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All ready for action in inclusive classrooms? Conceptions of the tiered support framework, professional roles, and collaboration among Finnish pre-service teachers

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ABSTRACT

The idea of inclusive education became prevalent around the world. To implement inclusive education, some countries adopt a multi-tiered support framework to support children with special educational needs. Although Finland introduced this framework already in 2010, few studies have investigated how pre-service teachers understand its implementation and multi-professional collaboration. This study examined pre-service teachers' conceptions of the multi-tiered support framework, professional roles, and collaboration in Finland. Data were collected from 139 pre-service teachers using questionnaires. Cluster analysis identified four pre-service teacher profiles: 'Support knowing-doing gap', 'Support positive', 'Support negative', and 'Three-tiered support negative', revealing a knowing-doing gap in the implementation of the support framework. Furthermore, the result indicates that some pre-service teachers were more critical of the multi-tiered support framework than of multi-professional collaboration, possibly due to the framework's relative novelty. This study provides useful insights for developing pre – and in-service teacher education regarding inclusive education.

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SDG 3: Good health and well-being; SDG 4: Quality education

1. Introduction

Inclusive education – including all students with educational needs in mainstream schools – has become a central issue to educational policies and practices internationally after the Salamanca Statement was published (Wermke et al. 2020). Each country has established various support systems to include children with diverse educational needs, and some countries (e.g. the United States (US), Netherlands, and Finland)

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have adapted a multi-tiered support framework (Björn et al. 2016; Fuchs, Fuchs, and Compton 2012; Hingstman et al. 2021). For example, the US's Individuals with Disabilities Education Improvement Act permitted educators to use the multi-tiered support framework called response-to-intervention (RTI) already in 2004, consisting of a four-step process to identify students' educational needs (Fuchs and Fuchs 2005). Although there are some similarities in how each country implements the multi-tiered support framework, there are also large differences influenced by its cultural and socio-economical contexts (Björn et al. 2016; 2018; Hingstman et al. 2021). Thus, it is extremely important to study inclusive educational support in a specific cultural context so that we can learn new approaches from each other (Artiles and Dyson 2005).

Finland has implemented an inclusive education system that accommodates all students, regardless of their diverse backgrounds (Halinen and Järvinen 2008; Savolainen 2009). According to the Official Statistics of Finland (2018), 64.5% of students who receive special support were partly included in regular classrooms, and 21.3% of those students were fully included in Finland. Therefore, providing pedagogical support adapted to children's diverse educational needs has become a part of teachers' daily duties (Thuneberg et al. 2013). Although the multi-tiered support framework outlines the structure for supporting children with special educational needs (SENs), it has been indicated that teachers' work is becoming more challenging due to increasing heterogeneity in classrooms (Nislin et al. 2015; Ojala 2017).

Teachers' knowledge and skills in supporting children with SENs are assumed to be essential for effective inclusive practices. Previous research has indicated that teachers' content and pedagogical knowledge and teaching skills influence their beliefs and attitudes towards inclusive education, which further affects their teaching practices (Sharma and Jacobs 2016; de Avramidis and Norwich 2002; Boer, Pijl, and Minnaert 2011). Given that the demanding nature of the work also affects novice teachers, several studies have underscored the importance of enhancing pre-service teacher training, enabling them to confidently implement inclusive education early in their careers (Forlin, Kawai, and Higuchi 2015; Saloviita and Tolvanen 2016). A recent study by Kyttälä et al. (2022) demonstrated that Finnish pre-service teachers' prior knowledge of special needs education was linked to their understanding of assessment, which is a critical component of the multi-tiered support framework. Furthermore, one element identified as lacking in pre-service teacher training is collaboration skills (Savolainen et al. 2012). Although multi-professional collaboration is emphasised as a key component of inclusive education in the national core curriculum (Finnish National Board of Education 2016), the current teacher training system rarely provides opportunities to explore what collaboration entails and how to implement it in school contexts (Malinen, Väisänen, and Savolainen 2012). Thus, it is essential to examine future teachers' knowledge and skills of support for students with SENs to inform and improve teacher training programmes. Training novice teachers to develop confidence in their ability to implement inclusive education before entering their demanding profession will further enhance their intention and actual behaviour in implementing inclusive practices, ultimately benefiting their students (Song, Sharma, and Choi 2019).

The objective of this research is to explore how Finnish pre-service teachers understand the implementation of the three-tiered support framework and multi-professional collaboration. Specifically, using a quantitative approach, the study aims to investigate

pre-service teachers' conceptions of the Finnish three-tiered support framework, their conceptions of their future professional role as teachers in multi-professional collaboration, and their attitudes towards teachers' work as collaborative practices. In addition, the current study intends to explore how pre-service teachers' conceptions and attitudes together cluster into different patterns representing different profiles of pre-service teachers. The cluster analysis allows for the identification of sub-groups of pre-service teachers based on their perceptions, thereby enabling university educators to provide targeted training on inclusive education tailored to their specific profiles.

1.1. Three-tiered support framework in Finland

In 2006, the Finnish Ministry of Education, Science, and Culture launched a steering group to develop a strategy for special education in basic education, including the development of assessment methods of SENs, legislation regarding special needs education, teacher education, and administrative procedures in special needs education services (Björn et al. 2018). This resulted in a new policy document, the 'strategy for special education' (Ministry of Education and Culture 2007), which was introduced in 2010 in parallel with the amendment of the Basic Education Act (Parliament of Finland 2010) and implemented into practice in all Finnish schools in 2011 (Pesonen et al. 2015). The main idea was to start a new multi-tiered support system as part of an inclusive education framework consisting of three support levels: General support (Tier 1); Intensified support (Tier 2); and Special support (Tier 3). General support aims to provide temporary help mostly in mainstream classrooms, including guidance and counselling, part-time special needs education, differentiation, remedial teaching, and cooperation between home and school (Björn et al. 2016; Finnish National Board of Education 2016). If general support is not sufficient, longer-term support in a specific domain, referred to as 'intensified support', is provided (Björn et al. 2016). At this level, a learning plan in a specific area, such as literacy skills, mathematics, or both, is made based on an educational assessment (Björn et al. 2016). While special needs education teachers are available at all levels of support in Finland, in tier 2, they play a crucial role in assessing students' needs and planning their daily schoolwork in collaboration with classroom teachers (Björn et al. 2016). Finally, special support is offered when intensified support is not sufficient and the child needs long-term, multifaceted support. The tier 3 level requires extensive assessment by multi-professionals, administrative decision-making, and an individual educational plan (IEP) (Lakkala and Thuneberg 2018). In the new three-tiered support framework, a pedagogical approach is stressed rather than the previous emphasis on psychological and medical assessment, and early intervention with student welfare groups is recommended, including not only classroom teachers and special needs education teachers but also principals, school nurses, school psychologists, and school social workers (Thuneberg et al. 2014).

Although a decade has passed since the implementation of the multi-tiered support, a recent study interviewed Finnish in-service teachers and found that the boundary and concept of intensified support are still unclear to them, and navigating between support levels is not straightforward (Nykänen 2021). Other studies have investigated the role of special education teachers in the implementation of the three-tiered support system in Finland (Paloniemi et al. 2023; Sundqvist, Björk-Åman, and Ström 2019). Sundqvist,

Björk-Åman, and Ström (2019) demonstrated that special education teachers play a key role, especially in the transition from intensified to special support. On the other hand, collaboration between special education and classroom teachers, including shared knowledge and documentation, is more prominent in the transition from general to intensified support (Sundqvist, Björk-Åman, and Ström 2019). A study by Paloniemi et al. (2023) further indicated that special education teachers see pedagogical documents as useful tools to document pedagogical support and collaborate with classroom teachers.

1.2. Multi-professional collaboration and support

Multi-professional collaboration as stated in the legislative documents (Ministry of Education and Culture 2007) and the national core curriculum (Finnish National Board of Education 2016) is one of the important elements to be implemented not only within the Finnish three-tiered support framework, but also as part of inclusive practices elsewhere. Classroom teachers, special needs education teachers, subject teachers, and other school staff could collaborate in various ways, including assessing students' learning outcomes, planning their schoolwork, executing actual support, co-teaching, and sharing professional skills and responsibilities (Björn et al. 2016; Kokko, Takala, and Pihlaja 2021).

A systematic literature review of teacher collaboration by Vangrieken et al. (2015) found that the terminology of 'collaboration' remains ambiguous, and the concept was often used interchangeably with other terms, such as collegiality, professional (learning) communities, and teacher teams. For Friend and Cook (1990), the term 'collaboration' refers to 'a style [of] direct interaction between at least two co-equal parties voluntarily engaged in shared decision making as they work toward a common goal' (72). Moreover, Kelchtermans (2006) used 'collaboration' as a descriptive term, referring to the cooperative actions implemented by teachers to achieve job-related purposes.

Apart from its high potential to support students' learning, multi-professional collaboration may also lead to disagreements and conflicts due to the different backgrounds or expertise of the team members (Jurkowski and Müller 2018). For instance, the study by Da Fonte and Barton-Arwood (2017) offers three potential barriers to implementing multi-professional collaboration: (a) management of time; (b) gaps in content knowledge; and (c) communication. Effective communication is crucial for successful multi-professional collaboration where teachers and staff of varying disciplines share their observations of student difficulties in different school settings with the aim of enabling those students to compensate for their difficulties (Dieker and Murawski 2003). Furthermore, teachers' attitudes towards multi-professional collaboration have a direct bearing on whether proficient collaboration can be achieved (Bush and Grotjohann 2020). Although discussion on multi-professional collaboration is increasing rapidly (Vangrieken et al. 2015), information on how pre-service teachers view multi-professional collaboration is still limited in the literature (Hamilton-Jones and Vail 2014).

1.3. Knowing-doing-being framework in inclusive practices

Teachers' knowledge, skills, attitudes, and professional identity that are relevant to the teaching profession have been discussed in the knowing-doing-being framework

(Rouse 2006; Snook, Nohria, and Khurana 2012). 'Knowing' refers to the cognitive domain, including understanding of concepts, cognitive modelling, and framing (Snook, Nohria, and Khurana 2012). In the context of inclusive practices, knowing emphasises what teachers know about, such as teaching strategies, types of disabilities and SENs, assessment, and monitoring of students' learning, and legislative and political contexts (Rouse 2006). 'Doing' is generally understood to mean the behavioural domain, that is, what teachers do in their classrooms (Rouse 2006). Here, it would be important for teachers to know how to use the aforementioned knowledge in day-to-day teaching practices, in other words, ways of 'turning knowledge into action' (Rouse 2006, 11). 'Being' represents one's values, attitudes, and beliefs as a teacher (Snook, Nohria, and Khurana 2012). Teachers' attitudes and beliefs towards inclusive education have been further considered as crucial factors for effective inclusive practice and thus studied widely in the field (Forlin et al. 2011; Savolainen et al. 2012; Yada, Tolvanen, and Savolainen 2018).

These three domains do not work independently, rather they interrelate to each other. According to Pfeffer and Sutton (2000), the challenge of turning knowledge into action is called the knowing-doing gap. Although the knowing-doing gap has mainly been studied in management literature, the concept can be adopted in different fields, including education. For instance, several lines of evidence indicated that there is a gap between theories presented in teacher education programmes and actual teaching practices in schools (Allsopp et al. 2006; Everington 2013; Wahlgren and Aarkrog 2021). In light of pre-service teachers' being, it has been demonstrated that pre-service teachers in Finland hold neutral attitudes towards inclusive education (Alnahdi, Saloviita, and Elhadi 2019). However, some studies have presented controversial evidence, showing that pre-service teachers have negative attitudes toward inclusive education, particularly regarding specific groups of students with SENs (Byra and Domagała-Zyśk 2022; Takala and Sirkko 2022). Furthermore, pre-service teachers' belief in the capability to implement inclusive practices was significantly related to their resilience (Yada et al. 2021). Though there are many studies focusing on pre-service teachers' views on inclusive education, few studies have investigated pre-service teachers' perspectives and skills regarding the three-tiered support framework and multi-professional collaboration within the knowing-doing-being framework.

1.4. Context of the current study

The present study was conducted as part of a teacher education programme in Finland. Teacher education programmes are organised by eight universities spread across Finland to provide equal educational opportunities (Malinen, Väisänen, and Savolainen 2012; Pursiainen et al. 2019). Studying in teacher education programmes is one of the most popular career passes in Finland, where only about 16% of candidates get into the programme for classroom teacher education (Finnis National Agency for Education 2019). The teacher education programmes offer various courses for pre-service teachers aiming to get a teaching certificate in either a classroom teacher, special needs education teacher, subject teacher, or guidance and counselling. Furthermore, in Finland, teacher education programmes generally take a research-based approach in order to educate the teacher as researcher (Malinen, Väisänen, and Savolainen 2012), and a master's

degree is necessary for obtaining an official teaching qualification since 1979 (Naukkarinen 2010). Thus, every pre-service teacher who attends the programme requires a relatively demanding research orientation, including completion of both bachelor's and master's theses. However, there are some differences in the content of teacher education programmes for different teacher types such as classroom teachers, subject teachers, or special needs education teachers. Classroom teachers are required to have a master's degree in education (300 ECTS credits), on the other hand, subject teachers can have a master's degree in their major subjects, and they need to complete pedagogical studies (60 ECTS credits) in a teacher training institutes (Evagorou et al. 2015; Naukkarinen 2010). Special needs education teachers have a master's degree in education (300 ECTS credits) specialised in teaching students with SENs, but it is also possible to become a special needs education teacher by completing professional competence courses (60 ECTS credits) after finishing any master's degree programme (Naukkarinen 2010).

This study was conducted as part of the project 'Opettajien arviointiosaaminen oppimisen, osallisuuden ja tuen toteutumisen edistämiseksi (OPA) [Developing teacher assessment skills to enhance learning, engagement, and interactions]' funded by the Ministry of Culture and Education for years 2018–2021. The project aims to promote various kinds of assessment practices.

1.5. Research questions

The above review of the literature suggests that effective implementation of the three-tiered support framework and multi-professional collaboration depends on how individual teachers understand these and whether they have the necessary knowledge and belief in their ability to deliver them, and agree that the practices are useful for students. This research addresses the following research questions to investigate whether pre-service teachers considered themselves equipped to implement the three-tiered support framework and related multi-professional collaboration:

(1) Is there any correlation between pre-service teachers' (a) conceptions of the Finnish three-tiered support framework, (b) conceptions of their future professional role as teachers, and (c) attitudes towards teachers' work as collaborative practices?
(2) What kinds of profiles are created for pre-service teachers based on the aforementioned three constructs?
(3) How do different pre-service teacher profiles differ with respect to background variables (age, gender, major study subject, and number of credits)?

2. Method

2.1. Participants

The participants in this study comprised 139 pre-service teachers studying in a teacher education programme at one Finnish university. The participation and thus response rate of the questionnaire was 44%. Most participants were in the middle of their teacher education, i.e. in their third or fourth year of study (variation due to different teacher education programmes and timings of studies). Table 1 summarises the

Table 1. Demographics of the participants (N = 139).

	Contents
Gender (%)	Female: 113 (81%) Male: 26 (19%)
Mean age (SD)	24.91 (4.88)
Mean number of study credits (ECTS) so far gained for the particular degree (SD)[1]	15.24 (5.36)
Study major (%)	Classroom teacher: 51 (37%)
	Special needs education teacher: 8 (6%)
	Combination of special needs education and classroom teacher: 3 (2%)
	Subject teacher: 72 (52%)
	Combination of subject and classroom teacher: 5 (4%)

Note. [1] As of November 7, 2022, the Study in Finland mentioned on its website that a total of 180 ECTS credits are required for a bachelor's degree and 120 ECTS credits for a master's degree in Finnish universities.

participants' demographics. There were 113 (81%) women and 26 (19%) men. These numbers correspond to the Finnish teacher population, of which 80% of classroom and full-time teachers are female (Paronen and Lappi 2018).

2.2. Procedure and research instruments

Data were collected in a teacher education programme in Finland using a web-based questionnaire. A link to the questionnaire was sent via e-mail to each participant. Prior to data collection, ethical consent was obtained through a consent letter that explained the voluntary nature of participation, the assurance of confidentiality, and that participation would not affect students' course evaluations. Participant anonymity was ensured by refraining from collecting directly identifying information (e.g. names) and by assigning student numbers solely for the purpose of linking follow-up questionnaires across time points. Confidentiality was maintained through secure storage and restricted access: the dataset containing student numbers is stored in encrypted form by the principal investigator, and only de-identified data were used in the analyses.

Several scales were included in the questionnaire, although not all were selected for use in this study. The scales used were: (a) demographic questions related to participants' gender, age, major study subject, and study credits (ECTS) so far gained for the particular degree; (b) questions regarding participants' 'Conceptions of the Finnish three-tiered support framework' (11 items); (c) questions regarding participants' 'Conceptions of future professional role as a teacher' (8 items); and (d) questions related to participants' 'Attitudes towards teachers' work as collaborative practices' (5 items). The scale items were developed by the authors for the present study based on previous research literature which covers the different concepts and roles of teachers in relation to providing support for students (Fuchs, Fuchs, and Compton 2012; Fuchs, Fuchs, and Stecker 2010; Grigorenko 2009; Haager, Klingner, and Vaughn 2007; Ikeda and Gustafson 2002). The scale was first piloted with a small group of ten pre-service teachers, who were asked to provide feedback on the items in addition to completing them. Based on that sample, items with low reliability (i.e. scale α significantly below 0.6, if the item was included) were omitted from the final version of the scale. The items reflect critical underlying attitudes regarding the pre-service teachers' readiness for inclusive practices. For example, the statement, 'Support should be research-based only in special education services,

not in regular teaching (Note: coding reversed),' directly reveals whether a pre-service teacher may need to engage more with literature and training on teaching diverse student groups.

For the purposes of the present study, the scale was further examined using exploratory factor analysis. 'Conceptions of the Finnish three-tiered support framework' was intended to measure both pre-service teachers' theoretical and procedural knowledge related to the Finnish three-tiered support framework. Exploratory factor analysis with principal axis factoring was conducted to identify a factor structure of the scale. The analysis revealed that four items (i.e. items 1, 4, 6, and 8; see Appendices) had low correlation coefficients and communalities, and, thus, were omitted from the further analysis. The remaining 7 items showed a clear two-factor structure, which explained a total of 86.39% of the variance, with Factor 1 contributing 69.00% and Factor 2 contributing 17.40%. Five items load onto Factor 1, and it was labelled as 'Knowing' based on the knowing-doing-being framework (Rouse 2006; Snook, Nohria, and Khurana 2012). Two items were loaded onto Factor 2 and related to participants' understanding of whether they know how to use the Finnish three-tiered support framework. This factor was named as 'Doing'. The reliability of the remaining 7 items was $\alpha = 0.932$. Reliability for each subscale was $\alpha = 0.957$ for Knowing and $\alpha = 0.978$ for Doing, respectively.

'Conceptions of future professional role as a teacher' was developed in order to assess pre-service teachers' knowledge about a professional role as a teacher in multi-professional collaboration. Reliability analysis was performed, and three items (i.e. items 1, 3, and 7; see Appendices) were removed stepwise based on item/total correlation coefficients. After removing these three items, Cronbach's alpha was improved to close to 0.6 ($\alpha = 0.561$), which has been suggested as acceptable (van Griethuijsen et al. 2015).

'Attitudes towards teachers' work as collaborative practices' aimed to examine pre-service teachers' cognitive attitudes towards multi-professional collaboration since cognitive aspects of attitudes were shown as related to one's knowledge about an attitudinal object (van der Linden et al. 2015). The reliability of this five-item scale was $\alpha = 0.659$, which is acceptable.

Item descriptions translated into English are presented in the Appendices. All questions except the demographic questions were answered on a 6-point Likert scale ranging from 1 to 6 (I fully disagree – I fully agree).

2.3. Data analysis

All analyses were carried out using SPSS version 26 (IBM 2016). Missing values accounted for 1.46% and the highest item accounted for 3.60%. Missing data were handled using the default procedure in the SPSS. For instance, the default handling of missing values in cluster analysis is to exclude cases with missing values from the analysis (i.e. using only complete cases). Listwise deletion carries the risk of biased results when data are not missing completely at random (MCAR). However, the amount of missing data in our dataset was small, and Little's MCAR test confirmed that the data were missing completely at random (χ^2 (13) = 11.966, $p = .530$). Analysis followed five steps: (1) firstly, correlation analysis was conducted between the identified two factors of 'Conceptions of the Finnish three-tiered support framework', 'Conceptions of future

professional role as a teacher', and 'Attitudes towards teachers' work as collaborative practices'; (2) cluster analysis with the k-means algorithm was then implemented to identify the pre-service teachers' different profiles. The partitioning method using the k-means algorithm was chosen because it is suitable for small – to medium-size data sets (Jiawei, Kamber, and Pei 2011). The analysis enables researchers to differentiate a set of data into homogeneous sub-sets (Jiawei, Kamber, and Pei 2011), here, partitioning pre-service teachers into groups that share similar characteristics based on the two factors of 'Conceptions of the Finnish three-tiered support framework', 'Conceptions of future professional role as a teacher', and 'Attitudes towards teachers' work as collaborative practices'. The mean scores of each variable were standardised for the analysis. The number of clusters was determined by checking the final solution of the hierarchical cluster analysis and by testing the 2, 3, 4, and 5 cluster solutions. The 4-cluster solution was determined as preferable because it is theoretically justifiable and supported by the result of the hierarchical cluster analysis; (3) a discriminant analysis was then carried out in order to evaluate the fit of the cluster solution; (4) multivariate analysis of variance (MANOVA) was next conducted to test the validity of the clusters; (5) finally, to investigate whether there were differences among the cluster groups in terms of pre-service teachers' background variables, an analysis of variance (ANOVA) was conducted for participants' age and number of study credits (ECTS) so far gained for the particular degree, and Fisher-Freeman-Halton tests were performed for gender and major study subject.

3. Results

3.1. Correlation analysis

The relationship between the two factors of 'Conceptions of the Finnish three-tiered support framework', 'Conceptions of future professional role as a teacher', and 'Attitudes towards teachers' work as collaborative practices' was investigated using Pearson's correlation coefficient. Table 2 demonstrates that there were weak to medium positive correlations among the variables (Cohen 1988).

3.2. Clustering pre-service teacher profiles

Cluster analysis was performed using standardised z scores of the means of 'Conceptions of the Finnish three-tiered support framework' (two factors), 'Conceptions of future professional role as a teacher', and 'Attitudes towards teachers' work as collaborative practices'. The cluster profiles are presented in Figure 1, and descriptive statistics for the four clusters identified by the k-means cluster analysis are presented in Table 3. In order to

Table 2. Correlation coefficients among the four studied constructs (N = 139).

	1.	2.	3.
Conceptions of the Finnish three-tiered support framework			
1. Knowing	–		
1. Doing	.499***	–	
1. Conceptions of future professional role as a teacher	.354***	.272**	–
1. Attitudes towards teachers' work as collaborative practices	.268**	.281***	.490***

Note. * $p < .05$, ** $p < .01$, *** $p < .001$

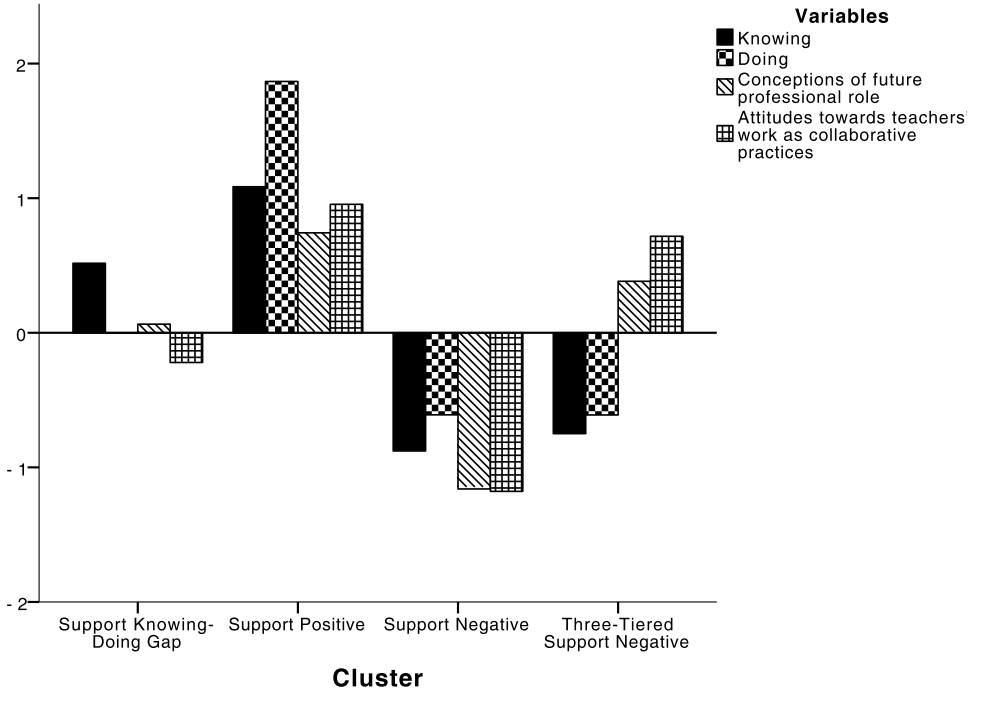

Figure 1. Cluster profiles (N = 139).

compare the cluster scores, cluster means of each factor were identified as high if it is above the 75th percentile of the entire data set, as average if it is between the 25th and 75th percentile, and as low if it is below the 25th percentile.

3.2.1. Cluster 1: knowing-doing gap exists in conceptions of the Finnish three-tiered support framework

Cluster 1 (N = 55) represents pre-service teachers with relatively high scores (slightly below 75th percentile) in 'Knowing', and average scores in 'Doing', 'Conceptions of future professional role as a teacher', and 'Attitudes towards teachers' work as collaborative practices'; this cluster was named the 'Support Knowing-Doing Gap', representing a

Table 3. Descriptive statistics of the four clusters (N = 139).

	Support Knowing-Doing Gap (*N* = 55)		Support Positive (*N* = 21)		Support Negative (*N* = 28)		Three-Tiered Support Negative (*N* = 35)			
Measure	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	ηp^2
Knowing	.517	.319	1.085	.460	−.878	.870	−.750	.897	60.320***	.582
Doing	−.002	.717	1.867	.616	−.610	.292	−.611	.362	98.761***	.695
Conceptions of future professional role as a teacher	.048	.666	.755	.919	−1.131	.847	.383	.822	27.015***	.384
Attitudes towards teachers' work as collaborative practices	−.213	.679	.939	.533	−1.212	.814	.717	.544	59.004***	.577

Note. * $p < .05$, ** $p < .01$, *** $p < .001$

subgroup of pre-service teachers whose scores in 'Doing' and 'Knowing' exhibit a gap between them.

3.2.2. Cluster 2: high in both conceptions of the Finnish three-tiered support framework and conceptions and attitudes related to multi-professional collaboration

Cluster 2 (N = 21) includes pre-service teachers with high scores in all the variables. Typical of pre-service teachers in this cluster were very high scores in 'Doing', and this cluster was named 'Support Positive', indicating that pre-service teachers in this group have knowledge of the three-tiered system, an understanding of how to implement it, a higher perception of their future professional role as a teacher, and more positive attitudes towards teachers' work as collaborative practices.

3.2.3. Cluster 3: low in both conceptions of the Finnish three-tiered support framework and conceptions and attitudes related to multi-professional collaboration

Cluster 3 (N = 28) contains pre-service teachers whose scores in all the variables were low except 'Doing' (slightly above 25th percentile), particularly in 'Conceptions of future professional role as a teacher' and 'Attitudes towards teachers' work as collaborative practices'; this cluster was named 'Support Negative', representing a subgroup of pre-service teachers whose scores in all four constructs might indicate a need for further training in both the Finnish three-tiered support framework and multi-professional collaboration.

3.2.4. Cluster 4: low in conceptions of the Finnish three-tiered support framework but high in conceptions and attitudes related to multi-professional collaboration

Cluster 4 (N = 35) consists of pre-service teachers with low scores in 'Knowing', average but relatively low scores in 'Doing' (slightly above 25th percentile), average scores in 'Conceptions of future professional role as a teacher', and high scores in 'Attitudes towards teachers' work as collaborative practices'; this cluster was named 'Three-Tiered Support Negative', indicating that pre-service teachers' scores were lower in relation to the Finnish three-tiered support framework and, thus, may need specific training in it.

3.2.5. Testing validity of the cluster solution

A discriminant analysis was conducted to test whether the data fit the cluster solution. Significant mean differences were observed for all the variables. Box's M test indicated that the assumption of the equality of covariance matrices was violated; however, the log determinants were quite similar and, thus, this problem was not considered serious. The discriminate function confirmed the fit of the cluster solution (Wilks' $\lambda = 0.065$; $\chi^2 = 352.445$; df = 12; $p < .0001$). The classification results revealed that 95.5% of respondents were classified correctly into the cluster groups.

Next, MANOVA was performed to see the validity of the cluster solution. It was confirmed that the four cluster groups differed significantly on all variables (Pillai's Trace = 1.599, $F\ (12,\ 387) = 36.786$, $p < .001$, $\eta p^2 = .533$; Table 3). Pairwise post hoc tests (Bonferroni) revealed that for 'Knowing' and 'Doing' all cluster group differences

were statistically significant except the difference between clusters 3 (Support Negative) and 4 (Three-Tiered Support Negative). Regarding 'Conceptions of future professional role as a teacher', cluster 3 (Support Negative) showed significantly lower scores than the other three cluster groups. Cluster 2 (Support Positive) showed higher scores than cluster 1 (Support Knowing-Doing Gap), although there were no significant differences between clusters 1 and 4, and 2 and 4. Regarding 'Attitudes towards teachers' work as collaborative practices', all cluster groups differed, although the difference between clusters 2 (Support Positive) and 4 (Three-Tiered Support Negative) was not statistically significant.

3.3. Testing relationships between cluster groups and background variables

Finally, a one-way ANOVA and Fisher-Freeman-Halton test were conducted to examine whether pre-service teachers' background variables (age, credits, gender, and major study subject) differ among the cluster groups. According to ANOVA, there were no statistically significant differences among the cluster groups in age ($F\ (3,\ 133) = .447$, $p = .720$) and credits ($F\ (3,\ 135) = .691$, $p = .559$). In addition, the Fisher-Freeman-Halton tests revealed that there was no significant relationship between pre-service teachers' gender and the cluster groups ($p = .940$). The relationship between pre-service teacher's major study subjects and the cluster groups was statistically significant ($p = .037$). However, a cellwise residual analysis (García-Pérez and Vicente Núñez-Antón 2003) indicated that there was no statistically significant cell using a p-value of Bonferroni correction. According to Table 4, the percentage of participants whose major study subject was a subject teacher or combination of subject and classroom teacher and who belong to cluster 2 (Support Positive: 7.8% from n = 77) was lower compared to the other cells, although it was statistically indicative (corrected p-value = .084).

4. Discussion

The first research question examined whether the two factors of 'Conceptions of the Finnish three-tiered support framework' (i.e. knowing and doing), 'Conceptions of future professional role as a teacher', and 'Attitudes towards teachers' work as collaborative practices' associate with each other. The current study found that there were weak to moderate correlations among the variables. In this study, 'Conceptions of future professional role as a teacher' reflect pre-service teachers' knowledge and understanding

Table 4. Frequencies and percentages of major study subjects in different cluster groups (N = 139).

	Support Knowing-Doing Gap (N = 55)	Support Positive (N = 21)	Support Negative (N = 28)	Three-Tiered Support Negative (N = 35)
Classroom teacher (N = 51)	18 (35.3%)	11 (21.6%)	13 (25.5%)	9 (17.6%)
Special needs education teacher or combination of special needs education and classroom teacher (N = 11)	4 (36.4%)	4 (36.4%)	0 (0.0%)	3 (27.3%)
Subject teacher or combination of subject and classroom teacher (N = 77)	33 (42.9%)	6 (7.8%)	15 (19.5%)	23 (29.9%)

of their role in multi-professional collaboration (i.e. knowing). Meanwhile, 'Attitudes towards teachers' work as collaborative practices' represent their values and beliefs as future teachers (i.e. being) (Snook, Nohria, and Khurana 2012). These results are in accord with previous studies indicating that knowing, doing, and being indeed are inseparable from one another (Fives and Buehl 2008; Rouse 2006). Hence, bridging the knowing-doing gap alone may not be enough to prepare pre-service teachers for effective implementation of the three-tiered support framework and multi-professional collaboration. It is equally important to foster positive attitudes towards implementing inclusive principles and practices, as well as belief in their own skills and knowledge.

The second question in this research was to identify pre-service teacher profiles as defined by the 'Knowing' and 'Doing' of 'Conceptions of the Finnish three-tiered support framework', 'Conceptions of future professional role as a teacher', and 'Attitudes towards teachers' work as collaborative practices'. In this study, the Finnish pre-service teachers were found to cluster into four different profiles: Support Knowing-Doing Gap (cluster 1, $N = 55$); Support Positive (cluster 2, $N = 21$); Support Negative (cluster 3, $N = 28$); and Three-Tiered Support Negative (cluster 4, $N = 35$). 'Support Knowing-Doing Gap', the largest group of the four, is characterised by relatively high scores for 'Knowing' regarding 'Conceptions of the Finnish three-tiered support framework' and 'Conceptions of future professional role as a teacher', but lower scores for 'Doing' regarding 'Conceptions of the Finnish three-tiered support framework' and 'Attitudes towards teachers' work as collaborative practices'. These results support the idea of a knowing-doing gap (Pfeffer and Sutton 2000) among the Finnish pre-service teachers regarding the implementation of the Finnish three-tiered support framework. In accordance with the present result, previous studies have demonstrated that there is a key challenge for teacher educators to bridge the gap between theory and practices (Allsopp et al. 2006; Everington 2013; Kremsner 2023). Allsopp et al. (2006) indicated that strengthening the link between theory and practice requires close collaboration between universities and teacher-training schools, which in turn enables pre-service teachers to apply their university learning more effectively during practicum. Another study draws a similar conclusion, suggesting that action research, where pre-service teachers conduct a research project during their practicum, can help narrow the gap between theory and practice (Ulvik, Riese, and Roness 2018). Furthermore, they emphasised the importance of the opportunity for pre-service teachers to reflect on their teaching practices, focus on what they found important, and have their experience of using specific tools for professional development (Ulvik, Riese, and Roness 2018). These practices may help Finnish pre-service teachers bridge the knowing-doing gap when implementing the three-tiered support framework.

Further, our findings indicated that the knowing-doing gap among pre-service teachers is associated with lower attitudes (i.e. being) towards teachers' work as collaborative practices. This result somewhat corroborates the findings of Ulvik, Riese, and Roness (2018), who suggested that action research projects, where pre-service teachers put research-based knowledge into practice, influenced their attitudes towards action research. The previous findings showed that pre-service teachers majoring in special education typically have more positive attitudes toward inclusion (Miesera et al. 2019; Takala and Sirkko 2022). In other words, the more knowledge they gain related to inclusion (i.e. knowing), the more positive their attitudes can become. In addition, the study by Tuncay

and Kizilaslan (2022) indicated that pre-service teachers who had been in contact with students with SENs (i.e. can be considered as doing) had more positive attitudes than those with no experience. The results of our study further suggest that gaining knowledge and practical experience is not enough; bridging this gap is key to positively changing their attitudes. The importance of not only providing knowledge about inclusive education but also increasing opportunities to work with students with SENs, in relation to pre-service teachers' attitudes toward inclusion, was also indicated in the recent study by Takala and Sirkko (2022). As studied in previous research, positive attitudes toward inclusion might influence teachers' intentions to implement inclusive education, which further affects their behaviour in accommodating students with SEN (Gülsün et al. 2023; Yang, Pang, and Sin 2024).

The 'Support Positive' profile typically had high scores for all variables, in contrast to the 'Support Negative' profile, which displayed consistently low scores. These results were consistent with our findings from research question 1 as well as previous studies that have pointed out correlations between knowing, doing, and being (Fives and Buehl 2008; Rouse 2006).

Finally, one of the most notable findings was the identification of the 'Three-Tiered Support Negative' profile among pre-service teachers. This group was characterised by relatively low scores for both 'Knowing' and 'Doing' regarding 'Conceptions of the Finnish three-tiered support framework', but higher scores for 'Conceptions of future professional role as a teacher' and 'Attitudes towards teachers' work as collaborative practices'. This result may be explained by the educational history in Finland, where multi-professional collaboration has been practiced since the 1970s when part-time special education was introduced to address heterogeneity in schools (Kivirauma and Ruoho 2007). Although the Finnish three-tiered support framework was implemented in teacher practice a decade ago in 2011 (Pesonen et al. 2015), it seems probable that its establishment is still an ongoing process. This accords with an earlier study indicating that RTI, which is a similar multilevel prevention system to the Finnish three-tiered support framework, has taken a long time to be implemented in the US (Fuchs, Fuchs, and Compton 2012). This may suggest that schools tend to change slowly, and old practices persist. In other words, Finnish pre-service teachers may have observed multi-disciplinary teachers and school staff collaborating during their own school years; however, the renewed three-tier support framework remains a relatively new concept to them. It can therefore be assumed that the concepts related to multi-professional collaboration, which was more familiar to the Finnish pre-service teachers, were more known, whereas those related to the three-tier support framework were less familiar to them. Future studies on the current topic using a qualitative approach may reveal a fuller picture of the gap between these two concepts.

Regarding the third research question, the present study was designed to determine the relationship between pre-service teachers' background variables (age, gender, major study subject, and the number of ECTS credits) and the four cluster groups. No significant differences were found in age, credits, or gender among the cluster groups. On the other hand, with respect to pre-service teacher's major study subject, the analysis indicated that the relationship between their major study subject and the cluster groups was statistically significant. Yet, the cellwise residual analysis showed that there was no significantly different cell with a Bonferroni-corrected p-value. This inconsistency may

be due to the small sample size, especially of the pre-service teachers whose major study subject was special needs education teacher or a combination of special needs education and classroom teacher ($N = 11$), and a further study using a larger sample is therefore suggested. Although the difference was not statistically significant, when we compared the percentage of each cell, the relatively low number (7.8%) of pre-service teachers who major in subject teacher or a combination of subject and classroom teacher belong to the 'Support Positive' profile. This finding is consistent with evidence from a previous study which indicated that subject teachers used instructional strategies regarding inclusive education less frequently than classroom teachers or special education teachers in Finland (Saloviita 2018). This finding highlights the need to strengthen teacher education programmes for subject teachers, in which they can gain the necessary knowledge, skills, and beliefs to implement the three-tiered support framework and multi-professional collaboration.

5. Limitations

First, the generalisability of these results is subject to certain limitations. For instance, the data were collected from one university in Finland using convenience sampling, and the sample size was rather small with a relatively low attrition rate. Further studies using a larger sample from different universities are therefore an essential next step in confirming the findings of this study. Moreover, the data had a low number of pre-service teachers with specific majors (i.e. whose major study subject was special needs education teacher or a combination of special needs education and classroom teacher). In a similar vein, pre-service teachers' situations vary based on factors such as their study year, the amount of special needs education they have received, and previous work experience as a teacher, which were not considered in our analysis. Further research, including more participants from these specific majors with diverse backgrounds, will be necessary. Another limitation is that the two scales (i.e. 'Conceptions of future professional role as a teacher' and 'Attitudes towards teachers' work as collaborative practices') had acceptable but relatively low reliability. Such low internal consistency constrains the strength of the conclusions that can be drawn. Further work is required to develop reliable instruments to measure pre-service teachers' conceptions and attitudes related to their professional roles. Finally, even though the quantitative data provided valuable insights, it did not fully capture the pre-service teachers' perspectives on inclusive practices, particularly regarding the three-tiered support framework and multi-professional collaboration. Future studies utilising qualitative methods, such as interviews or observations, could offer a deeper understanding of pre-service teachers' views on inclusive education.

Implications and conclusion

The findings of this study have a number of practical implications. First, the results of this study indicate that there was a knowing-doing gap in Finnish pre-service teachers regarding the implementation of the three-tiered support framework. Although Finland has put great emphasis on research-based knowledge to educate the 'teacher as researcher' (Malinen, Väisänen, and Savolainen 2012), the present study raises the possibility that pre-service teachers are struggling with turning this knowledge into actual practices –

or, at least, that this may take more time than envisaged. This finding has important implications for developing teacher education programmes, where pre-service teachers can gain not only theoretical knowledge (i.e. knowing) but also procedural knowledge (i.e. doing). One way to improve their, for example, collaboration skills is to organise a teacher education programme itself more inclusive, where pre-service teachers with different majors work together (Malinen, Väisänen, and Savolainen 2012) so that they could know each other's expertise and orientation. Previous research suggests that only a small proportion of universities mandate a course on collaboration, despite the increasing adoption of co-teaching as a method for meeting the instructional and behavioural needs of diverse learners (Allday, Neilsen-Gatti, and Hudson 2013). Thus, these improvements in the teacher education programme would further enhance their attitudes and self-efficacy in implementing inclusive education in a collaborative way (Alsarawi and Sukonthaman 2023). At the same time, continued efforts are needed to develop close collaboration between universities and practicum schools so that pre-service teachers could practice what they have learnt in terms of the three-tiered support framework and multi-professional collaboration in their teaching practicum (Allsopp et al. 2006; Ulvik, Riese, and Roness 2018). Second, the results of this study confirmed that the concepts of knowing, doing, and being were closely associated with each other. While previous research (Allsopp et al. 2006; Wahlgren and Aarkrog 2021) has devoted much attention to bridging the knowing-doing gap, it is also important to strengthen pre-service teachers' beliefs and attitudes (i.e. being) in teacher education programmes before beginning teaching, which is a demanding profession. There has been an increasing amount of literature on pre – and in-service teachers' being, such as attitudes towards and beliefs in inclusive education (Forlin, Kawai, and Higuchi 2015; Sharma, Loreman, and Forlin 2012; Yada et al. 2021); however, a greater focus on how to connect knowing, doing and being could produce useful insights for developing the teaching profession. Furthermore, this research identified a pre-service teacher profile that is more negative towards the three-tiered support framework than multi-professional collaboration, which may be due to the novelty of the support framework. A reasonable approach to tackle this issue could be to place more emphasis on knowing, doing, and being with respect to the three-tiered support framework in teacher education programmes to ensure pre-service teachers are more familiar with it. Finally, according to the results, it seems possible that pre-service teachers who study to become subject teachers were less equipped to implement the three-tiered support framework and multi-professional collaboration. Since all kinds of teachers are required to implement inclusive education, ensuring appropriate training and support especially for pre-service teachers who become subject teachers should be a priority for teacher educators in the future.

Inclusive education appears to impose new demands on teachers, as well as on teacher education programmes, which have not yet adequately adapted to these evolving requirements. In Finland, although special education is a mandatory subject, the number of credits varies from 1 to 6 (Takala and Sirkko 2022), which might not be sufficient to adequately prepare pre-service teachers to effectively implement inclusive education. Greater efforts are needed to further study the perspectives and needs of pre-service teachers. A key policy priority should therefore be to plan and reform teacher education programmes to ensure the cultivation of resilient future teachers, regardless of the challenges they may face in their profession.

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Appendices

Conceptions of the Finnish three-tiered support framework (scale translated into English)

		1 Strongly disagree	2 Disagree	3 Disagree somewhat	4 Agree somewhat	5 Agree	6 Strongly agree
1.	Talking about problems is already a solution for problems in learning and school. (Note: coding reversed)	1	2	3	4	5	6
2.	Pedagogical assessment and knowledge gained from it is a central feature of framework of support, so that the knowledge can be used for modifications on instruction and support.	1	2	3	4	5	6
3.	A central feature of framework of support is systematical support.	1	2	3	4	5	6
4.	Support should be research-based only in special education services, not in regular teaching. (Note: coding reversed)	1	2	3	4	5	6
5.	A central feature of framework for support is following the effectiveness of support.	1	2	3	4	5	6
6.	One cannot simultaneously use principles of inclusion and evidence-based support. (Note: coding reversed)	1	2	3	4	5	6
7.	One may utilise principles of the framework of support in general support, intensified support and special support.	1	2	3	4	5	6
8.	It is important to recognise the learning styles of students, when planning evidence-based support and its implementation. (Note: coding reversed)	1	2	3	4	5	6
9.	It is possible to utilise the principles of the framework of support both in behavioural and learning-related situations.	1	2	3	4	5	6
10.	I know, how to use framework for support in upcoming teaching practice studies.	1	2	3	4	5	6
11.	I know, how to use framework for support in work of teacher.	1	2	3	4	5	6

Conceptions of future professional role as a teacher (scale translated into English)

		1 Strongly disagree	2 Disagree	3 Disagree somewhat	4 Agree somewhat	5 Agree	6 Strongly agree
1.	Classroom teacher needs to be able to give instruction to students receiving intensified or special support himself/herself alone. (Note: coding reversed)	1	2	3	4	5	6

(*Continued*)

Continued.

		1 Strongly disagree	2 Disagree	3 Disagree somewhat	4 Agree somewhat	5 Agree	6 Strongly agree
2.	It belongs to the profession of special needs teachers to consult other professionals with issues related to support.	1	2	3	4	5	6
3.	It belongs to the profession of special needs teachers to independently and alone assess the need for support and also implement the support. (Note: coding reversed)	1	2	3	4	5	6
4.	It belongs as a possibility to the subject teacher's role to give support according to the framework of support.	1	2	3	4	5	6
5.	The best-fitting professional role for me will be consultative.	1	2	3	4	5	6
6.	The best-fitting professional role for me will be co-teaching.	1	2	3	4	5	6
7.	The best-fitting professional role for me will be working independently.	1	2	3	4	5	6
8.	The best-fitting professional role for me will be working like an interventionist, according to the framework of evidence-based support.	1	2	3	4	5	6

Attitudes towards teachers' work as collaborative practices (scale translated into English)

		1 Strongly disagree	2 Disagree	3 Disagree somewhat	4 Agree somewhat	5 Agree	6 Strongly agree
1.	Multi-professional collaboration will be a central part of my future work as a teacher.	1	2	3	4	5	6
2.	Collaboration with the caregivers will be a central part of my future work as a teacher.	1	2	3	4	5	6
3.	The principles of evidence-based support well fit my future work as a teacher.	1	2	3	4	5	6
4.	It will be important to deal with all types of need for support regardless of type and amount of them in my future work as a teacher.	1	2	3	4	5	6
5.	I can consult my colleagues in questions related to support in my future work as a teacher.	1	2	3	4	5	6