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Taylor and Francis Ltd.
2022-12-31

Antinluoma, M, Ilomäki, L & Toom, A 2022, 'The involvement of teaching assistants in professional learning communities', Cogent Education, vol. 9, no. 1. https://doi.org/10.1080/2331186X.2022.2145811

http://hdl.handle.net/10138/354624
10.1080/2331186X.2022.2145811

Cogent Education

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/oaed20

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To cite this article: Markku Antinluoma, Liisa Ilomäki & Auli Toom (2022) The involvement of teaching assistants in professional learning communities, Cogent Education, 9:1, 2145811, DOI: 10.1080/2331186X.2022.2145811

To link to this article: https://doi.org/10.1080/2331186X.2022.2145811

Published online: 18 Nov 2022.

Antinluoma et al., *Cogent Education* (2022), 9: 2145811
https://doi.org/10.1080/2331186X.2022.2145811

cogent education

EDUCATIONAL LEADERSHIP & MANAGEMENT | RESEARCH ARTICLE

The involvement of teaching assistants in professional learning communities

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Received: 27 April 2022
Accepted: 07 November 2022

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Reviewing editor:
Timo Ehmke, Department of Education, Leuphana University of Lüneburg: Leuphana Universitat Luneburg, Germany

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Abstract: Teaching assistants (TAs) have a notable role in supporting individual students, groups, and classes in learning and in daily practices, both in mainstream and special education at the primary and secondary school levels. To enhance teaching assistants' learning, they should be integrated members of schools' professional learning communities. Despite this, most research about professional learning communities has concentrated on studying professional learning communities from teachers' and principals' perspectives. The purpose of this study was to identify how Finnish teaching assistants perceive their own and their schools' capacities. Teaching assistants' perceptions about personal capacities indicated that collaborative knowledge construction is regarded as a strength, including shared inquiry with teachers, and reflection of common and own practices. Perceptions about interpersonal capacities indicated that collaboration, shared values and vision, collective responsibility of student learning and shared practices with teachers are regarded as strengths. The dimensions of relationships and climate, including relationships based on trust and respect, were also reported as strengths. Within organizational capacities, structural conditions, such as participation, time allocation, professional development and in-service training and stimulating leadership have been reported as aspects that could be stronger from teaching assistants' perspectives. Methodologically, this study confirms the nature of professional learning community as a multidimensional and multilayer construct, with interrelated dimensions and capacities.

Subjects: Educational Research; Inclusion and Special Educational Needs; Primary/Elementary Education; School Leadership, Management &Administration; Classroom Practice; Continuing ProfessionalDevelopment

Keywords: professional learning community; learning organisation; teaching assistant; school leadership

1. Introduction

The construct of *professional learning communities* (hereafter PLCs) has been a widely applied strategy for teachers' professional learning and development (Turner et al., 2018). The evidence confirms that professional collaboration can lead to improved student achievement (Jones et al., 2013; Lomos et al., 2011) and contribute to the effectiveness of schools (Louis, Dretzke & Walstrom, 2010; Hofman et al., 2015). The focus of PLC is on professional learning, commitment, and involvement of all staff members and together they can enhance each other's learning and school development (Stoll et al., 2007). They can take collective responsibility for the learning and development of all students (Stoll et al., 2007). However, most of the research on PLCs has concentrated exclusively on principals and teachers, and thus ignored other staff members' involvement.

During recent decades, school systems in several countries have adapted to deliver more inclusive education (Haakma et al., 2021). In inclusive education, special support is provided in conjunction with mainstream education. While adapting more inclusive education, the number of Finnish students receiving intensified support has increased (Suomen virallinen tilasto (SVT), 2018). This has followed the need for extra educational support staff in schools. The number of teaching assistants has increased, and they have a notable role in supporting students in inclusive and special classrooms (Logan, 2006; Takala, 2007), but also in mainstream education at the primary and secondary school levels (Skipp & Hopwood, 2019). TAs may be deployed as whole-class TAs or in-class targeted TAs (students with special support; Sharples et al., 2016). The work of TAs aims to enhance student learning through supporting students in daily situations, in conducting tasks related to rehabilitation, and in their growth, psychological, physical, and social development. The UK study of TAs revealed that TAs are being deployed for diverse complex and interconnected tasks to support teaching and learning in mainstream primary and secondary schools (Skipp & Hopwood, 2019). Teaching assistants can contribute, among others, to instruction, behaviour management and student learning, if they collaborate with teachers and are involved in planning and evaluation (Svanbjörnsdóttir et al., 2016). TAs also may carry out other tasks, such as evidence gathering, target-setting, resource preparation, providing personal support for pupils with mobility issues or those requiring personal care and providing medical care (Skipp & Hopwood, 2019).

Similar trend in increased numbers of TAs has occurred in the US (Reddy et al., 2021) and in the UK, where TAs share of the overall state-funded school workforce is nearly 30% (DfE, 2018). Main reasons for increasing the number of TAs in the UK were to reduce teachers' workloads (Sharples et al., 2016) and improve adult-to-pupil ratios (Webster et al., 2011). In the Finnish context, the challenges to support student learning and daily practices, and lately negative effects of the COVID-19 pandemic on learning and on the wellbeing of students have influenced the need for extra support, and extra funding has therefore been granted by the Finnish government to hire teaching assistants (Ahtiainen et al., 2020).

The main purpose of this study was to develop an understanding of the involvement of teaching assistants (TAs) in PLCs through an examination of three capacities (personal, interpersonal, and organisational) from the Finnish teaching assistants' perspectives. This research has several reasonable grounds. First, TAs have been excluded in most of the PLC studies. Second, there is a significant number of teaching assistants in Finnish special and mainstream classrooms supporting students in collaboration with teachers. Third, to maximise the TAs' potential, they should be an integral group of all PLCs. Fourth, according to the Finnish core curriculum for basic education, Finnish schools should operate as learning communities and encourage all community members to individual and collective learning (The Finnish National Board of Education, FNBE, 2014). Fifth, the number of studies published during the last decade about the PLCs confirms that there is continuing global interest in studies about PLC (Bush, 2019). Studying PLCs is therefore constantly topical, and results can support schools' development as PLCs.

2. Theoretical background

2.1. PLCs as a strategy to improve instruction

The main aim in building PLCs is to enable staff to take collective responsibility for learning (Bush, 2019) and improve instruction, which may enhance student learning (Hofman et al., 2015; Lomos et al., 2011). This could be reached by developing the staff's capacity for professional learning. PLCs can also be a strategy for school and system improvement (Harris & Jones, 2017), which includes three overlapping approaches: the entire school forms a PLC; teams and groups within the school form a PLC; and a PLC is composed of teachers who network between schools.

Despite the consensus about the concept, the definitions of PLC vary (Sleegers et al., 2013). Researchers have applied a range of terminologies to conceptualise PLC (see, e.g., the review in

Antinluoma et al., 2021). Additionally, researchers have emphasised several dimensions of PLC as key dimensions, while others have considered these to be supportive conditions, and the supposed interrelatedness of dimensions and capacities has not been convincingly demonstrated (Sleegers et al., 2013).

In this study, we applied the following definition of a PLC: "an inclusive group of people, motivated by a shared vision, who support and work with each other, finding ways, inside and outside their immediate community, to enquire on their practice and together learn new and better approaches that will enhance all pupils' learning" (Stoll et al., 2006a, 5). We made this choice because the definition also covers support staff as members of PLCs. We consider teaching assistants to be integral members of PLCs, who directly support student learning.

The concept of a professional learning community and its implementation in practice face several challenges. Researchers employ different definitions, dimensions, and capacities to describe professional learning communities, which leads to conceptual unclarity and focus (Sleegers et al., 2013) and endanger its original meaning (DuFour, 2004). National and local policies and approaches may support or hinder establishing PLCs. Third, the structures of high schools, such as age-grading, subject-based, lesson to lesson structure, form barriers for development (Sims & Penny, 2015), stronger than at the primary school level. Fourth, schools as institutions are based on conventional practices, hierarchically formed relationships, hierarchies between staff members, old-fashioned work roles, and exclusive meeting policies (Sirkko et al., 2022). Fifth, establishing PLCs is a multi-year process with phases of formative and beginning, developing, and experimenting and summative and sustaining (Huffman et al., 2016), which are affected by changes in internal and external factors, such as staff turnover and resources.

We drew on the conceptual model presented by Sleegers et al. (2013). They described the PLCs to be a multidimensional construct (Sleegers et al., 2013) and they identified three levels of capacity building within PLCs: capacity at the personal, interpersonal, and organisational levels. The personal capacity concerns knowledge building and professional practice. Sleegers et al. (2013) found that the dimension of active and reflective construction of knowledge contributed strongest to personal capacity, both at teacher and school level. The interpersonal capacity consists of building of values and norms, encouraging experimentation and critical analysis, which support both individual and collective learning. The organisational capacity, like structures, systems, and relationships, provides conditions, which support educational practices. These three capacities consist of eight underlying dimensions. Personal capacities consist of active and reflective construction of knowledge and of currency, which is described as teachers' personal capacity of applying scholarly knowledge and best practices. Interpersonal capacity consists of shared values and vision, collective learning, and shared practice. Organisational capacity consists of stimulating and participative leadership, relationships and climate, and resources, structures, and systems.

2.2. Teaching assistants as members of the professional learning community

The educational structures, legislation, occupational titles, and roles of support staff differ across countries and even within countries. In general, teaching assistants (TAs) are professionals who contribute directly to learning and work with teachers and other staff members (Bolam et al., 2005). TAs' duties have developed in different directions (Zhao et al., 2021) in different countries. Various titles are used internationally: teacher assistant, teaching assistant (Haakma et al., 2021), education assistant, educational assistant (Freer, 2018), paraprofessional (Zhao et al., 2021), special needs assistant (Zhao et al., 2021), inclusion support assistant (Zhao et al., 2021), learning support teachers (Mulholland & O'Connor, 2016), teacher aides (Andersen et al., 2020), and classroom assistants (O'Connor et al., 2021).

TAs have traditionally been a supplementary workforce, affected by the economy (Eskelinen & Lundbom, 2016), by the supply and demand culture (O'Connor et al., 2021), with low salaries and

short-term appointments (Takala, 2007). When the economy has been growing, TAs have been employed and during recessions, only TAs required by laws and acts have been employed. They have been regarded as an economical way of improving learning. Despite low salaries and uncertain employment, they have gradually become a necessary group of professionals necessary for providing education (Eskelinen & Lundbom, 2016) and a constituent part of the professional teams in schools (O'Connor et al., 2021). They play an important role in supporting students with disabilities, economic disadvantages, who speak a non-dominant language, or are otherwise considered to be at-risk (Chopra & Giangreco, 2019).

Deviations of equality between school staff members exist regarding duties and positions based on education acts, differing qualifications, responsibilities, and collective agreements. Sirkko et al. (2022) stated that diverse constructs and claims may support or hinder inclusion or exclusion. According to studies, TAs have reported to be undervalued, underpaid, and mistrusted by other professionals (Chopra et al. 2004). If TAs don't have opportunities to participate in staff meetings, planning meetings with teachers or are not involved in teams, they may feel excluded from the community and don't experience cohesion and are not able to integrate into the community, affect and participate in the development of PLC. The relation between TAs and PLCs is reciprocal: support staff contribute to student learning, but they also influence PLC, and PLC impact them (Bolam et al., 2005). In PLCs, staff learn work-embedded, besides other forms of informal and formal learning, in collaboration through collaborative knowledge building and from experience (Hargreaves & Fullan, 2012). To involve TAs in PLCs would be a message of accepting their professionalism and to be regarded as autonomous subjects and not as hierarchically controlled resources (Freidson, 2001). In Finnish context, the professional position of TAs has been strengthened and clarified and TAs have reported that teachers value their work, principals value somewhat, but administration and decision makers do not (Eskelinen & Lundbom, 2016). According to a study about TAs' sense of belonging (Sirkko et al., 2022) schools have traditional practices with hierarchically formed relationships, old-fashioned work roles and exclusive meeting policies. Sirkko et al. (2022) concluded that structural inequalities exist within school communities.

Research on the TAs has been mostly related to special education and especially to inclusion (; Chopra & Giangreco, 2019; Giangreco, 2010, 2013, 2021; Giangreco & Doyle, 2007; Mulholland & O'Connor, 2016). Other studies have concerned the deployment and impact of support staff (Blatchford et al., 2012), TAs' qualifications and training (Butt, 2017), employment procedures and practices (Butt, 2016), and the effects on student learning (Andersen et al., 2020). Andersen et al. (2020) found larger positive effects of TAs on learning for students of colour and students in high-poverty schools. TAs, whether they had a teaching degree or not, had positive impacts on learning, and assistants were impactful when sharing instructional responsibility for the classroom (Andersen et al., 2020). Zhao et al. (2021) found that the contribution of special needs assistants was highly valued by education stakeholders. In accordance, Jardí et al. (2021) found that it was important in having more than one adult in a classroom to manage quality, reciprocity and to avoid excessive responsibility delegation. Bolam et al. (2005) indicated that support staff contributed to student learning and to PLC, and PLC impacted them.

It has been questioned why less qualified professionals work often with the most challenging and vulnerable student population (Freer, 2018; Giangreco, 2010) and why it can be problematic to emphasise their central role in delivering inclusive education (Giangreco, 2021). To develop their utilisation, TAs should be part of the extended learning team and the team collaboration between teachers should be improved (Takala, 2007). The successful work of assistants contains planning of practices and of student learning with teachers (Blatchford et al., 2012) and all should understand the aims of and their own role in the educational process (Takala, 2007, p. 55).

2.3. Teaching assistants in Finnish education

In 2018, there were13657 TAs in Finnish schools, and most of them were working in comprehensive schools and at lower-class levels (Tilastokeskus, 2019). The number of TAs was significant compared to the number of 40895) comprehensive schoolteachers (SVT, 2020). Local education

providers can decide how widely students support rely on TAs, except in cases when according to the acts, a student is obliged to receive support from a TA. Thus, there are differences between the legislated levels in educational policies and in the number of TAs. Some legislative providers have chosen to rely more on teachers. Finnish TAs title and duties may vary, and they are employed to all school levels (Takala, 2016).

The three qualifying vocational qualifications for a TA's work are a vocational qualification in social and health care, a further vocational qualification in education and guidance, and specialist vocational qualification in education and guidance. The basic requirements to be accepted into TAs' training are vocation-specific health requirements, age at least 18 years, completed vocational basic qualification or higher secondary school studies or 3 years' working history. Applicants are invited, based on their application, to interview, and to a suitability test. Studies in vocational qualification in education and guidance programme cover following themes: instructing student and students' learning; responding to the need of support in the environment of learning and guidance; instructing morning and afternoon activities and optional studies, such as visual expression in education and guiding, supporting learning of basic skills in Finnish literacy. Finnish teaching assistants' tasks and needed expertise differ according to school setting (mainstream-special education), students' profiles and students' ages. TAs' training programmes include knowledge and skills of their working environment (e.g., relevant laws and service systems in the society) and how to support children's growth and support functional ability, and how to guide learning, e.g., basics of reading and writing difficulties, disturbance of attention, sensory disabilities, and various rehabilitation principles and how to support functional ability (Mäensivu et al., 2012). TA training covers skills in hygiene, first aid, communication and ICT, and knowledge of the common illnesses.

The duties of TAs are authorised by the Basic Education Act (628/1998). The main difference within jurisdictions between principals, teachers, and TAs is that principals and teachers can exercise the power of government officials, which includes student evaluation and disciplinary actions (Finnish National Agency for Education, 2021). Additionally, the collective agreements differ, which influences salaries, working hours, power, responsibilities, and obligation for in-service training. Finnish principals and teachers' responsibility for learning and for their student groups during school days can't be shared or divided. If a TA works as a substitute teacher, then the TA follows the teacher's collective agreement, should be paid according to it, and has the teacher's duties and responsibilities.

Students' educational support is divided into three stages and is described as three-tier support: general, intensified, and special support. Children with a need for special support must be provided with the TAs' support for free (Basic Education Act 628/1998). In 2020, 21% of Finnish basic education students received intensified or special support and this percentage has been increasing since 2011 (SVT, 2021). About 37% of students with intensified support status and 57% of students with special support status received support from TAs, in addition to other forms of support (SVT, 2021). Teaching assistants support students in accordance with teachers' and experts' instructions and when needed, participate in the planning of support (The Finnish National Agency for Education, 2010b). TAs are supposed to be part of the extended learning teams, participate in multi-professional cooperation, in-service training, and in staff meetings (Eskelinen & Lundbom, 2016; Takala, 2007). TAs in Finland work with teachers at all school levels, and they are part of the extended learning teams (Takala, 2007). In the Finnish context, TAs are also considered to be a general resource for schools and classes (Eskelinen & Lundbom, 2016).

Despite TAs having been employed since the 1960s (Eskelinen & Lundbom, 2016) and the large number of TAs, there have been few studies in Finland about teaching assistants. Takala (2007) has studied the content of assistants' work. Mäensivu et al. (2012) described the perceptions of assistants on their education, professional competence, the content, the significance of their work, and the further development of their role. Eskelinen and Lundbom (2016) concentrated on

studying TA positions from a social and economic perspective. Paju et al. (2021) studied the teaching staff's collaboration practices in inclusive education.

3. The aim of the study

3.1. Research questions

The main aim of this study was to investigate teaching assistants' perceptions about their schools' professional learning communities through personal, interpersonal, and organisational capacities and their underlying dimensions. In accordance with this, we set out to identify the strengths of professional learning communities and identify aspects that could be stronger from the teaching assistants' perspectives.

Our methodological sub-aim concerns the nature of PLC as a multidimensional construct. We tested the hypothesis that the interrelatedness of different capacities and dimensions within PLC can be assessed with the instrument adjusted for teaching assistants.

This research seeks to address the following questions:

(1) How do TAs perceive personal, interpersonal, and organisational capacities of PLCs?

(2) How are TAs' perceptions affected by contextual factors?

4. Materials and methods

4.1. The context

This study was conducted with TAs from two cities in the south of Finland. These cities had the population of 50619 (City A) and 14745 (City B), while the average size of cities in Finland was 17851 (AFLRA, 2021). These two cities had 22 primary schools, two comprehensive schools and three lower secondary schools. Eight primary schools had fewer than 100 students, and the smallest one had about 35 students. The lower secondary schools gather primary school students together and thus they form bigger units. The number of TAs varies according to school size. The smallest schools can have only one TA, while the largest schools may have between five and ten. Data collection took place between September and October 2021.

4.2. Participants

The participants (N = 53) were from City A and from City B, and the response rates from the TAs in these cities were 47% (34 of 72) and 38% (19 of 50), respectively. One biased response was deleted. The average age of participants was 48 years and 76% were aged 45 years or older, while nationally 70% of TAs were 35 years or older in 2018 (SVT, 2020). Of the Tas, 13% had no qualification for TAs work. Forty-six (87%) of the TAs reported working short periods as substitute teachers. TAs (n = 11) reported supporting students with languages other than Finnish or Swedish (the official languages of Finland). Among these languages were Russian, English, Ukrainian, Albanian, and sign language. Seventeen (32%) TAs reported having formal education other than that required to be a TA. Among these were commercial education, restaurant business education, high school education, and overseas teacher education. The detailed characteristics of participants are presented in Table 1.

City officials granted research permission for the study. The principals and TAs were informed about the study. The research introduction, the questionnaire link, and reminder messages were distributed to all TAs from the two cities with the Wilma web interface, which is used for staff communication. The questionnaire was distributed by city administrators to all TAs. The participation in this research was voluntary for TAs, and they gave personal consent for their participation. The research has been conducted according to the guidelines for the responsible conduct of research (Finnish Advisory Board on Research Integrity, 2013). Participants were coded, and responses were given anonymously.

Table 1. Characteristics of participants

	Characteristics	N	%
Education	Vocational Qualification in Social and Health Care	11	21
	Further Vocational Qualification in Education and Guidance	30	57
	Specialist Vocational Qualification in Education and Guidance	5	9
	No qualification to be a TA	7	13
	Total	53	100
Experience as TA (years)	0–5 years	16	30
	6–10 years	13	25
	11–15 years	5	9
	16–20 years	10	19
	21 or more	9	17
	Total	53	100
Current employment	Permanent	39	74
	A contract of definite duration	14	26
	Total	53	100
School level	Primary school	38	72
	Lower secondary school	9	17
	Comprehensive school	6	11
	Total	53	100
Class forms	Mainstream classes	36	68
	Special education classes	12	23
	Both	5	9
	Total	53	100
Supporting students	In one specific class	15	28
	In diverse classes	35	66
	As personal assistant for specific student	3	6
	Total	53	100

4.3. The measures

The data for the study were collected with a teacher questionnaire (Sleegers et al., 2013) which was modified for TAs. The questionnaire assesses PLCs according to three capacities and eight underlying dimensions, as described earlier. This instrument was chosen because findings supported the idea of the nature of a PLC as a multidimensional and multilevel concept (Sleegers et al., 2013) and it encompasses well the characteristics of PLCs presented in the literature (Antinluoma et al., 2021; Sleegers et al., 2013). The questionnaire was translated into Finnish. Second, the translated version was modified through several iterations by the authors. We have reformulated items to cover TAs and teachers together, as this dualism reflects the current understanding and aims of TAs working with teachers. We used the term school leaders rather than referring to one school leader because leadership is distributed and shared in PLCs, and therefore, an assistant or vice-principal can be the leader, who leads TAs' work independently or with the principal. Third, the face validity, appropriateness and relevance of the questionnaire content and its items to the context (Holden, 2010), was reviewed by two principals and by two

TAs with each having 20 years' experience as a TA. Small improvements in wording and in the terms used were conducted to make items more comprehensible. The original questionnaire consisted of 42 items, the revised consisted first of 50 items, but the final version consisted of 46 items (Appendix). Personal capacities consisted of two dimensions and six items, interpersonal capacities consisted of three dimensions and 11 items, and organisational capacities consisted of three dimensions and 29 items. Four items were deleted to reach acceptable model fit with confirmatory factor analysis (CFA). The model is presented in the results section. A 5-point Likert scale (strongly agree, agree, neither agree nor disagree, disagree, and strongly disagree) was used, because the 5-scale has been found to be user-friendly and to provide acceptable levels of reliability (Dillman et al., 2014).

4.4. Data analysis

The survey was administered with Qualtrics XM software, and the data were transferred and analysed with SPSS 27 and AMOS 28 software. There were no missing data to handle, but the answers of one participant were biased and thus deleted. The following analyses were conducted with the data of 53 cases: descriptive statistics, the coefficient of internal consistency reliability of the measures and Pearson's correlation coefficient. Differences in perceptions of TAs in terms of background variables were analysed by comparing groups with Mann-Whitney's U-test. Additionally, to test the construct, the data were analysed with CFA, which is one form of structural equation modelling (Cheung, 2015). Sum variables of dimensions were computed, and CFA was conducted with formed capacities (sum variables) to latent factor (PLC). CFA enables confirmation of the factor structure of observed and latent variables, and thus to confirm or reject the theoretically designed construct. These analyses are presented in the following.

First, the coefficient of internal consistency reliability of the measures was analysed (Table 2). This measure can be used to study how closely sets of items are related within dimensions. The analysis indicated values of alpha ranging from 0.72 to 0.95 which represents an acceptable level of internal consistency in the measures (Tavakol & Dennick, 2011).

Second, Pearson's bivariate scale correlation coefficient between capacities was analysed. There were positive and significant correlations between the capacities: personal and interpersonal (r = .823, N = 53, P = <.001), personal and organisational (r = .665, N = 53, P = <.001), and between interpersonal and organisational (r = .761, N = 53, p = <.001). Correlations were significant at the 0.01 level. Personal and interpersonal, and interpersonal and organisational capacities have a strong positive correlation, while personal and organisational capacities have a good positive correlation.

Third, the confirmatory factor analysis was conducted to test the construct, because the model was theory driven. Factor loadings of items to its dimension ranged from 0.19 to 0.84. Comrey and Lee (1992) have suggested that loadings greater than .70 can consider to be excellent, .63 very good, .55 good, .45 fair, and .32 poor. According to DiStefano and Hess (2005), these criteria may provide a rough guideline for CFA studies. All items lower than .45 were removed from the construct. The final construct had an average factor loading value of 0.64 (Appendix): 20 factor loadings were excellent, nine were very good, four were good and nine were fair. The confirmatory factor analysis was conducted between dimensions and capacities, and the factor loadings and correlations are presented in Figure 1.

Factor loadings from dimensions to its capacity ranged from 0.61 to 0.89. The loadings between personal and interpersonal capacities were 1.00 between personal and organisational capacities 0.78 and between organisational and interpersonal capacities 0.87. The final confirmatory factor analysis model showed adequate model fit 19,254/16 = 1.203.; CFI .99; TLI .98; RMSEA .063 (with 90% C.I.: .000—.149; SRMR: .04). CMIN/DF <3 indicates an acceptable fit between the hypothetical model and sample data (Kline, 1998). A model indicates acceptable fit when the CFI (comparative fit index) value is ≥.90, TLI (Tucker-Lewis fit index) value is ≥.95, SRMR (standardised root mean

Table 2. Reliability of the measures

Capacities	*N of items*	*N*	*M*	*SD*	*α*
Personal capacities					
Active and reflective construction of knowledge	5	53	19.17	3.3	.732
Currency	4	53	12.96	3.0	.703
Interpersonal capacities					
Shared values and vision	6	53	22.57	4.1	.733
Collective learning	5	53	18.30	3.3	.709
Shared practices	4	53	14.13	2.9	.718
Organisational capacities					
Supportive sources, structures, and systems	12	53	37.42	9.4	.882
Relationship and climate	8	53	31.72	5.4	.875
Stimulating and participative leadership	14	53	47.64	10.9	.943

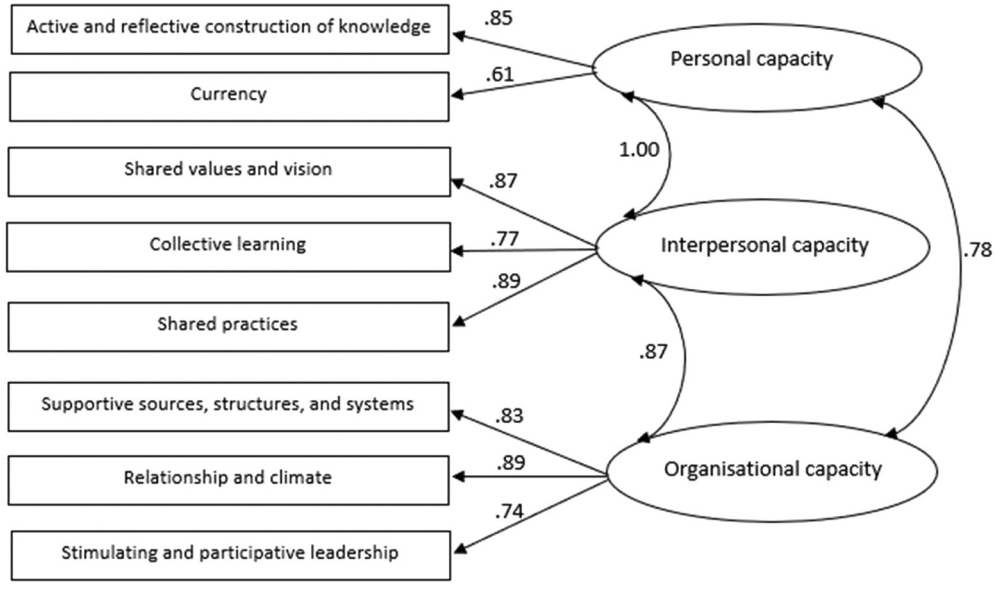


Figure 1. Structural model: factor loadings of dimensions and factor correlations between capacities.

residual) is below .05 and the RMSEA (root mean square error of approximation) value is between 0.05 and 0.08. Therefore, values of analysis indicate an acceptable model fit. This model fit was reached by allowing for one correlation between measurement errors. We also computed sum variables of dimensions and conducted factor analysis of formed capacities (sum variables) to the

Figure 2. Factor loadings to latent variable.

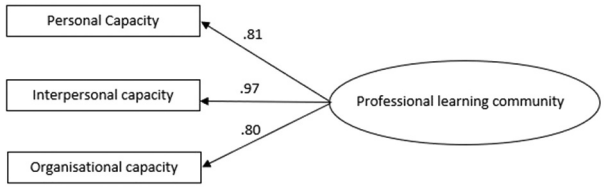
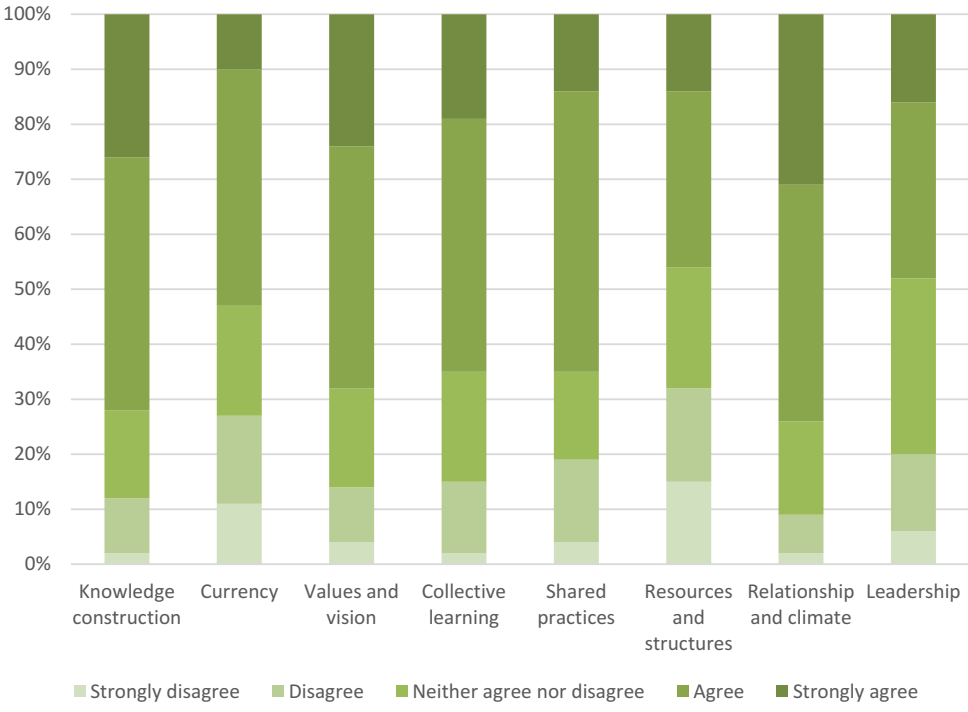


Figure 3. Distribution of frequencies by dimensions (%).



latent factor (PLC). We also computed sum variables of dimensions and conducted factor analysis of formed capacities (sum variables) to the latent factor (PLC; Figure 2).

We can conclude that high positive factor correlations between capacities and acceptable factor loadings to dimensions confirmed the structural model of PLC as a multidimensional construct with interrelated dimensions and capacities.

5. Results

5.1. The main strengths and challenges in the capacities and dimensions of PLCs from the teaching assistants' perspectives

The first aim of the study was to identify strengths and challenges in the personal, interpersonal, and organisational capacities of PLCs from TAs' perspectives. The data informed how capacities and dimensions perceived by TAs contributed to the PLC. The analysis indicated that the interpersonal capacity contributes strongest to PLC and equally strongly personal and organisational capacities. This study confirmed Sleegers et al.'s (2013) finding that active and reflective construction of knowledge contributes strongest to personal capacity. The dimension of relationship and climate and the dimension of supportive sources, structures, and systems were identified as strong contributors to the organisational capacity. The dimensions of shared values and vision, collective

learning, and shared practices contributed strongly to interpersonal capacity. TAs perceived that stimulating and participative leadership contributed least to the organisational capacity.

The results from the Cities A and B are first presented together, followed later by statistically significant differences between cities. We regarded responses to an item as a strength for positive responses of 70% or higher (agree or strongly agree). Distribution of frequencies by dimensions is

Table 3. The strengths of the PLCs from the teaching assistants' perspectives

Capacities and dimensions	Items	% of agree and strongly agree responses
Personal capacity		
The dimension of knowledge construction	We search with teachers for better ways of doing things.	77%
	We think with teachers about what is working and what's not.	76%
	I reflect on my professional practice.	87%
Interpersonal capacity		
The dimension of values and vision	I am aware of the school's vision and values.	85%
	With teachers we take collective responsibility for student learning.	81%
	We share ideas about how to facilitate student learning with teachers.	77%
The dimension of collective learning	We collaborate with TAs and teachers to help students to solve problems.	79%
The dimension of shared practices	We share ideas, and suggestions for improving student learning and support informally with teachers.	75%
	We discuss student work to improve classroom practices with teachers.	83%
Organisational capacity		
The dimension of resources, structures, and systems	Communication systems promote a flow of information among the staff.	72%
	Appropriate tools, materials, ICT and other technology are available to me.	76%
The dimension of schools' relationships and climate	Caring relationships between staff are built on trust and respect.	72%
	Caring relationships between staff and students are built on trust and respect.	87%
	We are willing to talk to each other about each other's professional practice.	69%
	I discuss support for students' learning and "school going" with teachers.	81%
	My work as TA is respected by the staff.	69%
The dimension of stimulating and participative leadership	The school leader is aware of TAs' competencies and expertise.	79%

Table 4. The challenges of the PLCs from the teaching assistants' perspectives

Capacities and dimensions	Items	% of agree or strongly agree responses
Personal capacity		
Currency	We are informed about good practices by other schools.	13%
Interpersonal capacity		
The dimension of shared practices	I am involved in various forms of social network interaction in support of professional learning.	38%
Organisational capacity		
The dimension of resources, structures, and systems	There are sufficient opportunities for professional development.	43%
	I participate in staff meetings.	21%
	I participate in multi-professional meetings at which we plan and evaluate support for students.	38%
	TAs are members of the school's professional teams	43%
	As a TA, I have sufficient opportunities for in-service training.	34%
	The school's schedule promotes collective learning and shared practice	53%
	Some of my working hours have been allocated to the collective learning and shared practice of the staff.	33%
The dimension of stimulating and participative leadership	The school leader treats all individuals or groups impartially.	49%
	The school leader stimulates me to think about my work supporting students.	32%
	The school leader encourages me to develop individual professional growth goals.	31%
	The school leader is a source of new ideas for my professional learning.	25%
	The school leader encourages me to try new things in line with my interests.	43%
	The school leader involves TAs in innovations.	35%

presented in Figure 3. Percentages of 55% or lower percentages of agree or strongly agree responses to an item were regarded as challenges.

The strengths in capacities of the PLCs from the TAs' perspectives are presented in Table 3 and challenges in Table 4.

5.2. Conceptual factors' effect on Tas' perceptions

Differences in the perceptions of TAs in terms of background variables were compared by using Mann-Whitney's U-test. The results are presented in Table 5.

Table 5. Differences in perceptions of TAs in terms of background variables

Variables	Group (N)	Md	Mean Rank	Z	Sig
Differences between cities					
Organisational capacity	City B (19)	3.3	20.50	−2.263	.024
	City A (34)	3.7	30.59		
Supportive sources, structures, and systems	City B (19)	2.6	19.42	−3.055	0.002
	City A (34)	3.6	31.84		
Communication systems promote a flow of information among the staff	City B (19)	3.0	19.42	−2.891	0.004
	City A (34)	4.0	31.21		
The school's schedule promotes collective learning and shared practice	City B (19)	3.0	18.32	−3.199	0.001
	City A (34)	4.0	31.85		
The school leader takes TAs' opinions into consideration	City B (19)	3.0	21.29	−2.145	0.032
	City A (34)	4.0	30.19		
Differences between mainstream and special education					
TAs participation in multi-professional meetings	TAs in mainstream classes (36)	1.0	20.68	−3.432	.001
	TAs in special education classes (12)	4.0	35.96		
TAs participation in parents' meetings	TAs in mainstream classes (36)	1.5	20.53	−3.560	.001
	TAs in special education classes (12)	3.5	36.42		
Sufficient possibilities for in-service training.	TAs in mainstream classes (36)	3.0	21.54	−2.609	.009
	TAs in special education classes (12)	4.0	33.38		

(*Continued*)

Table 5. (*Continued*)

Variables	Group (N)	Md	Mean Rank	Z	Sig
Differences according to experience					
Teachers value TAs' initiatives to develop instruction	0–5 years working experience as TA (16)	3.0	10.69	−2.520	.012
	16–20 years working experience as a TA (10)	4.0	18.00		
TAs work is valued among the staff	0–5 years working experience as a TA (16)	4.0	10.69	−2.573	.010
	16–20 years working experience as a TA (10)	4.5	18.00		
Caring relationships between staff are built on trust and respect.	0–5 years working experience as a TA (16)	3.5	10.78	−2.402	.016
	16–20 years working experience as TA (10)	5.0	17.85		
Other differences					
Personal capacity	TAs who don't work as substitute teachers (7)	3.3	14.36	−2.345	.019
	TAs who worked as substitute teachers (47)	4.0	28.92		
My work as a TA is respected by the staff.	TAs with a contract for definite duration (14)	3.0	18.11	−2.661	.008
	TAs with permanent contract (39)	4.0	30.19		

The results indicate that TAs, who work in special education classes participate more in diverse meetings than those working in mainstream classes, and they also perceive having sufficient in-service training possibilities. Experienced TAs report that their work and initiatives to develop instruction are valued. Results confirm that working as a substitute teacher contributed to personal capacity.

6. Discussion

The first purpose of this study was to identify how do TAs perceive personal, interpersonal, and organisational capacities of PLCs. TAs perceived that there were some aspects of strength within all capacities. Within personal capacity, they scored high in reflecting practices and experiences with teachers and reflecting on their own practices. This study confirmed that active and reflective construction of

knowledge contributes strongest to personal capacity (Sleegers et al., 2013) Responses to interpersonal capacity indicated that dimensions of values and vision and sharing of practices were aspects of strength. TAs reported that the dimension of relationships and climate was a strong contributor to organisational capacity. These findings were compatible with results from earlier studies about Finnish teachers' and principals' perceptions about PLCs (Antinluoma et al., 2018, 2021), which indicated high levels of collegiality, trust, and commitment and professional collaboration in schools with readiness as PLCs. These findings are positive because trust is regarded as backbone of PLCs (Hargreaves, 2007), and teachers' and principals' trust and appreciation contribute most to TAs' sense of belonging (Sirkko et al., 2022). Despite these positive findings, half of the participants reported that not all individuals or groups are treated impartially. These results resemble those reported by Sirkko et al. (2022): TA stories included experiences of undervaluing and exclusion from the community by teachers or even principals.

TA perceptions indicated challenges within all capacities. Within the organisational capacity, structural conditions and stimulating leadership have been reported as dimensions which could be stronger. A significant number of TAs reported that they do not participate in staff meetings nor in multi-professional meetings in which student support is planned and evaluated and that working hours have not been allocated for planning the learning support. Study confirmed that schools have exclusive meeting policies and structural inequalities, which are based on schools' traditional practices, hierarchically formed relationships, old-fashioned work roles, and exclusive meeting policies (Sirkko et al., 2022). These organisational challenges are maintained by education providers' solutions, which set TAs' work often as part-time and working hours are allocated according to the students' lessons. In practice, finding time for collaboration is challenging if TAs support students in several classes and should collaborate with several teachers. These challenges lead to ad hoc planning, situational cooperation, and limited professional development opportunities (Mulholland & O'Connor, 2016) and to sense of not belonging (Sirkko et al., 2022). We agree that there is a need to improve organisational capacity to secure continuous reflective communication among staff (Paju et al., 2021). TAs report that offering sufficient opportunities for professional development or in-service training are additional organisational challenges. While Finnish teachers reported that professional growth was systematic, and on-going component of school improvement efforts (Antinluoma et al., 2018), a significant number of TAs reported contrary opinions.

About one-third of TAs reported that the stimulating and participative leadership contributes least to the organisational capacity, which indicates that leaders don't succeed well in encouraging and involving leadership, even though leaders have succeeded in promoting learning focused collaborative cultures, and supportive relationships and climate. This indicates that the school leaders might be distant from the work of individual TAs. We argue that deeper inclusion of TAs in school PLCs and more effective use of teacher assistant resources demands strengthening of leadership roles by vice or assistant principals, by grade team leaders or by teachers. Also, clear definitions of roles and responsibilities would enhance the collaboration (cf. Takala, 2007). We support the suggestion that the role of the teacher as an accountable instructor and manager of classroom activities needs to be clarified. Resources, time, and compensation should be reserved for those who lead and coordinate TAs' work.

The second purpose of the study concerned how TAs' perceptions are affected by contextual factors. Analysis indicated some differences between the two cities in the organisational capacities, especially in the dimension of supportive sources, structures, and systems, for the larger city's favour. Communication systems were reported to promote flow of information among the staff more in larger city. Similarly, the school's schedules promote collective learning and shared practice staff more in larger city. Generally, capacities and dimensions were scored similarly. This indicates similar strengths and challenges, thus about equal quality of TA inclusion in PLCs between participant cities. Obvious differences were found between school levels and between mainstream and special education. TAs working in special education classes participate more in meetings with stakeholders and are offered more in-service opportunities.

Methodologically, we could confirm acceptable levels of internal consistencies within eight dimensions and thus the set of items within these dimensions were closely related and measured the same construct

(capacity). Significant correlation coefficients were found between capacities and confirmed positive correlation. These analyses indicated consistency of dimensions and interrelatedness of capacities in the model. Our main concern was the small sample size. Wolf et al. (2013) found a range of sample size requirements when they analysed data sets from 30 to 460 cases. The sample size requirements depended on numbers of factors, numbers of indicators of a factor, level of factor loadings and correlations, and missing data. They found that sample size requirements decreased when the number of indicators of a factor increased and sample sizes of 30 cases or more can be analysed successfully with CFA under certain conditions. In our case, several conditions were met, including no missing data, about normal distribution within capacities, and 6–12 indicators of a factor. Despite certain challenges, an acceptable model fit was reached. However, with a small sample size, the unbalance in the number of indicators of a factor and few low factor loadings, caution must be applied, as the results might not be generalised. We suggest further development of items and testing the model with larger samples. Additionally, we suggest developing theory-based PLC questionnaires suitable for all staff members who are directly supporting students' learning. There are several limitations of using perception surveys, which measure respondents' beliefs, thoughts, or feelings (Hilker & Kangas, 2011). The evidence that perception surveys generate is perceptions of participants from their varying context and not replaces the facts (Herbert, 2013). More complete evidence of TAs' involvement in PLCs could be reached by triangulating data, gathering non-survey and non-perception data (Hilker & Kangas, 2011).

7. Conclusion

The PLC is described as an inclusive group of people collaborating internally and externally by inquiring practices, learning together, and focusing on improving student learning (Stoll et al., 2007). Regardless of the idea of inclusiveness, studies about PLCs have ignored TAs' involvement, while at the same time building PLCs has been regarded effective approach for teachers professional learning and development and school improvement (Turner et al., 2018; Watson, 2014). Research, schools, students, and staff members could benefit from taking more inclusive perspective on TAs' membership and work. Perceptions of TAs indicted that several interpersonal and organisational capacities of professional learning communities are present in participants' schools and in TAs work, such as collective learning, shared practices, supporting relationships and climate. This study confirmed challenges within organisational capacity, such as structural inequalities, lack of collaboration time and defects in stimulating and participative leadership. To enhance TAs inclusion and professional learning in PLCs requires at school-level strengthening of leadership, clarification of roles, questioning existing practices, providing training opportunities, and making structural changes (see also Sharples et al., 2016). Additionally, national and local contracts and claims concerning TAs should be examined and improved. Finally, it must be acknowledged that external support, networks, training, and inspiration are needed to develop PLCs and all member capacities, because the expertise within schools might be limited to solve diverse and exceptional challenges, which students face in their learning and in daily practices.

Funding
The authors received no direct funding for this research.

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Disclosure statement
No potential conflict of interest was reported by the author(s).

Data availability statement
The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation, to any qualified researcher. The datasets are available on request.

Citation information
Cite this article as: The involvement of teaching assistants in professional learning communities, Markku Antinluoma, Liisa Ilomäki & Auli Toom, *Cogent Education* (2022), 9: 2145811.

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Appendix

The capacities, dimensions and statements, means, medians, modes, standard deviations, variances, frequencies and percentages of scales, and factor loadings

Note. Scaling for all items was (1) Strongly disagree (2) disagree (3) Neither agree nor disagree (4) (5) Strongly agree.

				F (%)					
Capacities, dimensions, and items	***N***	***M***	***SD***	***1***	***2***	***3***	***4***	***5***	***factor loading***
Personal capacity									
Active and reflective construction of knowledge									
1. We search with teachers for better ways of doing things.	53	4.0	.93	-	5 (9%)	8 (15%)	23 (45%)	17 (32%)	.89
2. We think with teachers about what is working and what is not.	53	4.0	1.0	1 (2%)	5 (9%)	7 (13%)	22 (42%)	18 (34%)	.87
3. We consider with teachers how my practices affect students.	53	3.5	1.0	3 (6%)	5 (9%)	15 (28%)	24 (45%)	6 (11%)	.75
4. I reflect on my professional practice.	53	4.2	.69	-	-	7 (13%)	27 (51%)	19 (36%)	.48
				4 (2%)	15 (7%)	32 (15%)	96 (45%)	60 (28%)	.75
Currency									
1. We are informed about good practices from other schools.	53	2.3	.98	13 (26%)	21 (40%)	12 (23%)	7 (13%)	-	.59
2. We share information with teachers about good practices.	53	3.4	1.1	6 (11%)	4 (8%)	13 (26%)	24 (45%)	6 (11%)	.46
				19 (18%)	25 (24%)	25 (24%)	31 (29%)	6 (5%)	.52
Interpersonal capacity									

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(*Continued*)

				F (%)					
Capacities, dimensions, and items	***N***	***M***	***SD***	***1***	***2***	***3***	***4***	***5***	***factor loading***
Shared values and vision									
1. I am aware of the school's vision and values.	53	4.1	.79	-	3 (6%)	5 (9%)	29 (55%)	16 (30%)	.52
2. Decisions are made in line with the school's values and vision.	53	3.6	1.0	2 (4%)	5 (9%)	16 (30%)	20 (38%	10 (19%)	.47
3. We take collective responsibility for student learning with teachers.	53	4.1	.85	1 (2%)	1 (2%)	8 (15%)	26 (49%)	17 (32%)	.81
4. We share ideas about how to facilitate student learning with teachers.	53	4.0	1.0	1 (2%)	5 (9%)	6 (11%)	23 (43%)	18 (34%)	.86
				4 (2%)	14 (7%)	35 (15%)	98 (46%)	61 (28%)	.65
Collective learning									
1. Teachers and TAs work together to acquire and apply new knowledge, skills, and strategies.	53	3.2	1.1	4 (8%)	10 (19%)	15 (28%)	19 (36%)	5 (9%)	.69
2. We collaborate with TAs and teachers to help students to solve problems.	53	4.0	.85	1 (2%)	1 (2%)	9 (17%)	26 (49%)	16 (30%)	.71
3. We are engaged with teachers in a professional dialogue in which different ideas are examined.	53	3.6	1.1	1 (2%)	9 (17%)	10 (19%)	21 (40%)	12 (23%)	.79
				6 (4%)	20 (13%)	34 (20%)	66 (42%)	33 (21%)	.73
Shared practices									

(*Continued*)

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(Continued)

				F (%)					
Capacities, dimensions, and items	***N***	***M***	***SD***	***1***	***2***	***3***	***4***	***5***	***factor loading***
1. We share informally ideas, and suggestions for improving student learning and support with teachers.	53	3.8	.86	1 (2%)	4 (8%)	8 (15%)	32 (60%)	8 (15%)	.63
2. We discuss with teachers about student work to improve classroom practices.	53	3.9	.84	1 (2%)	3 (6%)	5 (9%)	33 (62%)	11 (21%)	.71
3. I am involved in various forms of social network interaction in support of professional learning.	53	2.9	1.1	5 (9%)	17 (32%)	11 (21%)	17 (32%)	3 (6%)	.47
4. Teachers observe my work and give feedback on it.	53	3.5	1.2	3 (6%)	10 (19%)	9 (17%)	21 (40%)	10 (19%)	.74
				10 (5%)	34 (16%)	33 (15%)	103 (48%)	32 (16%)	.63
Organizational capacity									
Supportive sources, structures, and systems									
1. There are sufficient opportunities for professional development.	53	3.2	1.2	4 (8%)	11 (21%)	15 (28%)	17 (32%)	6 (11%)	.57
2. We have easy access to professional literature from diverse sources.	53	3.5	1.1	2 (4%)	8 (15%)	12 (23%)	21 (40%)	10 (19%)	.49
3. Communication systems promote a flow of information among the staff.	53	3.7	1.0	2 (4%)	5 (9%)	8 (15%)	28 (53%)	10 (19%)	.69

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(*Continued*)

				F (%)					
Capacities, dimensions, and items	***N***	***M***	***SD***	***1***	***2***	***3***	***4***	***5***	***factor loading***
4. I participate in staff meetings.	53	3.6	1.4	7 (13%)	4 (8%)	7 (13%)	18 (34%)	17 (32%)	.47
5. I participate in multi-professional meetings in which we plan and evaluate students' support.	53	2.5	1.4	20 (38%)	8 (15%)	9 (17%)	12 (27%)	4 (8%)	.49
6. TAs are members of the school's professional teams.	53	3.1	1.3	9 (17%)	7 (13%)	14 (26%)	16 (30%)	7 (13%)	.59
7. As a TA, I have sufficient opportunities for in-service training.	53	2.9	1.2	7 (13%)	12 (23%)	16 (30%)	13 (25%)	5 (9%)	.65
8. I have appropriate tools, materials, ICT and other technology.	53	3.8	.89	-	6 (11%)	7 (13%)	29 (55%)	11 (21%)	.52
9. The school's schedule promotes collective learning and shared practice	53	3.4	1.1	2 (4%)	11 (21%)	12 (23%)	21 (40%)	7 (13%)	.59
10. Some of my working hours have been allocated to the staff's collective learning and shared practice .	53	2.9	1.0	5 (9%)	12 (23%)	21 (40%)	12 (27%)	3 (6%)	.64
				58 (11%)	84 (16%)	121 (23%)	187 (35%)	80 (15%)	.57
Relationship and climate									
1. Caring relationships between staff are built on trust and respect	53	4.0	.90	-	3 (6%)	12 (23%)	19 (36%)	19 (36%)	.51

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(*Continued*)

				F (%)					
Capacities, dimensions, and items	***N***	***M***	***SD***	***1***	***2***	***3***	***4***	***5***	***factor loading***
2. Caring relationships between staff are built on trust and respect	53	4.3	.70	-	1 (2%)	6 (11%)	25 (47%)	21 (40%)	.49
3. We are willing to talk to each other about our professional practice.	53	3.7	1.0	1 (2%)	7 (13%)	11 (21%)	22 (46%)	12 (23%)	.61
4. Teachers value my initiatives to develop instruction.	53	3.5	1.0	3 (6%)	6 (11%)	14 (26%)	23 (43%)	7 (13%)	.64
5. I discuss support for students' learning and "school going" with teachers.	53	4.1	.95	1 (2%)	3 (6%)	6 (11%)	23 (43%)	20 (38%)	.53
6. My work as a TA is respected by the staff.	53	3.8	1.0	2 (4%)	3 (6%)	11 (21%)	23 (43%)	14 (26%)	.48
				7 (2%)	23 (7%)	60 (19%)	135 (43%)	93 (29%)	.54
Stimulating and participative leadership									
1. The school leader takes my opinions into consideration when initiating actions that affect my work.	53	3.6	.93	1 (2%)	5 (9%)	15 (28%)	24 (45%)	8 (15%)	.69
2. The school leader is aware of my competencies and expertise.	53	4.1	.85	-	3 (6%)	8 (15%)	24 (45%)	18 (34%)	.64
3. The school leader ensures that I feel at home	53	3.7	.88	-	5 (9%)	15 (28%)	23 (43%)	10 (19%)	.75

(*Continued*)

(*Continued*)

				F (%)					
Capacities, dimensions, and items	***N***	***M***	***SD***	***1***	***2***	***3***	***4***	***5***	***factor loading***
4. The school leader is aware of my personal professional needs.	53	3.6	.97	-	6 (11%)	21 (40%)	14 (26%)	12 (23%)	.75
5. The school leader treats all individuals or groups impartially.	53	3.3	1.2	5 (9%)	8 (15%)	13 (26%)	19 (39%)	8 (15%)	.77
6. The school leader stimulates me to think about my work in student support.	53	3.1	1.0	2 (6%)	10 (19%)	24 (45%)	10 (19%)	7 (13%)	.83
7. The school leader encourages me to develop individual professional growth goals.	53	3.1	1.0	3 (6%)	11 (21%)	22 (41%)	11 (21%)	6 (11%)	.80
8. The school leader encourages me to evaluate my practices and refine them when needed.	53	3.3	1.0	4 (8%)	6 (11%)	20 (38%)	18 (34%)	5 (9%)	.68
9. The school leader is a source of new ideas for my professional learning.	53	2.9	1.0	7 (13%)	9 (17%)	24 (45%)	11 (21%)	2 (4%)	.78
10. The school leader encourages me to try new things in line with my interests.	53	3.0	1.2	7 (13%)	8 (15%)	22 (42%)	10 (19%)	6 (11%)	.77
11.The school leader involves TAs in innovations.	53	3.0	1.2	7 (13%)	11 (21%)	16 (30%)	14 (26%)	5 (9%)	.76

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(Continued)

				F (%)					
Capacities, dimensions, and items	***N***	***M***	***SD***	***1***	***2***	***3***	***4***	***5***	***factor loading***
12. The school leader facilitates effective communication among the staff.	53	3.6	1.0	2 (4%)	8 (15%)	10 (19%)	25 (47%)	8 (15%)	.75
13. The school leader gives me opportunities to implement innovations.	53	3.4	.91	1 (2%)	6 (11%)	23 (43%)	17 (32%)	6 (11%)	.81
				39 (5%)	104 (15%)	233 (33%)	220 (32%)	101 (15%)	.75

Cogent Education **(ISSN: 2331-186X) is published by Cogent OA, part of Taylor & Francis Group.**