☐	☐	☐
28. Ich kann Unterricht auch im bestehenden System so organisieren, dass sogar hochbegabte Kinder in ihren Stärken gefördert werden können.	☐	☐	☐	☐

Im folgenden Abschnitt finden Sie nun Fragen zum Verständnis Ihrer professionellen Rolle und Funktion als Lehrer. (Bitte beachten Sie bei der Bewertung der Aussagen, dass die Skalierung nicht mehr nur vier, sondern nun sieben Entscheidungsmöglichkeiten bietet.)

Diese/r Aussage ...	...lehne ich entschieden ab	... lehne ich sehr ab	...lehne ich ab	... lehne ich weder ab noch stimme ich zu	... stimme ich zu	...stimme ich sehr zu	... stimme ich voll und ganz zu
	1	2	3	4	5	6	7
29. Um den Bedürfnissen von Schülerinnen und Schülern mit Behinderungen in Regelklassen gerecht zu werden, würde ich die Möglichkeit, in einem Team zu unterrichten, sehr begrüßen.	☐	☐	☐	☐	☐	☐	☐
30. Alle Schülerinnen und Schüler profitieren vom Team-Teaching, also vom gemeinsamen Unterricht durch einen Regel- und einen Förderlehrer.	☐	☐	☐	☐	☐	☐	☐
31. Die Verantwortung, Schülerinnen und Schüler mit Behinderungen in Regelklassen zu unterrichten, sollte zwischen den Regel- und den Förderlehrkräften geteilt werden.	☐	☐	☐	☐	☐	☐	☐
32. Um sich mit den Bedürfnissen von Schülerinnen und Schülern in Regelschulen auseinanderzusetzen, würde ich die Möglichkeit, an einem Lehrerberatungsmodell (d.h. regelmäßige, kollaborative Treffen zwischen Regel- und Förderlehrkräften zum Austausch von Ideen, Methoden oder Material), teilnehmen zu können, sehr begrüßen.	☐	☐	☐	☐	☐	☐	☐

Was ist schulische Inklusion?

Schulische Inklusion



Fokusfrage

(Leitfrage für die Concept-Map)

Was ist schulische Inklusion?

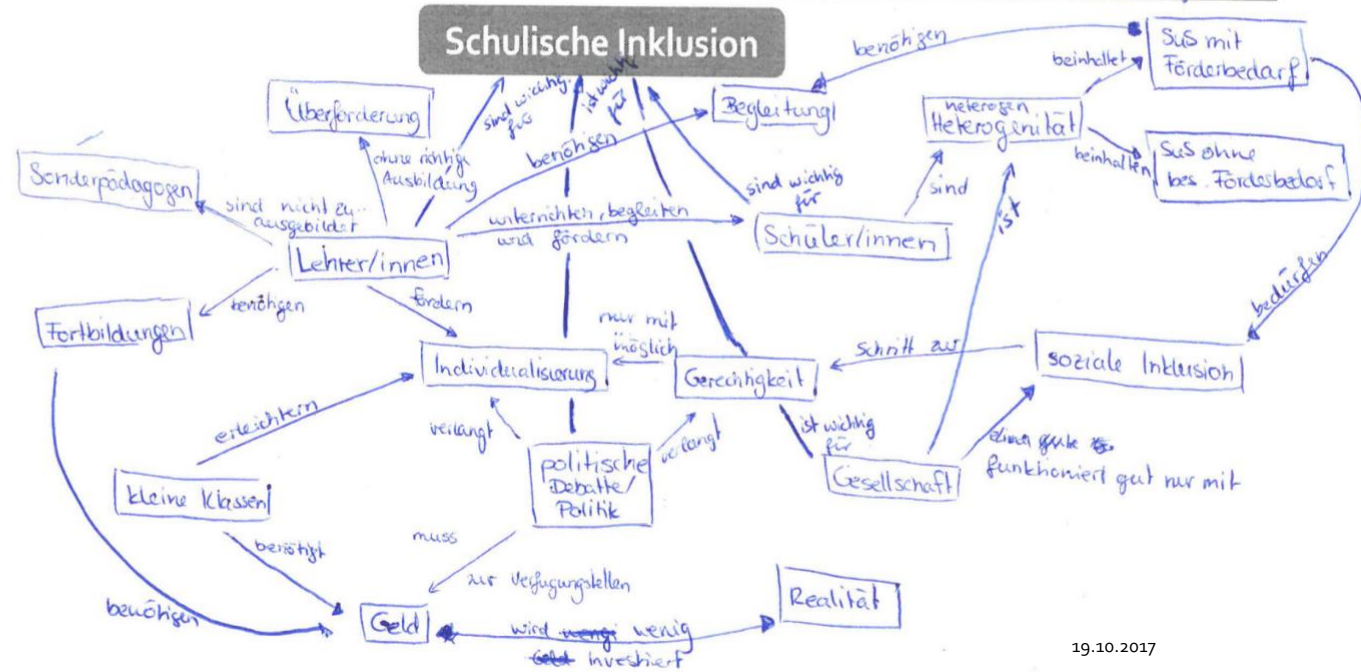
Schlüssel

05.10.2015. L. 7. 51

Konzepte

(Möglichkeit zur Sammlung von Begriffen)

- Realität
- politische Debatte
- Heterogenität
- Fördermaßnahmen
- Begleitung
- Überforderung
- ✗ Lehrer
- ✗ Schüler/in
- kleine Klassen
- Individualisierung
- Gerechtigkeit
- ✗ soziale Inklusion
- ✗ Fortbildungen
- ✗ Geld



19.10.2017



Lerntagebuch für das Forschungsprojekt „Botanik inklusiv“

ID-Code:

TT.MM.JJ der Befragung	1. Buchstabe des Vornamens Ihres Vaters	1. Buchstabe Ihres Geburtsortes	1. Buchstabe des Vornamens Ihrer Mutter	Summe aus Ihrem Geburtstag und Monat (z.B. 15.7.=15+7=22)

Datum:

Symbol:

Studiengang:

Lerntagebuch Nr.:

1. Geschlossene Fragen:

Bitte kreuzen im nachfolgenden Fragebogen die auf Sie zutreffende Antwort an.

	Trifft immer zu	Trifft häufig zu	Trifft selten zu	Trifft nie zu
	1	2	3	4
1. Die Ziele unseres Teams sind uns klar	☐	☐	☐	☐
2. Unsere Ziele sind realistisch und erreichbar	☐	☐	☐	☐
3. Die Anforderungen an unsere Arbeitsergebnisse sind klar formuliert	☐	☐	☐	☐
4. Ich identifiziere mich mit den Zielen des Teams	☐	☐	☐	☐
5. Die Erreichung unserer Ziele ist wichtig für die Gesamtorganisation				
6. Wir haben Kriterien um den Grad der Zielerreichung bestimmen zu können	☐	☐	☐	☐
7. Unsere Prioritäten sind unklar	☐	☐	☐	☐
8. Die Teammitglieder kennen ihre Aufgaben	☐	☐	☐	☐
9. Wir koordinieren unsere Anstrengungen schlecht	☐	☐	☐	☐

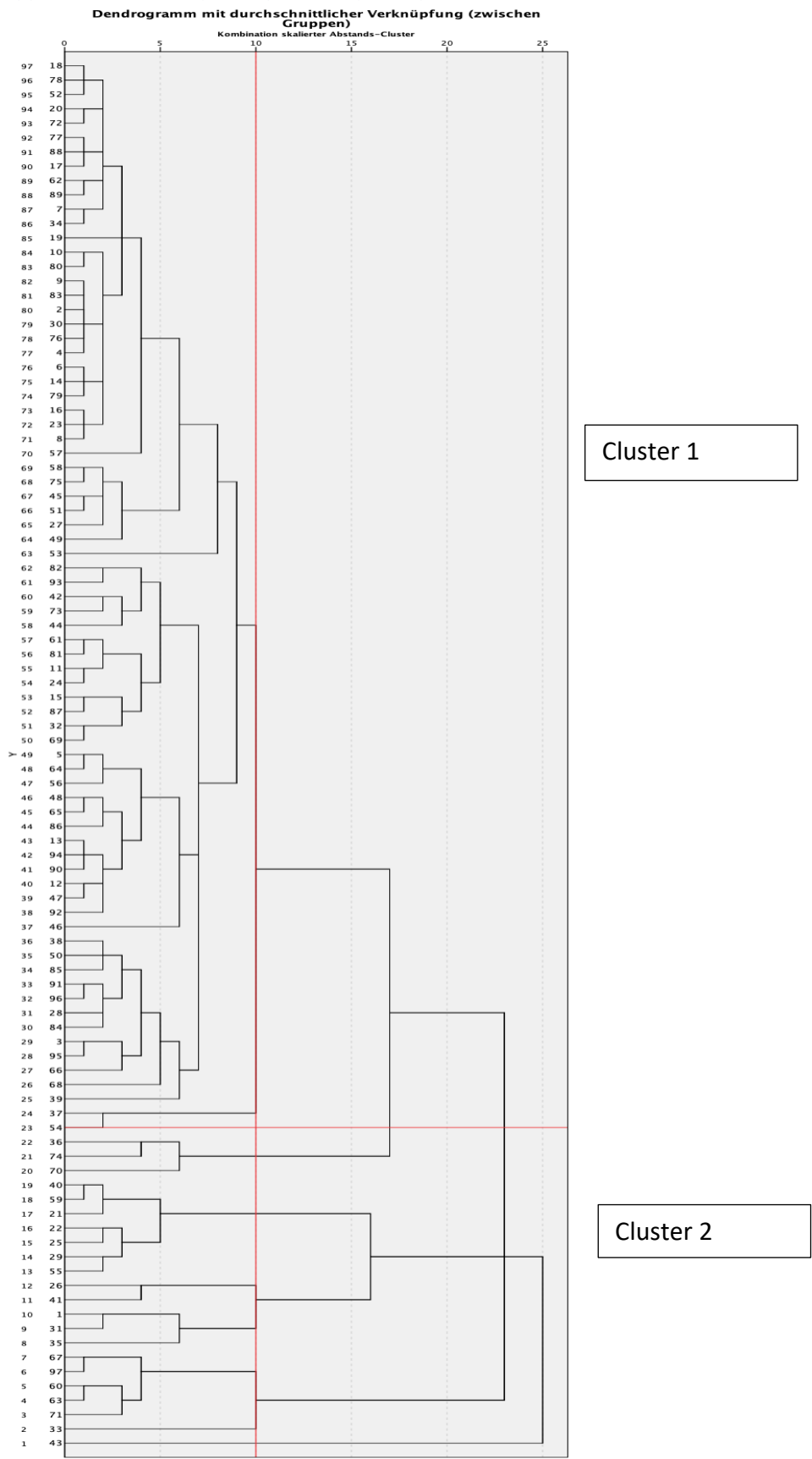
10. Informationen werden rechtzeitig ausgetauscht	☐	☐	☐	☐
11. Wir reden offen und frei miteinander	☐	☐	☐	☐
12. Wir bringen alle wichtigen Informationen in unser Team ein	☐	☐	☐	☐
13. Wir fühlen uns untereinander verstanden und akzeptiert	☐	☐	☐	☐
14. Manchmal denkt einer zu viel an sich selbst	☐	☐	☐	☐
15. Es gibt Konkurrenz zwischen den Teammitgliedern	☐	☐	☐	☐
16. Die Teammitglieder helfen sich gegenseitig, wenn einer in Zeitnot gerät	☐	☐	☐	☐
17. Einzelne Teammitglieder versuchen, sich auf Kosten anderer in den Vordergrund zu drängen	☐	☐	☐	☐
18. Wir fühlen uns als ein Team	☐	☐	☐	☐
19. Alle bringen sich in gleichem Maße in das Team ein	☐	☐	☐	☐
20. Die Teammitglieder vermeiden es, Verantwortung zu übernehmen	☐	☐	☐	☐
21. Wir denken ständig über Verbesserungen nach	☐	☐	☐	☐
22. In unserem Team fühlt sich jeder für das Gesamtergebnis verantwortlich	☐	☐	☐	☐
23. Es gibt niemals Spannungen im Team	☐	☐	☐	☐
24. Konflikte im Team können wir intern lösen	☐	☐	☐	☐

2. Offene Fragen

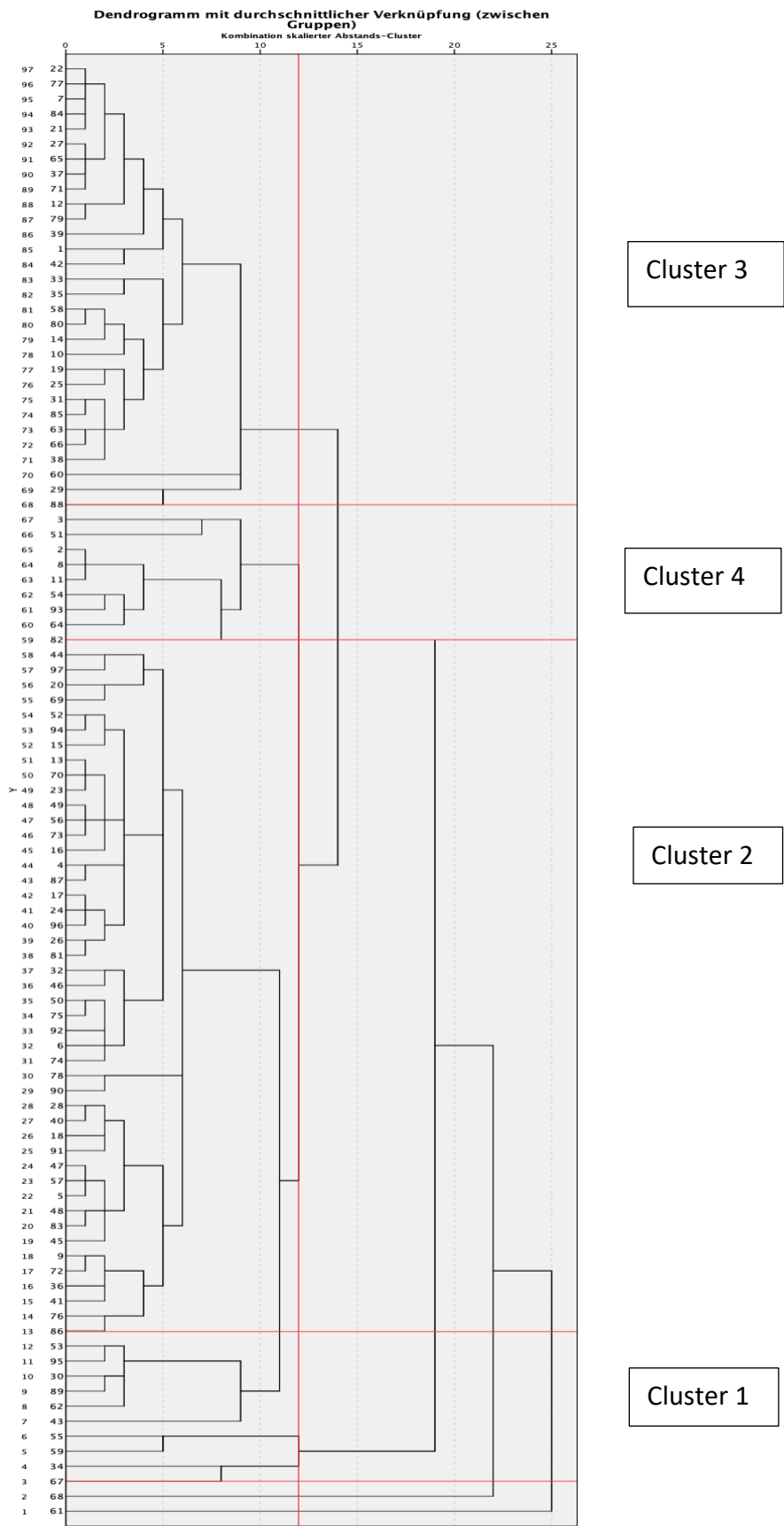
Bitte versuchen Sie, auf die folgenden Fragen kurz, aber möglichst präzise, einzugehen.

- a) Was hat in dieser Woche **im Team** gut oder besonders gut geklappt? Was hat nicht so gut geklappt? Woran kann es gelegen haben? Was würde ich beim nächsten Mal anders machen; was sollte mein Teampartner ändern? Welche Bereicherung bin ich für das Team; was kann mein Partner besonders gut?
- b) Was würden Sie einer Ihnen nahestehenden Person über den letzten Schultag erzählen?

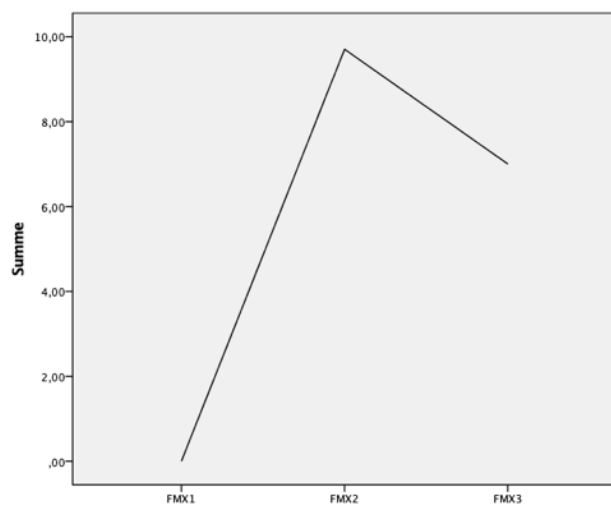
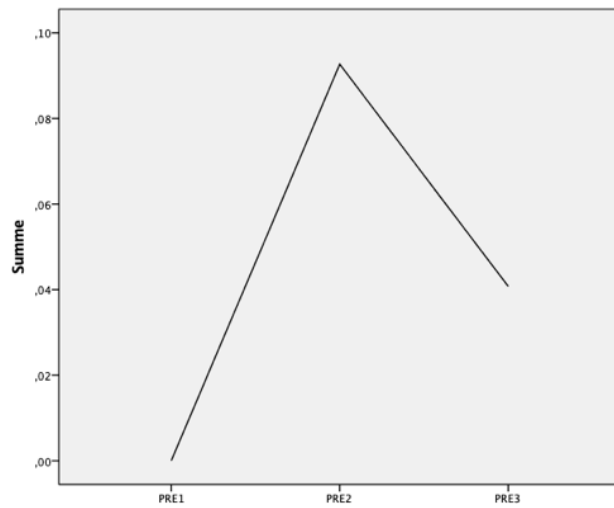
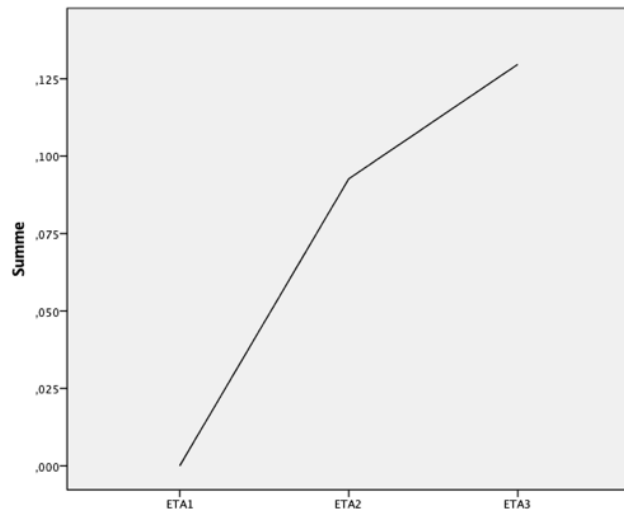
Appendix 6: Dendrogram of all categories pre-test



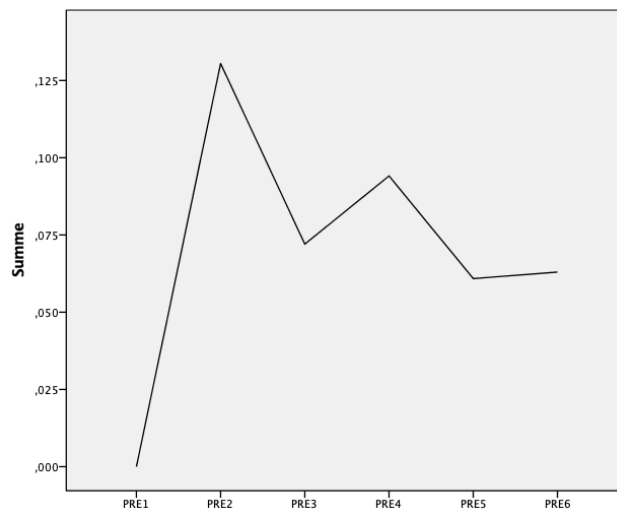
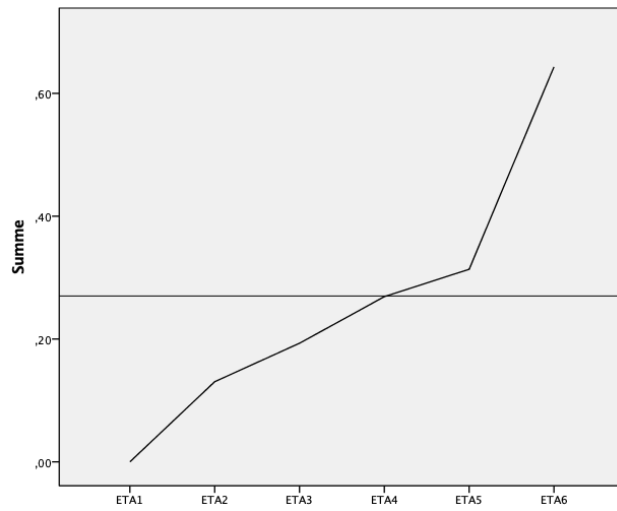
Appendix 7: Dendrogram of all categories post-practice test



Appendix 8: Diagrams of Test-statistics for Number of Clusters Pre-Test (t1)



Appendix 9. Diagrams of Test-Statistics for Number of Clusters Post Test (t2)



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