Finding a role in class: A mixed methods study of prospective teachers' beliefs towards co-teaching in inclusive classes

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Abstract

In a mixed methods design, this study examines prospective teachers' beliefs on co-teaching of general teachers and special education teachers. The quantitative approach comprises the development of a questionnaire regarding beliefs on teachers' roles and benefits of co-teaching in inclusive classes. The model fit and group mean differences of the final sample (n = 510) are reported. In a qualitative approach, focus groups with 56 participants were conducted and analyzed with the grounded theory method to provide further insights into prospective teachers' beliefs. The emerged core categories, role clarification, role reference system, and roles at eye level, disclose a multidimensional understanding of prospective teachers' beliefs on co-teaching.

Keywords: co-teaching, beliefs, inclusive education, teacher training, mixed methods

Introduction

Preparing prospective teachers for the challenges of inclusion in schools currently marks a central task within teacher training. Existing approaches into this field of research and theoretical concepts regarding teachers' competencies need to be substantiated with regards to the specific demands of inclusive settings of teaching and learning (Da Fonte & Barton-Arwood, 2017; Hamilton-Jones & Vail, 2014; Hamman et al., 2013; Melzer et al., 2015; Wolfswinkler et al., 2014). Consensus can be obtained that beliefs and value systems play an important role in individual-related dispositions regarding competent teaching action (Blömeke et al., 2015; Pajares, 1992). This article seeks to discover how to conceptualize beliefs on co-teaching with regard to inclusive teaching and learning settings.

The concept of beliefs refers to "understandings, premises, or propositions" (Richardson, 1996, p. 103) on various areas of life "that are felt to be true". These are individual, chronologically rather stable and exist as clusters on different objects or subject areas. They are partly unconscious but in principle accessible to consciousness. There is a broad sense of agreement that beliefs play a major role both in the assessment of pedagogical situations, for example, and in the action planning of teachers (Forgasz & Leder, 2008; Moser et al., 2014).

Value-based terms like necessary, important, or helpful express the importance or strength of a belief. Such a quality of valuation results in a measure of strength in the form of a personal, explicit rating, which can be measured in questionnaires with the known consent formulations. One part of this mixed methods study deals with the development of such a questionnaire, with the focus on co-teaching in inclusive classes.

The significant intensification of co-teaching of multi-professional teams represents a central innovation or challenge for teachers with regards to inclusion in schools (Scruggs & Mastropieri, 2017; Scruggs et al., 2007; Wolfswinkler & Fritz-Stratmann, 2014). The co-teaching of the professional actors and their beliefs towards collaboration mark an essential precondition

for the implementation of an inclusive school system (Lohrmann & Bambara, 2006; Montgomery & Mirenda, 2014).

Different definitions are available for the term inclusion or derived terms such as inclusive settings or inclusive schools, or they are theoretically underdetermined as a fuzzy concept. Accordingly, Grosche (2015) demands to define the underlying understanding of the term in relation to the respective specific research activity. The present research project refers to the obligation given by the ratification of the UN Convention on the Rights of Persons with Disabilities to make the German education system as inclusive as possible. This obligation was met with a highly differentiated special education system in Germany with specific schools for different special needs and overall high rates of exclusion. Efforts to reduce these rates led to the dissolution of many special schools and an increase in inclusion rates and heterogeneous classrooms, particularly in the areas of learning difficulties (Klemm, 2018). For each student identified as having special educational needs, a school receives specialized resources, generally in form of additional teacher hours performed by a special education teacher. Depending on the number of students with special educational needs, a special education teacher is accordingly in a class for only a few hours or for several hours on several days, offering support in learning to this group of students. For the specific arrangement of the co-teaching between the general teacher and the special education teacher, there usually is plenty of scope. Initial research results on frequently practiced forms of co-teaching and teachers' attitudes towards different forms of co-teaching are available (Gebhardt et al., 2015; Melzer et al., 2015; Pancsofar & Petroff, 2016). Under these conditions, the terms inclusion, inclusive settings, and inclusive schools used in this present study, are understood as the co-teaching of students in heterogenous classrooms, where students with and without special needs are offered learning spaces and included in learning together, conducted by general teachers and special education teachers.

It is not well known yet, however, which beliefs prospective teachers have on the topic of co-teaching in inclusive classes, which aspects they experience as challenging, and how they reflect and evaluate their first practical experiences (Da Fonte & Barton-Arwood, 2017; Jurkowski & Müller, 2018). It can be assumed that initial experiences with inclusive teaching and co-teaching, for example in the form of an internship at school, represent a sensitive phase in the prospective teachers' development of corresponding beliefs on collaboration (Bock et al., 2019). Inadequate academic or university training regarding co-teaching can have an effect on teachers' practical experiences, as a lack of conceptual knowledge or necessary skills can mark individual barriers for using forms of co-teaching in inclusive classrooms (Chitiyo, 2017). To date, the state of evidence on the extent to which prospective teachers' beliefs change during the course of their educational studies is still inconsistent (Steinmann & Oser, 2012). One aim of the present research project is to develop a reliable scale to measure beliefs with a specific focus on co-teaching. Among others, this allows to observe how these beliefs change over time, for example, during teacher training. A mixed methods design seems appropriate to address this complex issue, combining the quantitative approach with qualitative measures in the form of focus groups, which give further insights into prospective teachers' beliefs.

First, this article provides a theoretical background of the subject matter and discloses the study's goals. Then, in accordance with the applied fully integrated mixed methods research design, it presents both the quantitative and qualitative method, followed by results for both approaches. While methods and results are each reported subsequently, the article will reveal the dynamic interaction between the quantitative and qualitative approach occurring on multiple levels. The article closes with a discussion, providing an in-depth insight into prospective teachers' beliefs regarding co-teaching as well as an outlook on the implications for teacher training.

As a result of their meta-synthesis, Scruggs et. al (2007) construct major categories that divide the field, research on co-teaching in inclusive settings, into broad themes. While further or more recent research findings are already available on each topic area, the classification itself continues to prove useful in structuring the field.

The first category, *expressed needs for success in co-teaching* (hereafter abbreviated as *needs for co-teaching*), includes volunteerism, training, and compatibility, as well as planning time and administrative support, which represent particularly important factors for successful co-teaching from the teachers' point of view. Thus, under difficult conditions in form of time constraints, ad hoc planning, and limited professional development opportunities, collaboration can be perceived as a big challenge or strain on teachers (Mulholland & O'Connor, 2016). In particular, the lack of common planning time has been repeatedly confirmed in recent studies (Alnasser, 2021; Chitiyo, 2017; Scruggs & Mastropieri, 2017). Alnasser (2021) also found the lack of shared vision of co-teaching as a barrier named by the general and special education elementary school teachers interviewed, indicating different beliefs about co-teaching.

The second core category, *special and general education teacher roles in co-teaching* (hereafter abbreviated as *teacher roles*), considers how teachers in inclusive settings divide tasks and responsibilities as well as which form of co-teaching is particularly conducive to the objectives of inclusive teaching. According to the Anglo-American terminology of collaboration and following Marvin (1990) and Spieß (2004), Lütje-Klose and Urban (2014) describe a one-dimensional continuum model of co-teaching for inclusive settings. At the highest level of collaboration, inclusive values are represented together and responsibility for all students is shared. Equality and mutual appreciation with the willingness to take the other person's perspective mark additional characteristics for successful collaboration (Lütje-Klose & Urban, 2014). This is also reflected in empirical findings by Morgan, which highlight the necessity of

accountability and reveal shared responsibility as "the core of effective collaboration and thereby a driving force behind inclusion" (Morgan, 2016, p. 55). At the level of coordination, classroom instruction and individual support are coordinated, and, in some cases, phases are jointly conducted. However, each teacher remains in their area of responsibility and their role. In the case of cooperation, organizational arrangements are made, but classroom instruction and individual support usually remain unconnected. At the lowest level of co-activity, teachers work side by side with little exchange of views.

A survey from 1996 (National Center on Educational Restructuring and Inclusion) surveying teachers experienced in teaching in diverse classrooms also distinguishes four forms of co-teaching (see also Villa, Thousand & Nevin, 2013). The focus here is on the distribution of tasks and responsibilities in the classroom. The authors do not describe levels with different values, but alternative forms of organization that can be more or less useful for concrete teaching goals in a given situation. At the level of supportive co-teaching, one teacher leads the instruction while the other person rotates among the students to provide support. Parallel co-teaching refers to two teachers working with different groups of students in different sections of the classroom. At the level of complementary co-teaching, one teacher takes the lead instructional role for the whole group while the complementary teacher supplements the information, e.g. with visual representation. The form of team co-teaching refers to both teachers planning, teaching, assessing, and assuming accountability for all students in the classroom. Here, both teachers share leadership and responsibility, and therefore, according to the model of Lütje-Klose and Urban (2014), can also be described as a collaborative form of work. The supportive co-teaching approach by Friend and Cook (1995), refered to as the model "one teach, one assist", was observed or reported particularly often in the studies considered by Scruggs et al. (2007). In most cases, the special education teacher takes a supportive role while the general teacher dominates events. The summary of research by Solis et al. (2012) as well as recent studies, e.g. that of

Pancsofar and Petroff (2016), confirm the dominance of this asymmetric division of responsibility among teachers. Specific problems with the "one teach, one assist" model often manifest themselves in the form of "turf issues" (Scruggs et al., 2007, p. 408). The dominant role of the general teacher is not only a question of hierarchy and responsibility within the team. In many cases, the special education teacher is described as someone entering the general teacher's territory. Thus, the special education teacher is not only someone in second line with less responsibility and power, but actually a guest or even an intruder.

Despite the previously mentioned issues, there are many examples of successful collaboration in co-teaching (Gebhardt et al., 2015). Based on such positive examples, the advantages of intensive co-teaching become clear, which Scruggs et al. (2007) assort in the third core category, *expressed benefits of co-teaching* (hereafter abbreviated as *benefits of co-teaching*). They constructed four subcategories: benefits to teachers, benefits to students without disabilities, benefits to students with disabilities and students' skill level. In the subcategory benefits to teachers, learning from each other is usually named as added value, which is also confirmed by more recent studies (Friend & Cock, 2014). Some of the studies cited, e.g. Austin (2001), specify the increase in learning group-specifically. For example, the group of special education teachers particularly named the increase in content knowledge, while the group of general teachers mentioned an increase in their expertise concerning classroom management or the adaption of the respective curriculum to their individual learning group. In benefits to students with disabilities results show reduced segregation and improved students' socio-emotional and interaction skills (Friend et al., 2010; Strogilos & Avramidis, 2016; Strogilos & Stefanidis, 2015).

Purpose of the Study

As pointed out, this article intends to discover how to conceptualize beliefs on co-teaching with regard to inclusive teaching and learning settings. The designated mixed methods

approach, which combines quantitative and qualitative data and methods, allows an in-depth analysis of this issue. For the quantitative approach, a questionnaire was developed. Specific quantitative questions arise as to which factors the construct *beliefs on co-teaching of general teacher and special education teacher* supplies. Focusing on the point of reference – co-teaching between two defined groups –, the question also arises as to the measurement invariance of the scale and as to possible group differences. For the qualitative approach, focus groups serve as a content-related validation of the questionnaire and the deductively obtained factor structure. Furthermore, comparisons and contrasts between the methods and their results help to reduce possible research bias. However, the chosen complimentary mixed methods approach does not place the qualitative results solely at the service of the questionnaire development.

The explorative character of the study is also realized through the qualitative approach. The aim is to gain as comprehensive an insight as possible into the belief system of prospective teachers. This is obtained by means of a rather open survey procedure and authentic and true-to-life discussions in follow-up seminars of completed internships.

It is to be expected that the prospective teachers, who are under the immediate impression of their first practical experiences and in a discursive exchange with the collective, will make their beliefs available to disposition, compare them with those of other prospective teachers, and possibly differentiate them.

Mixed Methods Design

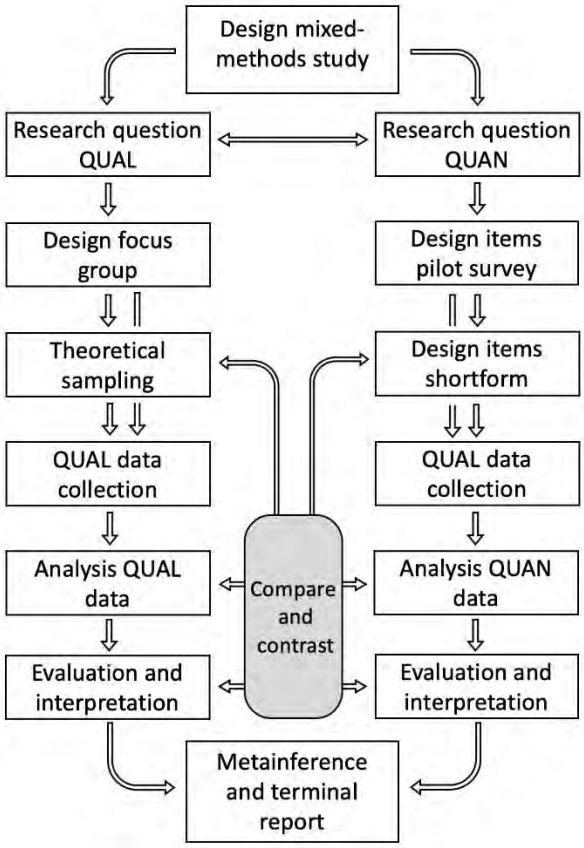
This study follows a multilevel mixed methods design (see Figure 1). Mixing occurs across multiple levels as quantitative and qualitative research is interrelated and analyzed to answer respective questions about the subject matter (Teddlie & Tashakkori, 2009).

Figure 1

Fully integrated mixed methods research design

(see Teddlie & Tashakkori, 2009, following

Kuchartz, 2014, p. 94).



The design and implementation of the qualitative method of group discussions and the quantitative questionnaires run parallel. In the course of the analysis and interpretation of the data, both approaches interact again. The objective is not only to triangulate the results but also to generate a dynamic interaction in the research process itself. Possible questions, hypotheses, and contradictions that arise in the course of the analyses enable new approaches to the specific data in the respective other research areas. Discriminant results of the qualitative and quantitative analyses need to be interpreted as an issue of content-related validity within the questionnaire. At the same time, during the process of repeated coding and systematizing of the transcripts from the focus groups, complementary results from the questionnaire were taken as an occasion to raise new questions and take new perspectives on the material (Creswell & Plano Clark, 2007).

Data Collection

Ethical guidelines were considered from the initial stages of planning this research project all throughout the study's lifecycle. Ethical considerations included voluntary participation, informed consent, confidentiality, and anonymity. The data collection took place from July 2015

until April 2018. It started with a first pre-version of the questionnaire with four prospective teachers following the think aloud method in a special test setting with one prospective teacher and one researcher present at a time (van Someren et al., 1994). All statements were recorded and transcribed. All further data collections were each completed as paper and pencil tests during seminar times at different universities. Participation was voluntary, but a return rate of over 95 % was achieved. The completion of the revised pre-version of the questionnaire with 29 items required about 15 minutes. The short scale was implemented into a set of further short scales for self-efficacy, attitudes, and motivation to study – all with reference to school inclusion. This set required a completion time of about 30 minutes.

Focus groups took place twice (March 2017, March 2018), each in the context of a follow-up seminar after a school internship. During the four-week internships, 56 prospective teachers were paired as tandems, each consisting of a prospective teacher for special education (prospective special education teacher) and a prospective teacher for mathematics (prospective math teacher). The seminar concept includes joint work on individual cases in the preparatory seminar and collaborative teaching during internships (Author, 2018). Focus groups mark the start of the reflections of these experiences. The discussions were fully recorded and transcribed and lasted between 35 and 50 minutes. Two to three groups were situated in a large seminar room respectively. After an introduction by a researcher, groups conducted their discussions largely independently. The possibility to consult a researcher was available at all times but was rarely used.

Sample

In total, data was collected from over 800 prospective teachers studying education. Sample 1 (n = 189) consisted of a group of BA students, who completed the revised pre-version of the questionnaire with 29 items (see Table 1). In the largest sample, the short scale was tested with prospective teachers of three German universities (Sample 2, n = 510).

Table 1

Descriptive statistics of the two largest samples

			Study progress				Teaching degree			
Sample	Number of Items	Total	BA 1-3	BA 4-6	MA	N/A.	Primary and/or Secondary	Gym.	Special Edu.	N/A.
1 (pilot)	29	189	0	189	0	0	57	94	36	1
		100 %	0 %	100 %	0 %	0 %	30.2 %	49.7 %	19.0 %	0.5 %
2 (short form)	12	510	152	213	134	1	309	18	168	15
		100 %	29.8 %	41.8 %	26.3 %	0.2%	60.6 %	3.5 %	32.9 %	2.9 %

At these universities, prospective teachers can earn different teaching degrees; most were assigned to the category primary and/or secondary or special education. Sample 2 mainly consisted of prospective teachers in the second half of their BA program (BA 4–6). 134 prospective teachers in their MA program were also included in this sample (see Table 1). Out of the whole group, 41.6 % stated they had not yet attended a seminar dealing with the subject of school inclusion over the course of several seminar sessions. 50.7 % stated they had never observed inclusive education, for example during an internship.

All 56 discussion partners of the focus groups were in their second half of their educational BA studies at the German Universität Hamburg. Among them were 30 prospective math teachers, who studied math as one of two subjects and who would later become general teachers, and 26 prospective teachers focusing on special education, who would later become special education teachers. Of these 56 prospective teachers, only 18 % stated they had not yet attended a seminar on inclusion. As in the total sample, however, about half of the prospective teachers stated they had not yet observed inclusive education before their internship.

Quantitative Measures: Developing the Questionnaire

For the pre-version of the questionnaire, a set of 29 items was systematically constructed for the core categories (needs for co-teaching, teacher roles and benefits of co-teaching) of the meta-synthesis by Scruggs et al. (2007). Transcripts of the first data collection with the think out loud method were checked by a group of four researchers. In addition, prospective teachers' statements deviating from the intended issues were identified, analyzed and the affected items were reformulated conjointly.

The revised questionnaire was presented to 180 prospective teachers (sample 1). Results showed very high mean values, which were not expected to this extent. The mean value for all items is $M = 3.26$ ($SD = 0.34$; theoretical mean value 2.5 on a four-level rating scale). Nine out of 29 items with a mean value of over 3.5 and modal value of 4 show clear ceiling effects. The decision not to use reversed items and not to use items that are possibly too strongly relativized ("XY could cause this and that"), could cause these high approval values. During further developments, it was tried to encounter these problems by rephrasing some items into negative ones, i.e., those that needed re-coding, and by making more polarizing statements. The fourth item of the subscale teacher roles, for example, expresses a form of cooperative role division and must therefore be re-coded: "Special education teachers are primarily responsible for students' individual needs during regular classes." The relativizing phrase "Joint lesson planning offers good conditions…" of the fourth item on the scale benefits of co-teaching was replaced by "Joint lesson planning of SE and math teachers enables the specific promotion of high-achieving students."

Results from the first focus groups provided further indications on revising the scale. These showed ambiguities whether high agreement values on items of the scale needs for co-teaching should be interpreted positively or negatively. Several lines of argumentation within the focus groups discuss needs for success as barriers to co-teaching, which is why intensive co-

teaching represents an unrealistic and irrelevant ideal. On these grounds, the factor needs for co-teaching was not taken into account in the further development of the scale. Another reduction to a total of 12 items was statistically directed with particular focus on the variance of content in order to reveal as many facets of the respective construct as possible (Saris & Gallhofer, 2014). For the next preliminary study (n = 30), as with all short scales, a six-level rating scale was used instead of a four-level one. This variant was used almost identically for the main survey with sample 2 (n = 510).

Quantitative Analyses

The quantitative analyses focus on the confirmatory factor analyses (CFA) and are carried out by the software Mplus (8.1.5; Muthén & Muthén, 2012-2017). The full information maximum likelihood (FIML) procedure is used to deal with missing values. The Little MCAR test was requested for the assessment of the MCAR condition. As a result, the null hypothesis must be rejected, i.e., MCAR-dependent procedures (e.g. listwise exclusion) are inadmissible (Baltes-Götz, 2013). For all items, samples 1 and 2 were additionally tested for normal distribution. The Kolmogorov-Smirnov test is statistically significant for all items ($p < .01$), i.e. the null hypothesis is rejected and the data are not normally distributed. Consequently, in the further process, the more robust MLR estimator was used (Kline, 2015).

Similar to the focus groups, where contrasting groups were formed, the quantitative analyses were used to investigate group differences, among others. For this purpose, the measurement invariance of the short scale is also examined. In a step-up approach, restrictions are gradually introduced into the model (Brown, 2015).

Qualitative Method: Focus Groups

As a qualitative method, mini focus groups of four to six participants were conducted in order to measure prospective teachers' beliefs complementary to the questionnaire survey. Through mutual stimulation, one's individual opinion can be expressed more clearly, and effects

of social desirability can be reduced (Schulz et al., 2012). Due to the open dialogue, a wide range of answers can be expected (Liamputtong, 2011). However, there is a risk that specific statements are more strongly attributed to group dynamics than to the individuals involved. Nonetheless, a discussion with like-minded prospective teachers, who are similarly affected by their internship experiences and who are equally challenged to concretize their ideas of a future career, creates an authentic and true-to-life dialogue (Kitzinger, 1994). It is precisely this dynamic that promises added value of the mixed methods design.

The question whether a heterogeneous or rather a homogenous group composition is more conducive is an ongoing discussion (Liamputtong, 2011). In the first round of focus groups, discussions in homogeneous groups, consisting of prospective teachers with the same study objective, showed an increased intensity and a wider range of polarizing statements – in contrast to those in heterogeneous groups. In the second round, theoretical sampling primarily consisted of monodisciplinary focus groups. Otherwise, positive experiences gained in the first round suggested maintaining the same non-directive variant without continuous moderation. Groups received a short oral input before conducting discussions self-sufficiently with the help of a written, structured assignment and further stimulus material. This included three photos of teaching situations and a text vignette with an excerpt from a fictional team meeting.

Qualitative Analyses

The qualitative data was approached with the help of a grounded theory framework and the constant comparative method (Glaser & Strauss, 1967). This method is frequently used to analyze focus group data (Leech & Onwuegbuzie, 2008). First, the researchers independently engaged in a process of open coding. Subsequently, axial coding was conducted in order to construct chunks of data. Memos were written to reflect preliminary theories and to keep an open mind regarding new emerging categories. Following the constructivist grounded theory methodology according to Charmaz (2015), particular importance was attached to one's own

expectations regarding a presupposed focus on teacher roles in terms of cooperation and collaboration. Discrepancies were discussed and codes were refined. Then, researchers repeated reading the transcripts independently in order to apply the refined codes to the entire data.

With regard to the controversially discussed question whether or not the grounded theory is to be described as a hermeneutic method or as content analysis (Breuer et al., 2019; Cho & Lee, 2014), the present study – with the declared goal of working out belief systems – positions itself clearly to the extent that a synthesizing work must also be performed through interpretation. It can be assumed that with the help of the grounded theory it will be possible to go beyond the subjective thinking, sorting, and interpretation worlds of the actors in the focus groups. However, assuming the principal capability of awareness of beliefs, the starting points are still the concepts and subjective theories of participants, which in themselves and not only through the researchers' interpretation represent a valuable contribution to the issue at hand (Breuer et al., 2019). The synthesizing work to be performed within the framework of the material is particularly carried out by the step of axial coding. The standardized coding paradigm by Strauss and Corbin (1990; 1998) aims to identify and display social processes and relationships and their consequences for participants. Thereby, the study follows a rather educational and psychological approach as the researchers focus less on social context, causes, or consequences and rather on the texture and quality of the participants' perspectives (Willig, 2008). Directly following the prospective teachers' first longer internship, there is – so the assumption – a high need for discussion and clarification about the roles of teachers and thus their own professional perspectives, as the prospective teachers are in an important phase of their professional biographical self-discovery.

Results

As described above, the two research methods qualitative and quantitative interlock several times within the integrated mixed methods design. In order to increase intelligibility, results of the quantitative analyses are reported first, followed by the qualitative ones.

Quantitative Results of the Statistical Analyses

In both subscales, prospective special education teachers show significantly more positive beliefs, i.e. on average they tend more towards collaborative forms of work and see greater advantages in co-teaching. This result is also confirmed by the nonparametric Mann-Whitney *U* test (see Table 2). Despite continuing ceiling effects, these differences can be seen in the subscale benefits of co-teaching, i.e. in the perceived benefits of co-teaching.

Table 2

Results of the Mann-Whitney U test for a latent mean comparison between prospective special education teachers and prospective math teachers in the subscales teacher roles and benefits of co-teaching.

Scale	Teaching degree	*M*	*SD*	*T*	*df*	*sig.*
CoTeachRol_mean	SE	3.83	0.66	5.43	475	<.001
	math	3.49	0.64			
CoTeachBen_mean	SE	5.14	0.61	5.16	475	<.001
	math	4.77	0.80			

The highest discrepancies between both groups can be found in two items, both of which address the special education teachers' responsibility for subject content. The item "The selection of subject content is a task for special education teachers to the same extent as it is for general teachers" receives a high level of agreement from prospective special education teachers (M = 4.79, SD = 1.32) in contrast to prospective math teachers (M = 3.99, SD = 1.44). The item "Giving the whole class an introduction to new subject content can be a task for a special education teacher " receives a slight rejection of 3.10 (SD = 1.41) from prospective math teachers

despite the relativizing phrasing, in contrast to prospective special education teachers with a mean value of 4.03 (*SD* = 1.54). In one item, prospective math teachers achieve slightly higher values and show stronger collaborative beliefs. This item, "Encouraging students with special needs in the area of emotional and social development to interact with fellow students in a respectful manner is a task of general teachers", conversely, deals with taking over "typical" SE tasks, which prospective math teachers (*M* = 3.99, *SD* = 1.30) are willing to undertake to a greater extent than prospective special education teachers (*M* = 3.68, *SD* = 1.47) actually concede.

The results of the CFA (see Table 3) show no acceptable fit in the incremental fit indices TLI and CFI for the two factor model with twelve items used in the main survey (acceptable fit: .97 > CFI/TLI ≥ .95; Schermelleh-Engel et al., 2003). The overall fit indices, however, are good to acceptable (.05 < RMSEA ≤ .08; 05 < SRMR ≤ .10; Schermelleh-Engel et al., 2003).

The modification indices refer to high correlations of the reversed items from both subscales. Thus, there are indications for a method factor that was tried to circumvent in the pilot study by aligning all items in the same way. The addition of a method factor improves the model fit (see Table 3). A further improvement of the model fit is achieved by eliminating the second item in the subscale benefits, so that the incremental indices CFL and TLI with values above .95 now also show an acceptable fit. This item is the only one not referring to teaching in a narrower sense, but to the teacher's own professional development. Cronbach's alpha for the subscale benefits of co-teaching was .751, which can be considered acceptable, but in the subscale teacher roles it was poor at .348. This result can be partially explained by the influence of the method factor, but also refers to the high complexity of the latent variable.

Table 3

Goodness-of-Fit of the original and the modified short scale

Factor Model	Items	χ^2	*Df*	χ^2/df	CFI	TLI	RMSEA 90%CI	SRMR
2 Fac.	12	173.07	53	3.27	.866	.833	.056-.078	.064
2+1 Fac.	12	111.31	46	2.42	.927	.896	.040-.065	.045
2+1 Fac.	11	61.56	37	1.66	.970	.956	.019-.052	.036

The assessment of the measurement invariance of the short scale certifies a metric but no scalar measurement invariance. The scaled difference $\chi 2$ test is highly significant ($p < .001$), which means that there is no measurement invariance. However, according to the rule of thumb established by Chen (2007; Cheung & Rensvold, 2002), the deterioration of the fit values is at limit. In CFI and TLI, a decrease of .02 and in RMSEA and SRMR an increase of .03 is still acceptable. It can be assumed that the underlying latent variables in the groups SE and math are not conceptualized completely alike, which is why the reported mean differences can only be interpreted with this reservation.

Qualitative Results Revealed by the Grounded Theory Method

The research situation – corresponding to the intention of the research design – is not experienced as a problematic social situation to be overcome, but rather as a protected space in which personal beliefs can be freely expressed. However, it also shows the fragility of many beliefs and a high willingness to irritate one's own point of view. These assessments correspond with the first of three emerged core categories, *role clarification*. It functions as a kind of modus operandi, which structures the discussions and pervades the prospective teachers' expressed beliefs and shared practical experiences. In particular, lacking or unexpected regulations regarding the division of roles at schools visited during internships are described as irritating. In

the course of the discussions, contrary practical experiences and oppositional belief systems complicate the consensus within all groups and a congruent picture for the individual, as the following two passages show.

In this first example, several prospective math teachers explicitly ask about the tasks, specific competencies, and study contents of special education teachers in demarcation to educators without a university degree, which also questions the special education teachers' status as full-fledged teachers.

> C: I just think, if the special education teacher only supports, that's also something an educator can do, /A: Yes, the question is, how exactly the potential is utilized, right, yes. /So if that only means that the special education teacher sits down and helps with token or something like that. That's something also an educator can do. At our school, the educators did that, mostly. And I just think that you don't have to go to university for that. That's just nonsense somehow, that the special education teacher is paid to that extent.
>
> B: Yes, but then what's THEIR thing? What makes them better, the special education teacher better than educators? Because, for me, this just sounds like, yes, also an educator can do that. Yes, but what, what makes them different, I mean, what do they study differently? (FG7_Math_C+B 00:07:54)

In the second example, a statement of a prospective special education teacher also discloses irritating experiences made during the internship that are obviously not congruent with the prospective teacher's own understanding of roles:

> C: At our school, that was really kind of strange. The special education teacher, WHEN she came to class. She immediately took the children OUT. […] She ALWAYS did individual one-on-one work, always outside. And somehow our mentor also said, you know the principal, yes, special education teachers only have an adVISING role. (FG5_SE_C 00:04:38)

The second core category describes the *role reference system* used by prospective teachers to determine the validity of their statements. The reference system contextualizes

individual beliefs in relation to social spaces of experience or established figures of thought. The arguments of the prospective teachers disperse between the poles established practices and values, i.e. the prospective teachers distance themselves from the observed practices to varying degrees and demand more or less clear changes according to different ideals of the inclusive school or the roles at eye level (→ core category 3). These findings are in line with Ghedin and Aquario (2020). In the *co-teaching paradox*, they describe the contradiction in teachers' beliefs ranging from what is important at an ideal level and what is important in reality. During the course of discussion, distinct effects of group situations become apparent. For example, there are longer passages, in which the whole group adapts a fatalistic devotion towards the negative school reality and negotiates co-teaching, respectively, as an unrealistic utopia. Nonetheless, there are also passages, in which group members show solidarity towards this reality and highlight their own ideals and demands. The following passage is an example for the explicit phrasing of one's own ideals with the starting point of distancing oneself from observed practices and practices assessed negatively:

> A: And especially also, that the special education teachers only drop by in class as a GUEST, once a week, that they would actually have to coordinate with so many different general teachers and plan lessons together. That just doesn't work at all. Ideally, of course, you have ONE special education teacher and ONE general teacher in your class permanently. And at best, always the same special education teacher, who knows the class very well. (FG3_SE_A 00:10:36)

The third core category, *roles at eye level*, is expressed in the desire for status equality that emerges in all discussions. This demand, however, goes in different directions within both groups. While the prospective special education teachers wish for recognition and equivalence of their profession towards general teachers, the prospective math teachers relate their desire for status equality directly to their internship situation. The prospective math teachers criticize their treatment as novices with no given responsibility and the linguistic mark as "only a trainee".

Meanwhile, prospective math teachers generally appear as very self-confident. They harshly criticize both poor practice as well as, specifically, the group of special education teachers. Some strongly criticize the incompetent tandem partners during their internship ("A: He was more afraid of the students than I was"; FG7_Math_A 00:14:10), others also criticize the special education teachers of their internship schools, who could not accomplish central tasks, like "keeping the class quiet." The lack of expertise is often described as the special education teachers' personal handicap, which considerably limits their abilities to responsibly participate in lesson planning and teaching and calls into question their status as full-fledged teachers.

In summary, prospective teachers' beliefs cannot be described exhaustively on one dimension between the poles of co-activity and collaboration. The difficulty in naming the special education teachers' contribution to collaborative co-teaching proves to be the greatest resistance, in fact, by both groups. Accordingly, no position can be taken regarding benefits of co-teaching as asked in the questionnaire. Possible directions of action of a specific SE expertise cannot be verbalized.

Discussion

In line with the intention of an explorative mixed methods design to gain diverse insights into prospective teachers' beliefs on co-teaching, various inferences between both research strands were made. However, not all contrasts and comparisons can be reported here. With regard to the quantitative questions, the assumed two-factor structure of the short form was confirmed. However, there are many indications that a further development of the subscales seems necessary.

The unexpectedly high degree of agreement on collaborative forms of co-teaching in the subscale teacher roles, as found in the quantitative data, gave an important impulse for the analysis of the qualitative material. Reconstruction of many critical statements with simultaneously high agreement in the questionnaire gave reason to conceptualize the construct

multi-dimensionally, so that both agreement and disagreement became possible while considering the specific role reference system. Rather low agreement of items dealing with special education teachers taking over math teachers' "classical" tasks of selecting and introducing new topics also forced new perspectives on the qualitative material. Thus, additional distinctions were coded, depending on whether prospective teachers really expressed collaborative beliefs with flexible roles at eye level or showed confidence in taking over tasks of the respective opposite group.

Further parallels between the qualitative and quantitative results refer to the polarization of cooperation and collaboration. From a quantitative perspective, the necessity of the additionally added method factor with cross loadings on reversed items gives further indications that cooperation is not to be understood as a simple negation of collaboration. Especially prospective special education teachers view a distribution of roles at eye level as the highest maxim for co-teaching, which can be realized in one form or another. Concerning further developments, it seems necessary to examine the use of separate subscales for beliefs on collaboration and those of cooperation. Thus, by no means is there a consensus within the current debate on inclusion that collaboration is to be preferred in any case (Melzer et al., 2015), where both general and special education teachers engage in designing and executing effective instruction and learning spaces for all students as well as share responsibility for everyone.

In the quantitative results on benefits of co-teaching, the revised short scale also shows a very high level of agreement for both groups. These positive beliefs on co-teaching also emerge in the qualitative material, where, again, the value of the qualitative results for the interpretation of the quantitative data becomes clear. However, the question is whether all prospective teachers refer to interdisciplinary co-teaching while filling out the subscale or whether it is simply better to have two teachers present, as repeatedly mentioned during discussions. No prospective math teacher can verbally substantiate the advantages of co-teaching with a special education teacher,

so it is questionable if they consciously agree to an added value of a specific special education expertise.

In the present study, this issue indicates a crucial point for the structure and implementation of collaboration in inclusive settings. Various studies have already shown that specifically the roles of special education teachers in joint teaching arrangements are often insufficiently clarified and, correspondingly, role confusion can be observed (Leko & Smith, 2010; Shepherd, et al. 2016). The present study with its mixed methods design offers additional, in-depth insights into the sources of the prospective teachers' uncertainty. For the prospective special education teachers, it is less about the specification of their tasks in the classroom but rather about collaborating at eye level. Within the focus groups, individual prospective teachers report best practice experiences from their internship, but otherwise also predominantly confirm the conclusion of the meta-synthesis by Scruggs et al.: "If the qualitative research to date represents general flexibilization practice, it can be stated that the ideal of true collaboration between two equal partners […] has largely not been met" (2007, p. 412). The asymmetry is widely confirmed in recent empirical studies (Banks, 2018; Pancsofar & Petroff, 2016). Classical role distributions with a higher status of general teachers cause, among other things, strong feelings of psychological safety for this group (Hackett et al., 2020). As the flexibility of responsibilities and collaboration at eye level become the subject of group discussions, confusion or resistance to co-teaching increases among prospective math teachers.

Since the participating prospective special education teachers themselves are not able to clearly identify their special expertise, the desired equality in the conducted focus groups is hardly achieved, or their status is repeatedly questioned by the outside group. Conversely, the prospective general teachers see no necessity to renegotiate their role in the classroom, as they see a high degree of congruence between their competencies and their supposedly fixed role in leading the class. In this context, the mostly higher content knowledge of this group comes up

several times, resonating with existing research findings (Da Fonte et al., 2017; Muraswski, 2012; Scruggs et al., 2007).

The present study's central contribution to the research field is the recognition of the close connection between the prospective special education teachers' desire for appreciation at eye level, the confusion in the distribution of roles in co-teaching, as well as the insufficient self- and external description of the special education teachers' competencies in inclusive teaching settings.

Limitations

The explorative character of this study with the combination of qualitative and quantitative methods in a multilevel mixed design inevitably produces a multitude of further questions that the study itself cannot answer. Discrepancies between the two research approaches proved to be beneficial. However, they also highlight the preliminary character of the study and its results. There are also limitations regarding the generalization of the results, caused by the recruitment of test subjects or participants. While the sample of the questionnaire survey was quite heterogeneous with three participating universities comprising prospective teachers with different study progress, the group of participants in the group discussions was rather homogenous. All prospective teachers were at the same stage of study and were all under the immediate impact of an internship completed a few days prior. The prospective math teachers involved, who deliberately enrolled in the follow-up seminar with a title including the word inclusion, had also a significantly higher rate of already attended seminars on the topic of inclusion compared to other prospective math teachers in the total sample.

Additional impulses for constructing theoretical models on prospective teachers' beliefs on the subject area could possibly be gained by a theoretical sampling with the inclusion of prospective teachers at different stages of study and with other school subjects. Limitations also result from the fact that only German prospective teachers were surveyed. Some particularities of

the underlying situation in Germany have already been mentioned, e.g. the progressive development of an inclusive school system starting from a very differentiated system of exclusive special needs education and a high degree of specialization of special education teachers with regard to students with specific needs.

Conclusion and Implications for Teacher Training

In summary, the chosen multilevel mixed methods design proves to be adequate to the complexity of the subject matter. In particular, the localization of cooperative and collaborative forms of co-teaching on a one-dimensional continuum model (Lütje-Klose & Urban, 2014), which combines both task division as well as relational aspects such as trust and appreciation, does not do justice to the complex belief system of the prospective teachers surveyed. Two dimensions, role reference system and role clarification, which were identified as core categories, burst open the one-dimensional model. Positive beliefs about shared responsibility and joint lesson planning and implementation for all students are presumably only relevant in practice and guiding action if they are also assessed as feasible in the reference system of school reality.

The present study reinforces research findings that co-teaching during internships as well as follow-ups of these experiences in seminars at the university are particularly important in preparing prospective teachers to teach in inclusive schools (Chitiyo, 2017; Hamman et al., 2013; Jurkowski & Müller, 2018; Ritter et al., 2018). One risk here, which this study highlights, is that prospective teachers who do not find positive role models for co-teaching in their practicum school, or who have negative experiences co-teaching with their tandem partner, will be reinforced in their view that collaborative forms of co-teaching have no meaning in the field of practice. In retrospect, the chosen form of preparing prospective teachers for co-teaching in their internship by doing things together – especially in the form of case work – proves to be possibly insufficient. The norm of collaborative co-teaching implicitly conveyed by the design of the seminar is experienced as incompatible with school reality several times. During the internship,

the prospective teachers are overwhelmed with the task of proving themselves as teachers in the school system while at the same time keeping a critical distance from the practices established there, some of which do not provide for collaborative forms of co-teaching. The subsequent group discussions proved to be a notable forum to reconsider one's own negative experiences and subsequent pessimistic beliefs about feasibility. Best-practice examples seem to be an effective method to efficiently counter the assessment that collaboration is a utopia, especially if they are authentic reports of fellow prospective teachers. Irritations of the prospective teachers coded on the axis of role confusion in the group discussions are, however, also found at advanced points of the discussions, which sometimes break off without final clarification. The impression arises that central challenges only become clear to the prospective teachers at the end of the seminar unit, which comprises preparation, practical training and follow-up, during the group discussions. Thus, none of the groups satisfactorily succeeds in describing the special education teachers' specific expertise to enable collaboration at eye level. Comparable projects that explicitly make interdisciplinary co-teaching a topic of preparation in advance (Ritter et al., 2020) are to be preferred according to the interpretation of the findings presented here.

Hereby, teacher training should support prospective teachers’ self-efficacy regarding their own possibilities and competencies to establish positive collaborative forms of co-teaching in their future work as teachers. The developed questionnaire offers a first possibility to capture such changes over the course of studies and to estimate the influence of university learning opportunities in larger cohorts as well.

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