frontiers in Education

ORIGINAL RESEARCH
published: 04 January 2022
doi: 10.3389/feduc.2021.701987

Social, Systemic, Individual-Medical or Cultural? Questionnaire on the Concepts of Disability Among Teacher Education Students

Markus Gebhardt[1], *Michael Schurig*[2]*, *Sebastian Suggate*[1], *David Scheer*[3] and *Dino Capovilla*[4]

[1]University of Regensburg, Department of Education Science II, Regensburg, Germany, [2]Technical University Dortmund, Faculty of Rehabilitation Science, Research in Inclusive Education, Dortmund, Germany, [3]Ludwigsburg University of Education, Faculty for Special Needs Education, Ludwigsburg, Germany, [4]University of Wuerzburg, Institute of Special Education, Wuerzburg, Germany

The individual-medical concept of disability, whereby disability is believed to be caused by some intractable impairment, is perhaps the most widely held view in society. However, other concepts exist with which teachers in inclusive schools should be familiar (e.g., social, systemic), to better inform teacher behavior, attitudes and understanding. We therefore developed an instrument to capture education students' concepts of disability. We constructed the questionnaire according to four theoretical models of disability (individual-medical, social, systemic, and cultural concepts), which are commonly used in inclusive teacher education, and validated this on a sample of 775 education students. Additionally, we administered the Attitudes towards Inclusion Scale (AIS) and measured key demographic variables. The instruments, data and analysis code used are available online at https://osf.io/dm4cs/. After dropping redundant items, a shortened form of the questionnaire contained 16 items, with satisfactory psychometric values for scales pertaining to four concepts of disability (CFI = 0.963, TLI = 0.955, RMSEA = 0.037, SRMR = 0.039). These four concepts of disability showed small correlations with the AIS, indicating that our questionnaire measured an independent construct. The more experience education students had with disability and the more courses they had attended on inclusive education, the more likely they were to agree with the social concept of disability. The questionnaire shows promise in measuring concepts of disability and might be used to stimulate students' critical reflection during teacher education.

Keywords: models of disability, disability, inclusive education, teacher training, concepts of disability, questionair

OPEN ACCESS

Edited by:
Mats Granlund,
Jönköping University, Sweden

Reviewed by:
Kerstin Göransson,
Karlstad University, Sweden
Michael Grosche,
University of Wuppertal, Germany
Örjan Dahlström,
Linköping University, Sweden

***Correspondence:**
Michael Schurig
Michael.schurig@tu-dortmund.de

Specialty section:
This article was submitted to Special Educational Needs, a section of the journal Frontiers in Education

Received: *28 April 2021*
Accepted: *16 November 2021*
Published: *04 January 2022*

Citation:
Gebhardt M, Schurig M, Suggate S, Scheer D and Capovilla D (2022) Social, Systemic, Individual-Medical or Cultural? Questionnaire on the Concepts of Disability Among Teacher Education Students. Front. Educ. 6:701987. doi: 10.3389/feduc.2021.701987

1 INTRODUCTION

Inclusion has been the stated aim of many education systems internationally, both before and after the advent of the United Nations Convention on the Rights of Persons with Disabilities (The United Nations, 2006). However, as is well documented, inclusion remains a difficult goal that is seldom fully attained (Ainscow and Miles, 2009; Lindsay et al., 2020). It would appear reasonable to suggest that views of disability might be affecting the extent to which inclusive education can be established. For

instance, the individual-medical concept of disability tends to involve the idea that disability is caused by some intractable and often biological/individual impairment. Perhaps, as a result of such concepts, disability is viewed as something best addressed in exclusive educational settings with specialist facilities and personnel. However, before peoples' concepts of disability can be investigated as obstacles to inclusion, work needs to first investigate and develop measures of concepts of disability.

2 DEFINING CONCEPTS OF DISABILITY

At this juncture, it is important to distinguish between concepts, attitudes, and models. We consider models to represent theoretical frameworks based on scientific evidence for how particular disabilities, or disabilities in general, arise (Bailey, 1998). For example, formal theories might deal with genetic influences, societal factors, or normative criteria. Under current societal conditions, it is likely that education students have had some experience with aspects of formal scientific models of disabilities, either in school, through affected friends and relations, or perhaps from documentaries or other forms of media. Finkelstein (2001) described this individualized process of making sense of the term disability as forming an own interpretation of disability. However, because most people can be assumed to not have detailed knowledge of formal models, we suggest that most instead have an individualized conception of disabilities, which we refer to with the term concepts of disability (Michailakis, 2003).

Thus, concepts of disability refer to individual people's understanding of what a disability is, containing a strong cognitive component leading to the formulation of specific ideas (e.g., people are born handicapped). Further, we suggest that concepts of disability are based, to a varying extent, on lay-knowledge of formal theories. Accordingly, concepts of disability may manifest as "shadows" of formal theories and likely result in subsequent attitudes and behaviors regarding disability and inclusion. Therefore, in the current study, we develop and test a questionnaire measuring education students' concepts of disability based on items developed from more formal models of disability. Before presenting this, we first address a better-researched phenomenon, namely attitudes to inclusion, and subsequently turn to consider concepts of disability.

3 ATTITUDES TOWARDS INCLUSION

It is often argued that attitudes towards inclusion play a crucial role in inclusive teacher education and in developing an inclusive school system (Avramidis and Norwich, 2002; de Boer et al., 2011; Booth and Ainscow, 2002). Accordingly, the European Agency for Development in Special Needs Education [EADSNE] (2012) includes positive attitudes towards inclusion in their framework for inclusive teachers. Although attitudes towards inclusion are well studied (Avramidis and Norwich, 2002; de Boer et al., 2011; Booth and Ainscow, 2002; Miesera and Gebhardt, 2018; Schwab, 2018; Lüke and Grosche, 2018), this approach needs to be extended, we argue, to examining concepts of disability also because, we argue, concepts of disability likely influence attitudes to inclusion.

First, it is interesting to note that there is a range of definitions of inclusive education. Ainscow and Miles (2009) distinguish at least two ideas, namely a wide and narrow approach. A wide understanding of inclusion includes all different possible types of diversity, with no specific focus on disability in the conventional sense of the word. In contrast, a narrow understanding of inclusion focuses on disability. Further complicating the picture, in a systematic review Göransson and Nilholm (2014) found four different definitions of inclusion:

1. "Placement definition—inclusion as the placement of pupils with disabilities or those in need of special support in general education classrooms
2. Specified individualized definition—inclusion as meeting the social and/or academic needs of pupils with disabilities or those in need of special support
3. General individualized definition—inclusion as meeting the social and/or academic needs of all pupils
4. Community definition—inclusion as creation of communities with specific characteristics (which could vary between proposals)" (Göransson and Nilholm, 2014, p. 268, p. 268)

Due to this diversity in definitions of inclusion, it appears difficult to capture, isolate, or even shape attitudes towards inclusion independently from subjective understandings of inclusion. In practice, many countries refer to the Salamanca Statement (United Nations Educational, Scientific and Cultural Organization [UNESCO], 1994) and the Convention on the Rights of Persons with Disabilities (United Nations [UN], 2006) to justify and implement inclusive education. In such approaches, inclusive education is understood as the idea of either a "school for all" or, in most cases, placement of students with special educational needs in regular classroom education.

Second, and in indirect support of the need to consider underlying concepts of disability, attitudes towards inclusion are affected by subjective definitions of inclusion (Krischler et al., 2019; Scheer, 2020). Krischler et al. (2019) found that participants with a "general individualised definition" of inclusion held significantly more positive attitudes towards inclusion than participants with other definitions. Furthermore, Scheer et al. (2020) found positive correlations between a school-system, a human rights, and an ethics based perspective on inclusion, suggesting that attitudes are intertwined. However, it can be assumed that a consideration of inclusive education necessitates a consideration of concepts of disability also. Thus, Ainscow (1998) describes three perspectives that explain: 1) school difficulties as caused by individual characteristics of the pupils, 2) school difficulties via a mismatch between pupil's characteristics and school organization/curriculum arrangement, and 3) "in terms of curriculum limitations, using the term curriculum in a broad sense" (p. 9). Ainscow's recourse to student characteristics, implicates the need to understand disability and subsequent educational needs themselves.

4 MODELS AND CONCEPTS OF DISABILITY

As Michailkis (2003, p. 209) states, "a close look at the relevant literature on disability research shows that there is no agreement on how the concept of disability should be defined". Depending on the research direction, perspective and methodology, the number and definitions vary. Furthermore, models of disability are often used interchangeably with concepts of disability, which, as outlined, assumes a level of specialized knowledge beyond most people's concepts of disability. Beginning with models of disability, in the research literature, the most discussed are the contrasting individual-medical and the social model of disability (Shakespeare, 2006). An extension of the social model is the cultural model, which originates from disability studies (Snyder and Mitchell, 2006; Shakespeare, 2018). Further, in teacher education the systemic model of disability is often used to illustrate fields of activity in special education and the systemic challenges of the school system (Moser and Sasse, 2008).

There are further models of disability that are not necessarily used in all teacher education programs. For instance, Retief and Letšosa (2018) even go so far as to outline nine models of disability for the field of practical theology: disability as an act of God, disability as a disease, disability as a socially constructed phenomenon, disability as an identity, disability as a human rights issue, disability as culture, disability as a challenge to productivity, disability as victimhood, disability as embodied experience. Other authors (Buntinx and Schalock, 2010; Michailakis, 2003) reduce this detailed presentation of nine categories into four to five categories.

Depending on the detail and methodology, it would be possible to merge and divide the models in different ways as well. However, in order to bridge the gap between formal scientific theories and individuals' concepts about disability and design a questionnaire that encourages education students to think about their own concepts and reflect the different models of disability, we have narrowed down the total number of the models of disability to four models commonly used in German teacher education (Moser and Sasse, 2008). Specifically, the models of disability are the individual-medical, social, cultural, and systemic, which we now describe.

The *individual-medical model* (Michailakis, 2003) is the traditional model, dominating in lay circles and thus having vast significance for the everyday life of people with disabilities. Admittedly, defining the "medical model" has proven difficult, but generally refers to an authoritarian approach in which the medical professional decides what is best (see Bailey, 1998). Specific to disability, the individual medical model describes disability as being caused by innate impairments, disorders, or handicaps. In many countries, the individual-medical concept of disability was a theoretical foundation in developing special needs education starting from the 19th century onwards (e.g., Stötzner, 1864). Until the 1970s, in most countries children with disabilities were characterized using medical terminology (Lindsay et al., 2020). From this point of view, disabled persons need specific help and remedial support to compensate for their impairments in daily functioning. Another aspect pertaining to the individual side of the individual-medical model is that disability is also seen as a personal fate or subjective bad luck (Shakespeare, 2018).

This individual view was criticized early on by, for example, Vygotski (1924) in his conception of defectology. According to Vygotsky, physical "defects" always express themselves in social behavior and interaction, rendering disability a social construct. Although Vygotsky's ideas remained a minority view for a long time, during the late 20th century the individual or medical model came to be viewed more and more skeptically, with a more complex understanding of disability emerging (Michailakis, 2003). Despite such criticism, the medical model was largely endorsed, for example, by the World Health Organization [WHO]. Thus, in the International Classification of Impairments, Disabilities and Handicaps (World Health Organization [WHO], 1980), the terms impairment, disability and handicap are prominent. The individual-medical view was not further differentiated until 20 years later in the International Classification of Functioning, Disability and Health (World Health Organization [WHO], 2001), via the integration of a social approach to disability and a greater consideration of the role played by the environment.

The *social model of disability* took off in the 1970s supported by disability activists (Baldwinson, 2019; Hunt, 2019), and was later the subject of further theorizing (e.g., Barton, 1986; Finkelstein, 1980). A crucial role along this path was played by the Union of the Physically Impaired Against Segregation (UPIAS) who stated the kernel of the idea known as the "social model of disability" in the late 1970s (see Oliver, 1981). The social model of disability focuses on the social and political conditions that make people disabled, irrespective of their individual preconditions. According to this model, disability is social exclusion and not individual impairment (Shakespeare, 2006) that "emerges as an effect of the obstacles that society raises" (Michailakis, 2003, p. 210). This perspective brought inclusive education to the fore and was therefore supported by movements for inclusive education (Barton, 1986; Oliver and Barnes, 2010). Thus, the social model of disability was an initial political approach towards human rights (Berghs et al., 2019; Finkelstein, 2007) in which disabled people were no longer mere subject matter for the non-disabled to deal with, but instead themselves as main actors with an important role to play in defining disability (Finkelstein, 2001).

A third approach—the *systemic model* of disability—emphasizes the different interactions and relations between an individual and the school environment. In the systemic perspective (Clark et al., 1998), the question is "what is the difference between the needs of the child with disabilities and [that which] the school system's offers." The barriers are individual to the child, but systemically anchored by the school and the school system. The approach derives from the *ecological systems theory* also known as bio-ecological theory (Bronfenbrenner, 1979, 1992; Bronfenbrenner and Ceci, 1994). From this point of view, an individual is integrated in several microsystems (e.g., family, school, peers), that might overlap or interact with each other to form a mesosystem. Micro- and mesosystems are surrounded by integrating exosystems like neighborhood, social services, local politics that eventually are part of macrosystems (i.e., society, culture, traditions, ideology).

Specifically, in understanding child development and educational processes, Bronfenbrenner (1979) differentiates: 1) the individual child or youth within microsystems being directly affected, 2) the mesosystems with interconnections between microsystems, and 3) the exosystems that involve links between social settings in which the child/youth does not have an active role, with the macrosystem determining the cultural context. Thus, disability is seen as the result of several interactions between the individual and their surrounding systems. This means, that disability depends on the specific circumstances in the single systems. Although this theoretical model, as Skelton and Rosenbaum (2010) state, is also mirrored in the ICF classification (World Health Organization [WHO], 2001), it is devised for therapeutic settings (Howe and Briggs, 1982; Skelton and Rosenbaum, 2010) as well as for school psychology (Burns, 2013). The ecological systems theory has been used to disseminate, interpret, and describe effectiveness on the different levels from the student (micro) to the school level (macro) in inclusive schooling (e.g. Geldenhuys and Wevers, 2013; Singal, 2006; Schurig et al., 2020) and is a widely used theory in inclusive education.

The *cultural model of disability* derives from disability studies and questions why categories such as normal and deviant are used in modern societies, or why the concept of otherness is produced in society and culture (Waldschmidt, 2017). Disability studies do not focus on a specific definition of disability but on the question of barriers and how they are (to be) overcome as a cultural challenge (Retief and Letšosa, 2018). In 2006, Snyder and Mitchell first defined a cultural model of disability as a fuller concept than the social model to theorize a political act of empowerment. People with disabilities have formed a group identity with shared experiences of oppression and resilience (Brown, 2015). People with disabilities describe their own life experiences and create their own culture (Brown, 2002). This group therefore demands full participation as a human right as part of broader cultural diversity, not as disabled persons seeking recognition of a specific "disabled status". Waldschmidt (2017) therefore refers to this view as a new human rights approach. This cultural concept of disability emphasizes the importance of independence and empowerment for every individual and the inviolable right to be different in one's own way.

5 RESEARCH QUESTIONS

Understanding peoples' concepts of disability may be important in understanding how attitudes towards inclusion evolve, and how obstacles in the development of inclusive education arise and can be overcome (Shakespeare, 2018). This necessitates an empirical investigation of education students' concepts of disability. Not only are students of teacher education programs important actors in the formation of current and future educational settings, such work might also have the positive spin-off of stimulating reflection on concepts of disability in these students. With these aims in mind, we developed an instrument measuring the concepts pertaining to the four outlined models of disability (i.e., individual-medical, social, systemic and cultural) among student teachers.

A more specific aim of our study is to develop and exploratively evaluate the psychometric properties of a new questionnaire, which includes investigating the structure of hypothesized and observed latent constructs. We followed three distinct approaches: First, we evaluated whether the four subscales of the questionnaire can be empirically confirmed via four latent factors, including determining which items best fit the concepts empirically. Second, we evaluated whether the participants' concepts of disability can be modelled in distinct latent profiles. Third, we tested whether different types of teacher education study courses (i.e., primary, secondary, and special education) were associated with different disability concepts.

Likewise, in order to validate the questionnaire, we included an Attitudes towards Inclusion Scale (AIS), which we reasoned should moderately correlate with our scales. In particular, students with a social concept of disability should have more positive attitudes towards inclusion than those with an individual concept of disability. The systemic and cultural concepts of disability are based on parts of the social concept and are therefore theoretically related. Therefore, a medium to high correlation was predicted (Snyder and Mitchell, 2006).

It can be expected that special education students are more likely to choose the social concept of disability than regular education students, since they may be expected to have already dealt with the topic of disability when choosing their degree and subsequently during study. Likewise, it is an open question as to what extent the number of semesters and previous experiences with people with disabilities has an influence on which concepts of disability they endorse.

Therefore, our main research questions were:

- Q1: Does the questionnaire measure four latent factors corresponding to the four concepts of disability?
- Q2: At an item level, which items fit to the latent constructs?
- Q3: What are the profiles of the different student teachers in relation to the four concepts of disability?
- Q4: How strongly do the four factors of the questionnaire correlate with attitudes towards inclusion?
- Q5: How do different background variables effect participants' concepts of disability?

6 METHODS

6.1 Procedure

Students from four universities were asked to complete the questionnaire in regular online courses and in an open invitation between December 2020 and January 2021, with participation being recommended but voluntary. The survey was conducted using the LimeSurvey software.

6.2 Instruments

In this study, questions about study location (i.e., University), prior experience with people with disabilities ("Do you have experience of people with disabilities (work, family, friends)"),

age, gender, and two questionnaires (i.e., the Questionnaire on Concepts of Disability and the Attitudes toward Inclusion Scale) were used.

6.2.1 Questionnaire on the Concepts of Disability

The Questionnaire on the Concepts of Disability consists of 27 items (see **Supplementary Appendix**; German version see Gebhardt and Capovilla, 2021). These items were formulated according to the four theoretical models of disability that we hypothesized to manifest in students' concepts of disability. Thus, for 1) the individual-medical concept, items addressed the idea that disability is the result of innate or acquired impairments or disorders, 2) the social concept that one is not disabled by nature, but becomes disabled, 3) the systemic concept that disability is affected by how private and institutional environments react to someone's being "different," and 4) the cultural concept that disability is a longstanding historical reality that undergoes constant change. Since the conceptualization of the various models is expectedly heterogeneous in the literature, it was also assumed that the items for the different concepts would be heterogeneous. We assessed many facets of the different concepts of disability and had accordingly heterogeneous items. All items were reviewed with regards to their fit to the disability models in an informal expert validation by seven professors of special education, which lead to the revision of some items. For each concept, one item was considered crucial because it particularly matched that particular concept of disability. The key items were for the 1) medical concept: "Disability is the result of innate or acquired impairments or disorders," 2) social concept: "You are not disabled by nature, but become disabled," 3) systemic concept: "Disability is affected by how private and institutional environments react to someone's being "different," and 4) cultural concept: "Disability is a longstanding historical reality that undergoes constant change."

The students were asked "Which of these statements do you personally agree with?" Answers were collected on a five-point rating scale, ranging from "I do not agree at all" to "I fully agree." The items are presented in **Supplementary Appendix**. The items were presented to each student in a random order.

6.2.2 Attitudes Towards Inclusion Scale

Attitudes towards Inclusion Scale (AIS) was designed to measure teachers' attitudes toward inclusion (Sharma and Jacobs, 2016). It consists of 10 Likert items (for example: "All Students should be taught in regular classrooms."), ranging from strongly disagree (1) to strongly agree (5). A German translation of the questionnaire was used, which has shown good reliability with German student teachers (Miesera et al., 2019).

6.3 Participants

In Germany, there are different teacher education courses for each type of school (i.e., primary, special, and secondary). All teaching degrees also include courses on education and psychology and thus also generally include one or two lectures on inclusive education. Students in special education and primary education usually have even more sessions on inclusion in their major (subject). Hence, concerning the questionnaire, it cannot be expected that all teacher education students have the same prior knowledge of inclusion, although this likely depends on how long they have been studying.

In total, 850 teacher education students completed the questionnaire and were included in the analyses. From all participants, 43.6% were studying for primary level service, 34.1% for secondary level and 22.2% for special needs education (**Table 1**). We label these groups using the variable "study program." A majority (82.5%) of the participants described themselves as being female and 16.9% as male, with a further 0.6% categorizing themselves as "other." Personal experience with students with disabilities were reported by 86.8% of the future special needs teachers, 43.7% of the future primary school teachers and 51.4% of the future secondary school teachers (**Table 1**).

The participants studied at the Bachelor level. Most participants from the Heidelberg University of Education were in the fifth semester. The courses at the other Universities [Dortmund, Regensburg, Wuerzburg, Other (not identified)] were given in the first or second semester (**Table 2**).

The Attitudes towards Inclusion Scale (AIS) had satisfactory reliability with a standardized Cronbach`s Alpha of 0.83. The AIS scores were computed as means of all 10 items ($M = 3.63$; $SD = 0.54$). The AIS score does not differ significantly between Universities ($F(4,10) = 2.54$, $p = 0.106$).

6.4 Analysis

6.4.1 Confirmatory Factor Analysis

The four concepts of disability were operationalized as a multidimensional confirmatory factor model. The concept items were presented digitally and in a random order. The participants were asked to rate the statements. No imputation was applied, because it cannot be assumed that missingness was (completely) at random. Overall, 10.6% of data was missing. The structural equation models were calculated with lavaan (Rosseel, 2012) in R (R Core Team, 2020). No residual correlations were allowed in any model. A robust maximum likelihood estimator was used. Persons were excluded listwise due to missing values. Two models were evaluated. The first model included all items and the second model included items according to a theoretical selection.

6.4.2 Latent Profile Analysis

To address the question of whether there are distinguishable concepts of disability, a latent profile analysis (LPA) was applied. LPAs are a part of finite Gaussian mixture models and assume that the data in question is a mixture of k different distributions, with k indicating the number of different profiles. This model-based classification is probabilistic in nature, taking into account the uncertainty of profile assignment, and addresses the problem of the determination of the number of clustered structures, without prior knowledge of the number of clusters or information on their composition (Fraley and Raftery, 1999). Being Gaussian in nature and relying on the density of distributions, the indicator variables are assumed to be distributed normally. Usually different values of k are applied to explore a number of

TABLE 1 | Frequencies by university and study program as a function of teacher education.

Study program		University					
		Dortmund	Heidelberg (university of education)	Regensburg	Wuerzburg	Other	Total
Primary education students	Observed	0	13	354	2	2	371
	% within row	0.0%	3.5%	95.4%	0.5%	0.5%	100.0%
	% within column	0.0%	18.8%	56.4%	1.9%	50.0%	43.6%
Secondary education students	Observed	4	10	274	0	2	290
	% within row	1.4%	3.4%	94.5%	0.0%	0.7%	100.0%
	% within column	8.7%	14.5%	43.6%	0.0%	50.0%	34.1%
Special education students	Observed	42	46	0	101	0	189
	% within row	22.2%	24.3%	0.0%	53.4%	0.0%	100.0%
	% within column	91.3%	66.7%	0.0%	98.1%	0.0%	22.2%
Total	Observed	46	69	628	103	4	850
	% within row	5.4%	8.1%	73.9%	12.1%	0.5%	100.0%
	% within column	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

primary: students of primary level service; secondary: students of secondary level service; special needs: students of special needs education service.

TABLE 2 | Descriptive statistics of student teachers surveyed according to University.

	University	n	Mean	SD	SE
Age	Dortmund	46	21.22	3.08	0.45
	Heidelberg	68	23.25	5.23	0.63
	Regensburg	626	20.21	2.75	0.11
	Wuerzburg	103	20.66	2.73	0.27
	Other	4	22	4.24	2.12
Semester	Dortmund	46	1.8	2.15	0.32
	Heidelberg	68	4.96	3.08	0.37
	Regensburg	624	1.6	1.56	0.06
	Wuerzburg	102	1.33	1.20	0.12
	Other	4	1.5	1.00	0.50
AIS Score	Dortmund	45	3.64	0.51	0.08
	Heidelberg	60	3.69	0.53	0.07
	Regensburg	579	3.62	0.56	0.02
	Wuerzburg	84	3.63	0.46	0.05
	Other	2	3.45	0.07	0.05

SD, standard deviation; SE, standard error of the mean; Semester, Number of the Semester the students are enrolled in.

profiles fitting to the data. The assignment is made on the basis of high similarity between the response patterns within the classes or low similarity between the classes (Bacher and Vermunt, 2010; Kaufman and Rousseeuw, 2005). In addition to the number of profiles, it has to be specified whether and how the variances and covariances of the variables are estimated. Profiles are ellipsoidal, centered at the respective mean and have other features such as volume, shape and orientation (e.g., Scrucca et al., 2016). The latter features are determined by the covariance matrix. The correlation between the indicators is attributed to class affiliation (Bacher and Vermunt, 2010). It is unknown *a priori* how many people belong to the individual classes, which persons belong to which class and, if applicable, how many latent classes exist. The calculation was done with mclust (Scrucca et al., 2016; Fraley and Raftery, 1999) and the functionality of tidyLPA (Rosenberg et al., 2018) as well as car (Fox and Weisberg, 2020) and psych (Revelle, 2019).

To obtain latent profiles across all four concepts related to all items of the CFA with the best fit, the factor scores of the four concepts were used as indicators for the latent profile analysis. The number of profiles was restricted to a maximum of eight to ensure interpretability. Models with equal variances and covariances fixed to 0 (Model 1), varying variances and covariances fixed to 0 (Model 2), and equal variances and covariances are tested. Models for varying means are not taken into account, because of the scaling procedure of the concepts. A model with varying variances and varying covariances, therefore completely free parameters is not taken into account because of its inadequate parsimony. For more information on the models see Scrucca et al. (2016).

To evaluate the quality of the models Akaike information criterion (AIC) and Bayes information criterion (BIC) are taken into account as well as the entropy and the linked probabilities to belong to a profile. The model-entropy is calculated as the sum of each profile's entropy weighted by the size of each profile. It can be understood as the discriminatory power of the profiles. In terms of the information criteria, lower values indicate less information loss, therefore a more parsimonious model, in the modelling procedure. Higher values in Entropy indicate a better model-based classification accuracy. The range of n^*K shows the volume of the classes; therefore, we assume that classes have to include at least 5% of the sample to be interpretable. The p BLRT is a significance test between the model in question and a preceding model. A significant result shows that the likelihood of the model within the line of the p Value is significantly better than the model with K-1, because different bias effects for all parameters are taken into account in the process of estimating the appropriate number of classes. Because of the explorative nature of this research, we predetermined that the entropy is of special importance. Another important feature of the profiles is the size. In order to be interpretable, the profiles should hold as many individual profiles as possible (Jung and Wickrama, 2008). We determined that a profile should hold at least $n_k > 10\%$ of the sample. At last a bootstrapped likelihood ratio test was done to compare the likelihood of prior models.

TABLE 3 | Comparison of the four CFA models.

Model	χ^2	Df	χ^2/df	TLI	CFI	RMSEA	Comp	ΔAIC	$\Delta\chi^2$	Δdf
Model 1	1,016.97	344	2.96	0.802	0.820	0.051				
Model 2	202.39	98	2.06	0.955	0.963	0.037				
Model 3	260.34	103	2.53	0.935	0.944	0.044	vs. 2	48	52.12	5
Model 4	444.01	104	4.27	0.861	0.879	0.065	vs. 2	230	193.14	6

Model 1 = All items, four factors; Model 2 = 16 items, four factors; Model 3 = 16 items, two factors; Model 4 = 16 items, one factor. Comp. indicates to which model the current model is compared; TLI, comparative fit index; TLI, Tucker-Lewis index; RMSEA, root mean square error of approximation; AIC,akaike information criterion.

7 RESULTS

The mean for the number of missing values by concept items is 12.3 (*SD* = 5.59). The items most often dropped were Item K5_B (24 times) and item K4_B (30 times). The complete item descriptives are given in the appendix (**Supplementary Appendix**).

7.1 Confirmatory Factor Analysis

In a first step, we included all items and applied a four-factor model. Due to unacceptable fit of this model (see **7.1.1**), we chose a subset of 16 items and again applied the four-factor solution. Since three of the factors were highly correlated, we then tested the four-factor solution against a two-factor solution and a one-factor solution.

7.1.1 Model 1: Four Factors, all Items

In the first model all items were included. The concept individual-medical was represented by seven items, the concept social by six, the concept systemic by seven and the concept cultural by eight. Data from 760 students were included. The test statistic resulted in $\chi^2\,(344) = 1016.97, p < 0.001$ (χ^2/df ratio = 2.96). The measures of internal consistency for the single factors are α = .58 for the individual, α = .77 for the social, α = .59 for the systematic and α = .23 for the cultural factor.

The Root Mean Square Error of Approximation (RMSEA) indicated an acceptable result of 0.051 (90% CI 0.047, 0.054). The Standardized Root Mean Square Residual (SRMR) also resulted in an acceptable value of 0.062. The Comparative Fit Index (CFI) showed 0.820 and the Tucker-Lewis Index (TLI) 0.802.

7.1.2 Model 2: Four Factors, 16 Items

Due to the unacceptable (Hu and Bentler, 1999) values of the comparative fit indices (CFI and TLI), the items were assessed by the magnitude of the factor loadings as well as their theoretical content. When selecting the items, attention was paid to the fit with the key items. In the second model only three items were included for the concept individual-medical, five for social, four for systemic and four for cultural (see bold items **Supplementary Appendix**). This time 775 education students were included. The test statistic showed a more desirable $\chi^2\,(98) = 202.394, p < 0.001$ (χ^2/df ratio = 2.06). *CFI* (0.963) and *TLI* (0.955) are acceptable (>0.95) while *RMSEA* (0.037 [*90% CI* 0.030, 0.044]) and *SRMR* (0.039) remain good. The measures for internal consistency were $\alpha_{individual}$ = 0.60, α_{social} = 0.80, α_{system} = 0.60, $\alpha_{cultural}$ = 0.51. The standardized factor loadings range from 0.32 (Sy5_B) to 0.73 (So1_B). In **Table 4** the latent correlations of the four concepts are presented. While the individual-medical concept correlates negatively with the others ($r_{individual\text{-}system}$ = -0.23; $r_{individual\text{-}social}$ = -0.42; $r_{individual\text{-}cultural}$ = -0.28), the other concepts correlate very highly with each other ($r_{system\text{-}social}$ = 0.94; $r_{system\text{-}cultural}$ = 0.89; $r_{social\text{-}cultural}$ = 0.80).

TABLE 4 | Correlation matrix of the concepts' factor scores and the AIS score.

	AIS score	Individual	Social	Systemic	Cultural
AIS Score	—				
Individual	–0.089*	—			
Social	0.192**	–0.492**	—		
Systemic	0.186**	–0.348**	0.978**	—	
Cultural	0.169**	–0.377**	0.922**	0.967**	—

$^*p < 0.05$, $^{**}p < 0.001$; AIS: Attitudes towards Inclusion Scale. The correlations represent the manifest correlations of the concepts' factor scores.

7.1.3 Model 3: Two Factors, 16 Items

The high correlations between the latent factors for the systemic, social, and cultural scales may be taken to suggest that a model with these aggregated into a single factor may be more appropriate. To test this two-dimensional structure, a model with the individual construct as well as a second factor combining all remaining indicators was estimated (i.e., systemic, social, and cultural). The resulting model fitted the data well, χ^2/df ratio of 2.53, $\chi^2\,(103) = 260.343, p < 0.001$. Although, *CFI* (0.944) and *TLI* (0.935) were somewhat less adequate (i.e., <0.95) while *RMSEA* (0.044 [*90% CI* 0.038, 0.051]) and *SRMR* (0.043) were good (**Figure 1**). When compared to the four-factor model, an χ^2 difference test, $\Delta\chi^2\,(\Delta 5) = 57.949, p < 0.001$, as well as the comparison of AIC (Δ48) and BIC (Δ25) indicated a better fit to the data for the four factor model than for the two factor model. The final items are set in bold in **Supplementary Appendix**

7.1.4 Model 4: One Factor, 16 Items

To test the factorial structure, a one factorial model was compared to the four factorial model. The χ^2/df ratio was clearly worse (4.27). A scaled Chi-Squared Difference Test (Satorra and Bentler, 2001) showed a significant difference in favor of the four factorial model ($\chi^2\,(6) = 193.14, p < 0.001$).

7.1.5 Model Comparison

Comparison between the last three models revealed that the four factor solution fitted best and therefore was accepted (see **Table 3**).

In a last step for the factor analysis factor score coefficients were computed by linear regression. This procedure was chosen to maximize the validity of the estimates (DiStefano et al., 2009).

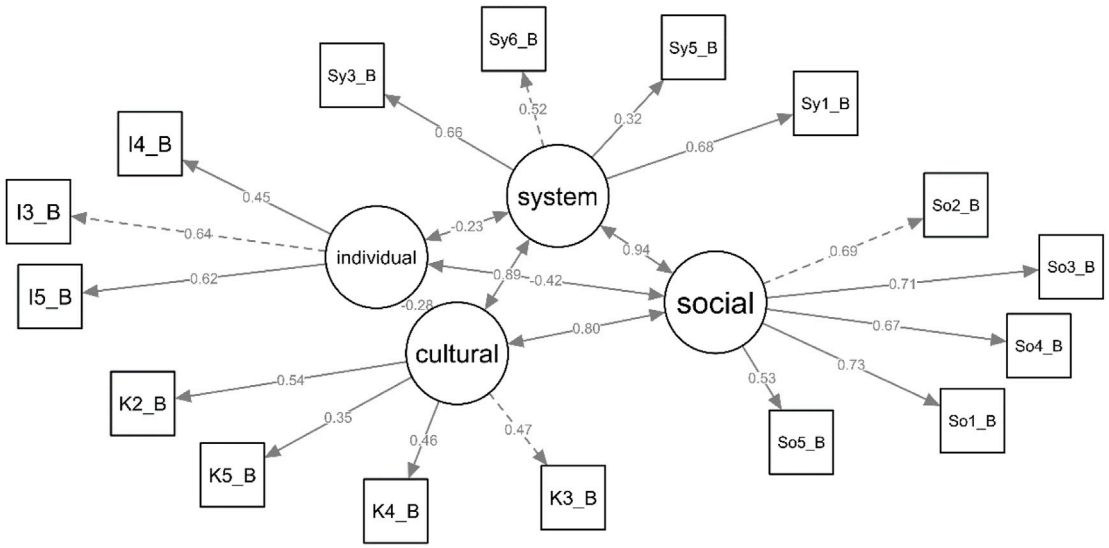

FIGURE 1 | Structural equation model on the four concepts of disability.

To assess the dimension scores against an external criterion the correlations between the dimension factor scores and the AIS were calculated (**Table 4**). The correlations between the dimension factor scores are overestimated due to the method of factor score estimation (DiStefano et al., 2009). Although the correlations between the factor scores of the concepts are medium to high, the correlations between the AIS and the concepts of disability scales are very low.

The latent and manifest correlations between the factors lead to the question of whether the assumption between the concepts are linear, or whether the correlations can be attributed to homogeneous subpopulations.

7.2 Latent Profile Analysis Across the Four Concepts of Disability

Table 5 shows that model 3, implying a free estimation of variances and covariances, holds the most advantageous information criteria. But the change between the number of profiles in model three is rather small. Additionally, the entropy indicates a low discriminatory power between the profiles. Model 3 with 2 profiles is above the threshold of $n > 10\%$ but the probability ranges only from 80 to 82% and the entropy indicates an improbable uncertainty of 0.61. Model 1 and model 2 show similar coefficients. This might be expected because only the variances differ (fixed vs. freely estimated). In both models the information criteria drop up to seven or even more profiles. This is mirrored in the bootstrapped LRT. But the entropy does not shift as strong and stabilizes >0.90. Here the number of objects within a cluster is taken into consideration. In model 1 the solution with 4 profiles is the last one that holds $nk > 10\%$. In model 2 the solution with 4 profiles has a minimum of $n_k = 21\%$ and the one with five profiles $n_k = 10\%$. When taking into account the information criteria the solutions from model 2 reaches more desirable values while establishing similar coefficients of certainty. The profiles for the models 2.4 and 2.5 were calculated and showed similar patterns. Because of this similar interpretative link and the lower n_k in model 2.5, the model 2 with 4 latent profiles was chosen.

The profiles are given in **Figure 2**. The *y*-axis refers to the means of the z-standardized values of the classes. It can be seen that the profiles differ mostly in the social concept of disability. The other three dimensions only differ in magnitude. Here, however, the individual concept is polarized differently. Therefore, one can see a strong difference between the individual and the social concept of disability across the four profiles. While the latent profile 1 has a strongly social concept of disability and thus also agrees with the statements on the systemic and cultural concept of disability, the understanding of profile 4 is very individual and the other three concepts of disability less endorsed.

The dependencies between the background variables, the AIS and the concept profile were assessed with a multinomial regression. An Omnibus Likelihood Ratio Test was done to assess the significant predictors. AIS score, study program, personal experience with people with disabilities and gender were checked. Teacher education and AIS score reached significant test statistics (**Table 6**).

The AIS score was added as covariates. Study program, was added as a factor. The factor was dummy coded with special needs as reference group. No interaction terms were included. Profile 1 was chosen as reference as reference for the regression. The Nagelkerke-R^2 reached 0.101 (**Table 7**).

Because the personal experience with people with disabilities is highly confounded with the enrolment in special needs education (**Supplementary Appendix**), the effect did not reach significance in the multinomial regression. When observed within a contingency table the effect of the experience alone is significant, χ^2 (3) = 40.3, $p < 0.001$. 31.5% of the participants with personal experience with persons with disabilities and only 17.1% of the person without this experience were allocated in profile 1.

TABLE 5 | Model comparison of finite mixture models.

Model	Profiles	*AIC*	*BIC*	Entropy	min probability	max propability	% min n	% max n	*p* BLRT
1	1	5,458.15	5,495.38	1	1	1	1	1	
1	2	3,881.84	3,942.32	0.89	0.96	0.97	0.47	0.53	0.01
1	3	3,018.92	3,102.67	0.90	0.95	0.96	0.27	0.44	0.01
1	4	2,473.55	2,580.56	0.91	0.94	0.97	0.17	0.33	0.01
1	5	2069.67	2,199.95	0.92	0.93	0.97	0.07	0.29	0.01
1	6	1748.76	1902.31	0.93	0.94	0.97	0.05	0.27	0.01
1	7	1,549.83	1726.64	0.92	0.90	0.98	0.05	0.22	0.01
1	8	1,389.71	1,589.78	0.92	0.92	0.96	0.03	0.21	0.01
2	1	5,458.15	5,495.38	1	1	1	1	1	
2	2	3,872.59	3,951.69	0.89	0.97	0.97	0.47	0.53	0.01
2	3	2,969.68	3,090.65	0.90	0.95	0.96	0.29	0.39	0.01
2	**4**	**2,355.39**	**2,518.24**	**0.92**	**0.94**	**0.97**	**0.21**	**0.29**	**0.01**
2	5	1976.93	2,181.65	0.92	0.93	0.98	0.10	0.26	0.01
2	6	1729.89	1976.50	0.92	0.92	0.95	0.07	0.26	0.01
2	7	1,489.36	1777.84	0.93	0.92	0.97	0.05	0.22	0.01
2	8	1,471.53	1801.88	0.93	0.85	0.96	0.03	0.20	0.02
3	1	−2,676.13	−2,610.99	1	1	1	1	1	
3	2	−2,692.84	−2,604.43	0.54	0.86	0.86	0.49	0.51	0.01
3	3	−2,703.44	−2,591.78	0.61	0.80	0.82	0.25	0.46	0.02
3	4	−2,718.55	−2,583.61	0.61	0.60	0.83	0.09	0.47	0.01
3	5	−2,745.39	−2,587.20	0.63	0.62	0.82	0.05	0.45	0.01
3	6	−2,746.49	−2,565.03	0.61	0.60	0.83	0.07	0.47	0.22
3	7	−2,747.69	−2,542.97	0.61	0.56	0.80	0.03	0.35	0.19
3	8	−2,768.04	−2,540.05	0.73	0.51	0.91	0.03	0.39	0.01

Model 1: Assumed equal variances and covariances fixed to 0; Model 2: Assumed varying variances and covariances fixed to 0; Model 3: Assumed varying variances and varying covariances; p BLRT, p*-value of the bootstrapped likelihood ratio test; AIC, akaike information criterion; BIC, bayesian information criterion. The values set in bold describe the accepted solution for the model.*

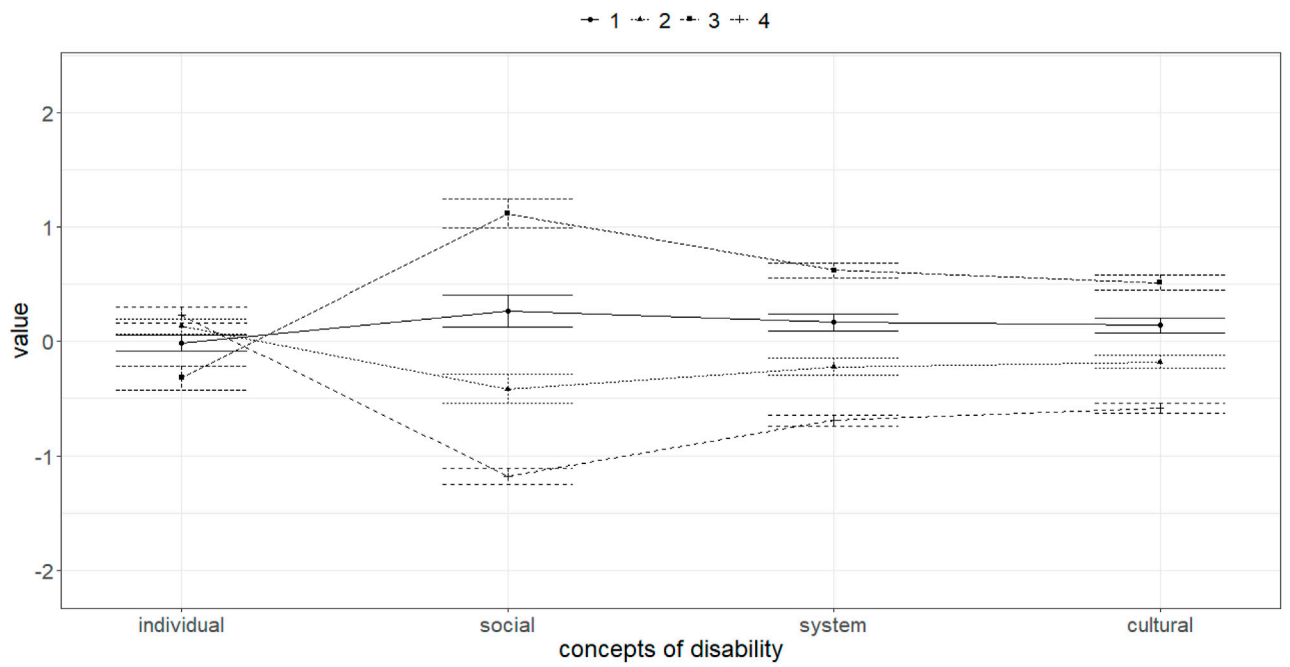

FIGURE 2 | Extracted four profiles on four concepts of disability.

The study program as well as the AIS score hold the largest partial effects. Participants with a higher AIS Score are more prone to be accounted for in profile 1. But the largest effects are shown by the dummy coding of the study program of teacher education. Being a special needs teacher increases the likelihood of being allocated to profile 1 by a factor of 2.7 or more.

TABLE 6 | Omnibus likelihood ratio tests.

Predictor	χ^2	*df*	*p*
Experience	5.43	3	0.078
Study program	134.21	6	<0.001
AIS_Score	19.85	3	<0.001
Gender	1.57	6	0.736

AIS: attitudes towards inclusion scale.

8 DISCUSSION

8.1 Overview of Findings and Theoretical Implication

Overall, the current study demonstrated that we were able to measure education teachers' concepts of disability in a nuanced manner, being sensitive to experience with disabilities and study program. Due to the different concepts of disability and their corresponding conceptually related models, which are also theoretically not completely separable from each other, a heterogeneous response pattern was expected. In light of this expected heterogeneity, the fit for the first CFA model including all items was surprisingly good, especially in terms of the SRMR and RMSEA indices. After including only a selection of the items most theoretically linked to the latent constructs, a better fit was achieved in the second model. Here, for the individual concept of disability, the selection was fixed to items with the terms impairment or disorder. This excluded items in which disability was defined as a personal fate (Shakespeare, 2018). Although this is also a part of the individual-medical concept of disability, it correlates little with the medical aspect, which refers more to the term disorder or impairment, and should be considered as a separate second dimension. Similarly, in the cultural concept of disability, the negatively formulated items were excluded, as these tend to measure the area of general social participation.

The second CFA showed that the four concepts of disability can be captured well with our questionnaire. However, only 16 of our 27 items were kept in the CFA. Accordingly, our approach should be considered exploratory and the questionnaire requires further development and testing. In particular, the individual-medical and social concepts differentiated well in all analyses. This pattern can also be seen in the correlation of the latent constructs, in which the individual concept correlates negatively with the other three concepts. Here, the correlation between the individual and the social concept is greatest among the negative coefficients, which may be due to the political items in the social concept. For instance, the item "The non-disabled majority is to be blamed for the disability" also had the lowest agreement among all students of teacher education.

The questionnaire had a random item order at the individual level, such that the students could not easily identify which dimensions belonged together. Therefore, results of the questionnaire also showed a very heterogeneous response pattern. Furthermore, the high correlations show that the social, systemic, and cultural concepts of disability were valued similarly. This was also confirmed by further LPA analyses. This can be explained by two arguments. On the one hand, predominantly students in their first semesters were interviewed and there were no disconfirming experiences leading to more nuanced concepts of disability. On the other hand, the concepts are based on parts of the social concept and are therefore theoretically related. Therefore, a medium to high correlation was expected (Snyder and Mitchell, 2006).

The LPA resulted in hierarchically ascending profiles, indicating a rank-ordered rather than a categorical cluster variable. Profile 1 has a low individual-medical concept of disability and a high social concept of disability. This group is more likely to consist of special educators, individuals with personal experience with persons with disabilities, and have a high AIS score. Profile 4, on the other hand, has a high individual-medical concept of disability and is more likely to consist of elementary and secondary teachers, individuals with a low AIS score, and less experience with persons with disabilities. Therefore, the more the different teaching professions deal with inclusion and disability, the more likely they are to change from an individual-medical to a social understanding of disability. In the current study, on the other hand, it was not possible to demonstrate distinct profiles in the area of systemic or cultural concepts of disability, as these overlapped with the social concept of disability in the responses.

TABLE 7 | Multinominal regression.

Class	Predictor	Estimate	SE	*p*	Odds ratio
Profile 2 - Profile 1	Intercept	1.978	0.814	0.015	7.226
	Study program:				
	Primary—special needs	1.055	0.248	<0.001	2.872
	Secondary—special needs	1.036	0.273	<0.001	2.818
	AIS_Score	−0.667	0.219	0.002	0.513
Profile 3 - Profile 1	Intercept	0.234	0.95	0.806	1.264
	Study program:				
	Primary—special needs	3.363	0.46	<0.001	28.862
	Secondary—special needs	3.525	0.47	<0.001	33.967
	AIS_Score	−0.81	0.237	<0.001	0.445
Profile 4 - Profile 1	Intercept	0.516	1.049	0.622	1.676
	Study program:				
	Primary—special needs	3.98	0.618	<0.001	53.542
	Secondary—special needs	3.945	0.626	<0.001	51.666
	AIS_Score	−1.087	0.245	<0.001	0.337

Note. *AIS: attitudes towards inclusion scale.*

It was not expected that the concepts of disability would correlate as lowly with the AIS as was observed in the current study. Although the AIS explains some of the associations in the profiles, it does not have a large direct correlation with the overall scale. This confirms the assumption that the concepts of disability should be seen as a separate component of inclusive education, tapping aspects that may lie deeper than the explicit attitudinal characteristics on the organizational questions of inclusive or separative schooling. Although individuals with a social understanding of disability are in favor of inclusion, the examination of the social concept of disability goes further and raises questions about all other areas of life in addition to questions about the organization of school (Shakespeare, 2018). This requires a completely new understanding of the concept of human beings, in which barriers are seen less as immovable medical realities, but rather as social constructs to be dismantled on the path to a truly inclusive education system and society (Ainscow and Miles, 2009).

8.2 Limitations

However, several limitations might restrict the generalizability of the results. An overall problem is that, like in many questionnaire studies, we had to use an ad-hoc sample which might not be representative for the population of student teachers in total. For instance, willingness to participate in the survey might bias the representativity of the results. Furthermore, the biggest group of participants were future primary school students. Thus, if there were effects of study program on the individual concept of disability, this might affect the overall picture in the sample. Another limitation for generalizability of the findings is that most of the participants were at the beginning of their teacher education. Correlations between the latent factors might be different in senior students or post-graduates. This might also be the case for the configuration of the latent profiles. Overall, the low reliabilities should also be viewed critically. Therefore, a newer version of the questionnaire has been constructed with new items closer to the intended latent constructs, with overly heterogeneous items being removed. The fact that the reliabilities turned out to be low despite the item exclusions, while the congruent model showed acceptable fit values, has a final significance for the further use of the scales. In the multidimensional model the dimensions still support each other, so that a separate use of the concept scales must still be discouraged.

8.3 Implications and Future Work

The current instrument was developed in this study and requires further work to continue to validate and extend this. A further development is facilitated by this questionnaire being freely accessible and open access. The first study consisted mainly of first-year students, so further studies with students in higher semesters are needed. Given that only a difference between the individual and social concepts of disability was found in the present study, it is necessary to ask whether a differentiation between the social, systemic, and cultural concepts of disability exists. Further, longitudinal data are also necessary to show the development of the concept in individuals across professional, personal, and educational development.

We suggest, based on indications from the current study, that the observed difference between special educators and regular student teachers in terms of concepts of disability would dissipate the more courses regular student teachers attend on the topic of inclusion and models of disability. Currently, regular students have sporadic mandatory classes on this and can take voluntary additional courses in which models of disability, in particular, are rarely covered. In special education, however, the models are a major focus of the study program.

In terms of future work, we intend to use the questionnaire longitudinally in conjunction with qualitative survey methods in University courses on concepts of disability. Likewise, the questionnaire has been published under free license so that other research groups can also confirm, and possibly extend, the factor structure.

Finally, we suggest that the questionnaire be used beyond research purposes in teacher education. Specifically, the questionnaire could be completed by students and then discussed at an item level in university courses. Perhaps such a mixed method use of the questionnaire, measuring both current concepts of disability and eliciting critical reflection of these, could contribute to a societal re-examination of how disability is understood, to eventually enable a more inclusive education system.

DATA AVAILABILITY STATEMENT

The datasets presented in this study can be found in online repositories. The names of the repository/repositories and accession number(s) can be found below: https://osf.io/dm4cs/.

ETHICS STATEMENT

The research was conducted in accordance with APA ethical procedures and guidelines. Participants provided informed written consent and could terminate participation at any point without any disadvantage to themselves and data were treated confidentially. Because no experimental manipulation, invasive procedure, or highly sensitive data were collected, a full ethics application from the University Ethics Committee was not required.

AUTHOR CONTRIBUTIONS

MG and DC developed the questionnaire. MG coordinated the study. As the primary author, MG did most of the writing, and some of the analyses. MS created the online questionnaire and did most of the data analyses. SS, DS, MS and DC wrote and edited the article.

ACKNOWLEDGMENTS

We acknowledge financial support by Deutsche Forschungsgemeinschaft and TU Dortmund within the funding program Open Access Publishing.

SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/feduc.2021.701987/full#supplementary-material

REFERENCES

Ainscow, M., and Miles, S. (2009). Developing inclusive education systems: How can we move policies forward? Chapter prepared for a book in Spanish to be edited by Climent Gine et al, 2009. Available at: http://www.ibe.unesco.org/fileadmin/user_upload/COPs/News_documents/2009/0907Beirut/DevelopingInclusive_Education_Systems.pdf.

Ainscow, M. (1998). "Would it Work in Theory? Arguments for Practitioner Research and Theorising in the Special Needs Field," in *Theorising Special Education*. Editors C. Clark, A. Dyson, and A. Millward (Oxfordshire, England, UK: Routledge), 123–137.

Avramidis, E., and Norwich, B. (2002). Teachers' Attitudes towards Integration / Inclusion: a Review of the Literature. *Eur. J. Spec. Needs Educ.* 17 (2), 129–147. doi:10.1080/08856250210129056

Bacher, J., and Vermunt, J. K. (2010). "Analyse Latenter Klassen," in *Handbuch der sozialwissenschaftlichen Datenanalyse*. Editors C. Wolf and H. Best (Wiesbaden, Germany: VS Verlag für Sozialwissenschaften), 553–574. doi:10.1007/978-3-531-92038-2_22

Bailey, J. (1998). "Medical and Psychological Models in Special Needs Education," in *Theorizing Special Education*. Editors C. Clark, A. Dyson, and A. Millward (Oxfordshire, England, UK: Routledge, Taylor and Francis).

Baldwinson, T. (2019). *UPIAS - the Union of Physically Impaired against Segregation (1972-1990): A Public Record from Private Files*. Randburg, South Africa: TBR Consulting.

Barton, L. (1986). The Politics of Special Educational Needs. *Disabil. Handicap Soc.* 1 (3), 273–290. doi:10.1080/02674648666780291

Berghs, M., Atkin, K., Hatton, C., and Thomas, C. (2019). Do disabled People Need a Stronger Social Model: A Social Model of Human Rights? *Disabil. Soc.* 34 (7–8), 1034–1039. doi:10.1080/09687599.2019.1619239

Booth, T., and Ainscow, M. (2002). *Index for Inclusion. Convention on the Rights of Persons with Disabilities*. New York: CRPD.

Bronfenbrenner, U., and Ceci, S. J. (1994). Nature-nurture Reconceptualized in Developmental Perspective: a Bioecological Model. *Psychol. Rev.* 101 (4), 568–586. doi:10.1037/0033-295X.101.4.568

Bronfenbrenner, U. (1992). "Ecological Systems Theory," in *Six Theories of Child Development*. Editor R. Vasta (London, United Kingdom: Jessica Kingsley Publishers), 187–250.

Bronfenbrenner, U. (1979). *The Ecology of Human Development: Experiments by Nature and Design*. Cambridge, Massachusetts: Harvard University.

Brown, S. E. (2015). Disability Culture and the ADA. *Disabil. Stud. Q.* 35 (3), 34–50. doi:10.18061/dsq.v35i3.4936

Brown, S. E. (2002). What Is Disability Culture? *Disabil. Stud. Q.* 22 (2), 34–50. doi:10.18061/dsq.v22i2.343

Buntinx, W. H. E., and Schalock, R. L. (2010). Models of Disability, Quality of Life, and Individualized Supports: Implications for Professional Practice in Intellectual Disability. *J. Pol. Pract. Intellect. Disabilities* 7 (4), 283–294. doi:10.1111/j.1741-1130.2010.00278.x

Burns, M. K. (2013). Contextualizing School Psychology Practice: Introducing Featured Research Commentaries. *Sch. Psychol. Rev.* 42 (3), 334–342. doi:10.1080/02796015.2013.12087477

Clark, C., Dyson, A., and Millward, A. (1998). "Theorising Special Education. Time to Move on?," in *Theorising Special Education*. Editors C. Clark, A. Dyson, and A. Millward (Oxfordshire, England, UK: Routledge), 156–173.

de Boer, A., Pijl, S. J., and Minnaert, A. (2011). Regular Primary Schoolteachers' Attitudes towards Inclusive Education: a Review of the Literature. *Int. J. Inclusive Educ.* 15 (3), 331–353. doi:10.1080/13603110903030089

DiStefano, C., Zhu, M., and Mîndrilã, D. (2009). Understanding and Using Factor Scores: Considerations for the Applied Researcher. *Pract. Assess. Res. Eval.* 14, 20. doi:10.7275/DA8T-4G52

European Agency for Development in Special Needs Education [EADSNE] (2012). Teacher Education for Inclusion. Profile on Inclusive Teachers. Available at: http://www.european-agency.org/sites/default/files/te4i-profile-of-inclusive-teachers_Profile-of-Inclusive-Teachers-EN.pdf.

Finkelstein, V. (1980). *Attitudes and Disabled People*. New York: World Rehabilitation Fund.

Finkelstein, V. (2001). *The Social Model of Disability Repossessed*. Manchester: Manchester Coalition of Disabled People. Available at: https://disability-studies.leeds.ac.uk/wp-content/uploads/sites/40/library/finkelstein-soc-mod-repossessed.pdf.

Finkelstein, V. (2007). The 'Social Model of Disability' and the Disability Movement. Available at: https://disability-studies.leeds.ac.uk/wp-content/uploads/sites/40/library/finkelstein-The-Social-Model-of-Disability-and-the-Disability-Movement.pdf.

Fox, J., and Weisberg, S. (2020). Car: Companion to Applied Regression. [R Package]. Available at: https://cran.r-project.org/package=car.

Fraley, C., and Raftery, A. E. (1999). MCLUST: Software for Model-Based Cluster Analysis. *J. Classification* 16 (2), 297–306. doi:10.1007/s003579900058

Gebhardt, M., and Capovilla, D. (2021). *Fragebogen Zum Konstrukt Behinderung*. Regensburg, Germany: Universität Regensburg. doi:10.5283/epub.45599

Geldenhuys, J. L., Wevers, N. E. J., and Wevers, N. E. J. (2013). Ecological Aspects Influencing the Implementation of Inclusive Education in Mainstream Primary Schools in the Eastern Cape, South Africa. *South Afr. J. Educ.* 33 (3), 1–18. doi:10.15700/201503070804

Göransson, K., and Nilholm, C. (2014). Conceptual Diversities and Empirical Shortcomings - a Critical Analysis of Research on Inclusive Education. *Eur. J. Spec. Needs Educ.* 29 (3), 265–280. doi:10.1080/08856257.2014.933545

Howe, M. C., and Briggs, A. K. (1982). Ecological Systems Model for Occupational Therapy. *Am. J. Occup. Ther.* 36 (5), 322–327. doi:10.5014/ajot.36.5.322

Hu, L. t., and Bentler, P. M. (1999). Cutoff Criteria for Fit Indexes in Covariance Structure Analysis: Conventional Criteria versus New Alternatives. *Struct. Equation Model. A Multidisciplinary J.* 6 (1), 1–55. doi:10.1080/10705519909540118

Hunt, J. (2019). *No Limits. The Disabled People's Movement – a Radical History*. Randburg, South Africa: TBR Consulting.

Jung, T., and Wickrama, K. A. S. (2008). An Introduction to Latent Class Growth Analysis and Growth Mixture Modeling. *Social Personal. Psychol. Compass* 2 (1), 302–317. doi:10.1111/j.1751-9004.2007.00054.x

Kaufman, L., and Rousseeuw, P. J. (2005). *Finding Groups in Data: An Introduction to Cluster Analysis*. Hoboken, NJ, USA: Wiley.

Krischler, M., Powell, J. J. W., and Pit-Ten Cate, I. M. (2019). What Is Meant by Inclusion? on the Effects of Different Definitions on Attitudes toward Inclusive Education. *Eur. J. Spec. Needs Educ.* 34 (5), 632–648. doi:10.1080/08856257.2019.1580837

Lindsay, G., Wedell, K., and Dockrell, J. (2020). Warnock 40 Years on: The Development of Special Educational Needs since the Warnock Report and Implications for the Future. *Front. Educ.* 4, 164. doi:10.3389/feduc.2019.00164

Lüke, T., and Grosche, M. (2018). What Do I Think about Inclusive Education? it Depends on Who Is Asking. Experimental Evidence for a Social Desirability Bias in Attitudes towards inclusionExperimental Evidence for a Social Desirability Bias in Attitudes towards Inclusion. *Int. J. Inclusive Educ.* 22 (1), 38–53. doi:10.1080/13603116.2017.1348548

Michailakis, D. (2003). The Systems Theory Concept of Disability: One Is Not Born a Disabled Person, One Is Observed to Be One. *Disabil. Soc.* 18 (2), 209–229. doi:10.1080/0968759032000044184

Miesera, S., DeVries, J. M., Jungjohann, J., and Gebhardt, M. (2019). Correlation between Attitudes, Concerns, Self-efficacy and Teaching Intentions in Inclusive Education Evidence from German Pre-service Teachers Using International Scales. *J. Res. Spec. Educ. Needs* 19 (2), 103–114. doi:10.1111/1471-3802.12432

Miesera, S., and Gebhardt, M. (2018). Inclusive Vocational Schools in Canada and Germany. A Comparison of Vocational Pre-service Teachers′ Attitudes, Self-Efficacy and Experiences towards Inclusive Education. *Eur. J. Spec. Needs Educ.* 33 (5), 1–16. doi:10.1080/08856257.2017.1421599

Moser, V., and Sasse, A. (2008). *Theorien der Behindertenpädagogik*. Waleska, Georgia: Reinhardt.

Oliver, M. (1981). "A New Model of the Social Work Role in Relation to Disability," in *The Handicapped Person: A New Perspective for Social Workers*. Editor J. Campling (New York City, New York: Radar), 19–32.

Oliver, M., and Barnes, C. (2010). Disability Studies, Disabled People and the Struggle for Inclusion. *Br. J. Sociol. Educ.* 31 (5), 547–560. doi:10.1080/01425692.2010.500088

R Core Team (2020). R: A Language and Environment for Statistical Computing. (*Version 4.0*) [Computer Software]. (R packages retrieved from MRAN snapshot 2020-08-24). Available at: https://cran.r-project.org.

Retief, M., and Letšosa, R. (2018). Models of Disability: A Brief Overview. *HTS Teologiese Stud. / Theological Stud.* 74 (1), a4738. doi:10.4102/hts.v74i1.4738

Revelle, W. (2019). Psych: Procedures for Psychological, Psychometric, and Personality Research. [R Package]. Available at: https://cran.r-project.org/package=psych.

Rosenberg, J., Beymer, P., Anderson, D., Van Lissa, C. J., and Schmidt, J. (2018). tidyLPA: An R Package to Easily Carry Out Latent Profile Analysis (LPA) Using Open-Source or Commercial Software. *J. Open Source Softw.* 3 (30), 978. doi:10.21105/joss.00978

Rosseel, Y. (2012). Lavaan: An R Package for Structural Equation Modeling. *J. Stat. Softw.* 48 (2), 1–36. doi:10.18637/jss.v048.i02

Satorra, A., and Bentler, P. M. (2001). A Scaled Difference Chi-Square Test Statistic for Moment Structure Analysis. *Psychometrika* 66 (4), 507–514. doi:10.1007/BF02296192

Scheer, D. (2020). An Integrated Framework Model for the Leadership Role of Principals in Inclusive Education. *Eur. J. Educ.* 56, 660. doi:10.1111/ejed.12480

Scheer, D., Egener, L., Laubenstein, D., and Melzer, C. (2020). Development and Psychometric Evaluation of an Instrument Measuring Subjective Definitions of Inclusion (FEDI). *Int. J. Inclusive Educ.* 2020, 1–21. doi:10.1080/13603116.2020.1853256

Schurig, M., Weiß, S., Kiel, E., Heimlich, U., and Gebhardt, M. (2020). Assessment of the Quality of Inclusive Schools A Short Form of the Quality Scale of Inclusive School Development (QU!S-S)–Reliability, Factorial Structure and Measurement Invariance. *Int. J. Incl. Educ.*, 1–16. doi:10.1080/13603116.2020.1862405

Schwab, S. (2018). *Attitudes towards Inclusive Schooling: A Study on Students', Teachers' and Parents' Attitudes*. Münster, Germany: Waxmann.

Scrucca, L., Fop, M., Murphy, T. B., and Raftery, A. E. (2016). Mclust 5: Clustering, Classification and Density Estimation Using Gaussian Finite Mixture Models. *R. J.* 8 (1), 289–317. doi:10.32614/rj-2016-021

Shakespeare, T. (2018). *Disability the Basics*. Oxfordshire, England, UK: Routledge.

Shakespeare, T. (2006). "The Social Model of Disability," in *The Disability Studies Reader*. Editor J. Lennard (Oxfordshire, England, UK: Routledge), 266–273.

Sharma, U., and Jacobs, D. K. (2016). Predicting In-Service Educators' Intentions to Teach in Inclusive Classrooms in India and Australia. *Teach. Teach. Educ.* 55, 13–23. doi:10.1016/j.tate.2015.12.004

Singal, N. (2006). An Ecosystemic Approach for Understanding Inclusive Education: An Indian Case Study. *Eur. J. Psychol. Educ.* 21 (3), 239–252. doi:10.1007/bf03173413

Skelton, H., and Rosenbaum, P. (2010). *Disability and Child Development: Integrating the Concepts*. Hamilton, Canada: CanChild Research Center, McMaster University. Available at: https://www.canchild.ca/en/resources/35-disability-and-child-development-integrating-the-concepts.

Snyder, S. L., and Mitchell, D. T. (2006). *Cultural Locations of Disability*. Chicago, Illinois: University of Chicago.

Stötzner, H. E. (1864). *Schulen für schwachbefähigte Kinder*. Leipzig and Heidelberg, Germany: Wintersche Verlagsbuchhandlung, Münchner Digitalisierungs Zentrum.

The United Nations (2006). *Convention on the Rights of Persons with Disabilities*. New York: The United Nations.

United Nations Educational, Scientific and Cultural Organization [UNESCO] (1994). *The Salamanca Statement and Framework for Action on Special Needs Education*. Paris, France: United Nations Educational, Scientific and Cultural Organization.

United Nations [UN] (2006). *Convention on the Rights of Persons with Disabilities*. New York: The United Nations.

Vygotski, L. S. (1924). Zur Psychologie und Pädagogik der kindlichen Defektivität. Available at: http://www.th-hoffmann.eu/archiv/wygotski/wygotski.1924.pdf.

Waldschmidt, A. (2017). "Disability Goes Cultural. The Cultural Model of Disability as an Analytical Tool," in *Culture-Theory-Disability*. Editors A. Waldschmidt, H. Berressem, and M. Ingwersen (Bielefeld, Germany: Transcript).

World Health Organization [WHO] (2001). *International Classification of Functioning, Disability and Health*. Geneva, Switzerland: World Health Organization.

World Health Organization [WHO] (1980). *International Classification of Impairments, Disabilities and Handicaps*. Geneva, Switzerland: World Health Organization.

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.

Publisher's Note: All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors, and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.