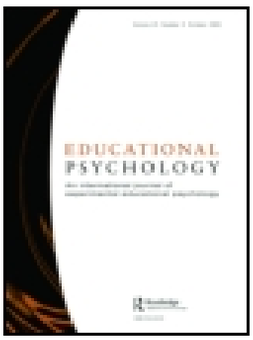

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Patterns of teachers' instructional support quality and the association with job satisfaction and collegial collaboration

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ABSTRACT

Classroom observations and teacher reports were used to investigate patterns of instructional support quality and the association with job satisfaction and collegial collaboration. Eighty-one Norwegian lower secondary schoolteachers participated in the study. Latent profile analysis (LPA) identified five profiles: confident ($n = 21$), low-quality ($n = 21$), less confident ($n = 18$), high-quality ($n = 9$), and low analysis and inquiry (AI) and instructional dialogue (ID; $n = 12$). The results indicated that the low-quality profile teachers were less satisfied with their job compared with the high-quality and low AI and ID profile teachers. By gaining more knowledge about patterns of instructional support quality and the associations with teachers' job satisfaction and collegial collaboration, actions to support teachers' professional development can be tailored to individual teachers' needs.

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Instructional support quality; systematic classroom observation; teacher reports; latent profile analysis; job satisfaction; collegial collaboration

Instructional support captures the ways in which teachers implement instructional activities to support students' academic learning effectively (Pianta et al., 2012). In classrooms with high-quality instructional support, students practice existing knowledge and integrate new skills, and they learn and develop better than students exposed to low-quality instructional support (Davis & Miyake, 2004; Pianta et al., 2012; Vygotsky, 1991). Recent studies indicated that the quality of instructional support is considerably lower than that of the other classroom interaction domains: emotional support and classroom organisation (Allen et al., 2013; Gitomer et al., 2014; Virtanen et al., 2018). This trend of lower quality is critical because instructional support is the core of teaching practices linked to students' academic learning and engagement (Hamre et al., 2013). Despite evidence from studies on instructional support as one of three domains, less is known specifically about instructional support quality in lower secondary classrooms. Additionally, little is known about how patterns of instructional support quality are associated with teachers' job satisfaction and collegial collaboration.

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Table 1. The five dimensions of instructional support (Hafen et al., 2015; Pianta et al., 2012).

Domain	Dimension	Description and examples
Instructional support	Instructional learning formats (ILF)	Maximization of students' engagement in learning through clear presentation of material, active facilitation, and provision of interesting and engaging lessons and materials
	Content understanding (CU)	The depth of lesson content and the approaches used to help students comprehend the framework, key ideas, and procedures connected to content and subject
	Analysis and inquiry (AI)	The degree to which students are engaged in higher-order thinking and novel/open-ended problems, tasks, and questions
	Quality of feedback (QF)	The degree to which feedback extends and expands students' learning and understanding through their responses and participation in activities
	Instructional dialogue (ID)	Cumulative, content-focused questioning and discussion to guide and prompt students' understanding of content

Conceptualising instructional support quality

The theoretical foundation for instructional support is primarily based on research and literature concerning students' cognitive and language development (Bransford et al., 2000; Carver & Klahr, 2001; Vygotsky, 1991). Instructional support describes teaching practices hypothesised to enhance students' cognition and learning and involves varied instructional strategies to help students solve challenging tasks and problems (Allen et al., 2013; Hafen et al., 2015). Teachers who give consistent, timely, and process-oriented feedback, focus on improving students' higher-order thinking skills, and present new content within a broader, meaningful context tend to have students who achieve more (Allen et al., 2013; Pianta et al., 2012). In the present study, instructional support aligns with the Teaching through Interactions (TTI) framework developed by Pianta and colleagues (Hafen et al., 2015; Hamre et al., 2013). At the secondary level, instructional support comprises five dimensions, displayed in Table 1 (Hafen et al., 2015; Pianta et al., 2012). The distinction between merely learning facts and gaining 'usable knowledge' is highlighted and builds on students' learning how facts are associated and structured (Bransford et al., 2000; Mayer, 2002). Thus, students' development of cognition and language depends on teachers providing high-quality instructional support for students to practice existing skills, and complex skills can be learned through teachers' scaffolding (Davis & Miyake, 2004; Vygotsky, 1991). A critical aspect of instructional support is students' metacognitive skills, including being aware of and giving words to one's own thinking processes, which are essential for students' academic development (Muijs & Reynolds, 2018; Veenman et al., 2005).

As students get older, they experience more structured and academically challenging activities. The more complex activities call for compound teaching skills and high-quality instructional support. However, substantial variation in teachers' instructional quality is observed, indicating that many students are not exposed to high-quality instructional support (Gitomer et al., 2014; Pianta & Hamre, 2009) but to low-quality implying a focus on performing basic skills and providing discrete answers or responses. Generally, a large variation in and low-quality instructional support are

observed in kindergarten and lower secondary school (Gitomer et al., 2014; Hu et al., 2018; Westergård et al., 2019; Yang & Hu, 2019). Studies in lower secondary school have shown that the more complex dimensions, such as analysis and inquiry (AI), quality of feedback (QF), and instructional dialogue (ID), are generally of lower quality, whereas instructional learning formats (ILF) and content understanding (CU) are of higher quality (Gitomer et al., 2014; Virtanen et al., 2019). These findings are not unexpected, given that the instructional support dimensions capture different instructional aspects and variation in complexity.

Associations between instructional support quality, job satisfaction, and collegial collaboration

Job satisfaction has been defined as teachers' affective reactions to their work or role as a teacher (Skaalvik & Skaalvik, 2010). Teachers' job satisfaction is associated with their actual performance in the classroom (Jennings & Greenberg, 2009); teachers who find their work meaningful and satisfying are more motivated to do their job (Caprara et al., 2006). Research indicates that job satisfaction is positively related to teachers' perception of their teacher-student interactions (Spilt et al., 2011; Virtanen et al., 2019) and teachers who are satisfied with their job give more instructional support to their low-level classes than teachers who are not satisfied with their job (Opdenakker & Van Damme, 2006). Overall, teachers' job satisfaction is positively associated with their motivation to teach and higher job performance (Judge et al., 2001).

For improving teaching practices, collaboration between teachers has been perceived as relevant and valuable (Levine & Marcus, 2010; Meirink et al., 2007). A recent review found that teacher collaboration benefits students, teachers, and the school. For example, students' educational performances improved, schools experienced cultural changes, and teachers progressed on a personal level (i.e. feeling less isolated and more motivated) as a result from teacher collaboration (Vangrieken et al., 2015). Moreover, collegial collaboration can be beneficial for teachers, as it allows them to exchange ideas, receive feedback, and discuss materials and strategies, leading to improved instructional support in classrooms (Butler et al., 2004). When teachers interact and collaborate in school, their learning is enhanced (Putnam & Borko, 2000), which may profit the students and enhance their learning. Notably, collegial collaboration can lead to beneficial outcomes, including more positive attitudes towards teaching and instruction (Brownell et al., 1997), higher job satisfaction (Munthe, 2003) and job performance (Vangrieken et al., 2015). However, less is known about how job satisfaction and collegial collaboration are related to patterns of instructional support quality.

Patterns of instructional support quality

Instructional support is a multifaceted construct, and teachers interact with their students in patterned ways (Virtanen et al., 2019; Wubbels & Brekelmans, 2005). Increasingly, researchers have applied a person-centered approach to identify patterns of classroom interaction quality within unobserved classroom subgroups (Halpin &

Kieffer, 2015; Hu et al., 2018; Virtanen et al., 2019; Yang & Hu, 2019). These person-centered approaches have identified distinct patterns of classroom interaction irrespective of whether the study was based on observations alone (Halpin & Kieffer, 2015; Virtanen et al., 2019) or a combination of observations and teacher reports (Hu et al., 2018; Yang & Hu, 2019).

Moreover, the TTI framework provides a structure for identifying the facets of instructional support and characterising high- versus low-quality practices within each dimension. Person-centered studies of classroom interaction in kindergarten and schools have identified one high-quality and one low-quality teaching profile across the studied dimensions (Halpin & Kieffer, 2015; Virtanen et al., 2019; Hu et al., 2018; Yang & Hu, 2019). Additionally, previous studies have identified mixed patterns with higher or lower quality for specific dimensions (Virtanen et al., 2019) or inconsistency between observations and teacher reports (Hu et al., 2018). Consequently, the instructional dimensions of classroom interactions require advanced teaching skills and involve complex interplays among individuals in the classroom. These skills may be challenging for teachers and difficult for observers and teachers to evaluate and measure (Gitomer et al., 2014).

Measuring the concept of instructional support quality

Measuring instructional support is challenging due to its complexity as outlined by the TTI framework and similar frameworks. The low correlations among observers, students, and teachers' reports shown in studies of the wider concept of teaching quality have led researchers to discuss whether it makes sense to talk about these constructs as perspective-independent. Fauth et al. (2020) argued that teaching quality (including instructional support) is not used in a perspective-specific way, either by teachers or those conducting substantive research. In contexts where these measures are applied, most people are interested in teaching quality in general, not in teaching quality from a certain perspective, they argued. When discussing instructional support that fosters student learning and development, we do not typically talk about teacher-perceived instructional support or instructional support as perceived by observers. From the scientific perspective, knowing that human perception is perspective-specific in nature, should not limit the search for the best instrument to measure instructional support (Fauth et al., 2020). Having acknowledged that agreement between perspectives can be expected, nonagreement must be explained. A rich literature discusses the strengths and limitations of observations, teacher reports, and student reports to measure teaching quality or classroom interaction (Fauth et al., 2020; Muijs, 2006; Wagner et al., 2016). However, a detailed discussion of the measurement of instructional support is beyond the scope of this study. Accepting that there is a true score for instructional support (Fauth et al., 2020), it is unlikely that none of these three perspectives can measure it accurately. Nonetheless, investigating patterns of instructional support drawing on more than one perspective will add insight to the understanding of the concept. By not focussing on both observations and teacher perceptions, one may overlook critical aspects of the classroom environment. Including more data

sources could provide higher predictive power of instructional support for student outcomes.

Classroom observations are snapshots of teachers' classroom interactions typically reflecting one to five classroom lessons but are conducted by an external observer (McCaffrey et al., 2015; Muijs, 2006). Teacher reports are effective for understanding teachers' own reflections on instructional support and provide opportunities for teachers to reflect on their practices over a longer period (Muijs, 2006). However, teachers' reports are prone to self-serving bias. Thus, drawing on information from observers and teachers extends the knowledge base for instructional support quality in classrooms.

Context of the study

This study was part of a larger study on classroom interaction enabled by a national initiative from 2012 to 2017 aiming to improve reading, writing, numeracy, and classroom management in lower secondary schools. All lower secondary schools (Grades 8–10) and combined schools (Grades 1–10) in Norway were invited and expected to participate in the initiative for 1.5 academic school years. The present study included a subsample of teachers from schools that chose classroom management as one of their fields for improvement. The teachers were observed in their classrooms and responded to a survey.

Aim, research questions, and hypotheses

The aim of the study was to investigate patterns of instructional support quality by profiling the observed and teacher-reported dimensions of instructional support into qualitatively distinct profiles. Moreover, the aim was to study the extent to which profiles are associated with teachers' job satisfaction and collegial collaboration. The following research questions and hypotheses guided the study:

1. How many and what kind of profiles of instructional support quality emerge in the sample of lower secondary school teachers? We expected different profiles of instructional support quality to emerge as a result of observers' and teachers' different perceptions (Hypothesis 1).
2. To what extent are the profiles associated with job satisfaction and collegial collaboration? We expected that profiles of high-quality instructional support would differ from low-quality profiles by representing teachers with higher job satisfaction and higher collegial collaboration (Hypothesis 2).

Method

Sample and procedures

Eighty-one Norwegian teachers and a classroom they were teaching (Grades 5–10) participated in this study. The teachers were 70.4% female, ranging in age from 24 to 63 years ($M = 42.2$ years, $SD = 9.6$ years). Teaching experience varied from 1 to 35 years

($M = 14.2$ years, $SD = 8.8$ years). The teachers and classrooms were located in 15 schools across three counties in Norway. Written consent was obtained from students and their guardian(s). The students and teachers were informed that they could withdraw from the study at any time.

Raters' training and video recordings

The observed assessment of instructional support was conducted by eight trained and certified raters following the Classroom Assessment Scoring System-Secondary (CLASS-S; Pianta et al., 2012) procedures. The raters participated in a 2-day training to learn about the TTI framework and the CLASS-S. A certification test followed the training where the percent within one (PWO) point interrater agreement has to be a minimum of 80% (Pianta et al., 2012). The classroom observations were video recorded to capture the instructional support interactions during typical class instruction. Each teacher taught the same subject in the same class for four lessons during one academic school year. Two segments of each lesson, lasting 0–15 minutes and 15–30 minutes (Joe et al., 2015), were scored, resulting in 318 lessons and 636 segments.

Twenty percent of the segments were double scored to calculate the PWO interrater agreement. The PWO for the instructional support dimensions ranged from 60% to 76% (Virtanen et al., 2019). In addition, test–retest reliability was calculated to determine correlations among the four lessons' domain-level composite scores (i.e. two segments per lesson aggregated at the lesson level and dimensions aggregated at the domain level). Correlations varied from 0.41 to 0.70 for instructional support and were statistically significant at $p < .001$ (Virtanen et al., 2019).

Measurements

Observed instructional support

Instructional support comprises five dimensions in CLASS-S (Table 1). Instructional support ($\alpha = 0.88$) was scored for each dimension on a scale ranging from 1 to 7: A score of 1–2 was low, 3–5 medium, and 6–7 high (Pianta et al., 2012). In line with previous research (Bell et al., 2012; Westergård et al., 2019), the dimension scores for each segment were averaged across the segments, resulting in one score for each of the five instructional support dimensions.

Teacher-reported instructional support

The teacher report scales captured teachers' reflections on their instructional support. The teacher instructional support scale ($\alpha = 0.78$) consisted of five items and was developed to correspond with the key elements of the CLASS-S instructional support dimensions (Ertesvåg, 2021; Pianta et al., 2012). The following items were included: 'I engage my students by setting clear goals and varying my approaches to the subject material' (IS1), 'I strive to support my students' understanding of the subject material by linking facts, skills, concepts, and principles' (IS2), 'I encourage my students to reflect by asking them to describe how they formulated their answer/argument or how they approached a certain problem' (IS3), 'I strive to give my students specific

feedback regarding what they are good at and what they can improve on' (IS4), and 'When facilitating classroom discussions, I strive to ensure that students acquire knowledge about the subject through arguing, comparing, and contemplating' (IS5). The items were rated on a 6-point scale, ranging from 0 (*not at all*) to 5 (*completely true*). Mean scores of each item from two time points comprised the teacher-reported instructional support scores.

Teacher-reported job satisfaction and collegial collaboration

The scale measuring job satisfaction ($\alpha = 0.88$) consisted of five items that aimed to capture teachers' perceptions of their work as satisfying (e.g. 'My work provides me with a sense of satisfaction' and 'I experience my work as being useful'). The scale was a slightly modified version of the Work Satisfaction scale (Starnaman & Miller, 1992). The modified version has been used in Norwegian studies (Ertesvåg, 2021; Munthe, 2003).

Collegial collaboration ($\alpha = 0.81$) was measured using a five-item scale that addressed how the individual teacher interpreted and viewed the value of collaborating with other teachers (e.g. 'Participating in collegial collaboration benefits my students' and 'Collegial collaboration gives me a deeper understanding of my role as a teacher'). This scale was developed for the present study. Job satisfaction and collegial collaboration were rated on a 6-point scale, ranging from 0 (*not at all/strongly disagree*) to 5 (*completely true/strongly agree*). Mean scores of the items from two time points were used in the analyses.

Data analyses

A person-centered latent profile analysis (LPA; Muthén, 2004; Nylund et al., 2007) was applied to identify subgroups of teachers with similar patterns of instructional support quality. LPA identifies unknown profile membership from a set of measured items whose responses are similar, in this case, dimensions of instructional support reported by observers and teachers (Nylund et al., 2007).

To determine the number of profiles, the following statistical criteria were used (Nylund et al., 2007; Wickrama et al., 2016): the log likelihood (LL), the Akaike information criterion (AIC), the Bayesian information criterion (BIC), the sample-size adjusted BIC (SSABIC), entropy, the Vuong–Lo–Mendell–Rubin likelihood ratio test (VLMR), and the Lo–Mendell–Rubin adjusted LRT test (LMR-LRT). In addition to the statistical criteria, the profiles should be interpretable and consistent with theoretical assumptions (Wickrama et al., 2016).

Multivariate analysis of variance (MANOVA) was conducted using IBM SPSS Statistics (Version 26); LPA was applied using Mplus version 8.3 (Muthén & Muthén, 1998–2017). Standard errors were corrected using maximum likelihood estimation with the robust standard error procedure and the mixture complex type of analysis implemented in Mplus. Little's (1988) missing completely at random test showed that missingness was completely random (χ^2 (26) = 20.40, p = .772) and was handled with the full information maximum likelihood (FIML) estimation.

Results

Descriptive analysis

Table 2 shows the correlations and descriptive statistics for all variables. The descriptives showed that the variables were normally distributed: Skewness and kurtosis values were below 2.0 and 7.0, respectively (Muthén & Kaplan, 1992).

Identifying profiles of instructional support quality

To identify the number of profiles, a series of models with an increasing number of profiles was estimated using LPA. Table 3 presents the model fit statistics. The fit statistics generally improved when a model was estimated with one additional profile. One of the groups in the six- and seven-profile models had a small percentage of teachers (<5%), and the three-profile model was not supported by theory and previous studies on classroom interaction in schools (Halpin & Kieffer, 2015; Virtanen et al., 2019). The profile model with five groups showed improved values for the AIC, LL, and SSABIC compared with the profile with four groups. An investigation of the teacher compositions in profiles 4 and 5 showed that the extra group in the five-profile model was a new group, not a result of one group split into two. Consequently, the five-profile model was chosen, as it best described the differences between the observed and teacher-reported instructional support. Moreover, the information provided in this model fulfilled theoretical expectations and was substantively meaningful and useful for further interpretations (Wickrama et al., 2016). Teachers' probabilities of being in a certain subgroup were high, with probability accuracy ranging from 92.7% to 99.6%, indicating that the five profiles successfully grouped teachers with similar within-profile patterns. The five-profile model with standardised values ($M = 0$; $SD = 1$) is presented in Figure 1.

Description of the five profiles

The mean scores and standard deviations for the five profiles are presented in Table 4. Profile 1 comprised 21 teachers (25.9%), characterised by generally low mean scores on the five observed instructional support dimensions and teacher-reported scores equal to or higher than the whole sample means for the same dimensions (Table 2). Accordingly, this profile was named confident.

Profile 2 also consisted of 21 teachers (25.9%). These teachers showed overall low observed and teacher-reported instructional support quality compared with the whole sample means. As a result, the profile was named low-quality.

Profile 3 comprised 18 teachers (22.2%) and generally had high observed quality and low teacher-reported quality compared with the whole sample means. The profile was named less confident.

Profile 4 consisted of nine teachers (11.1%) who showed high-quality observed and teacher-reported instructional support, compared with the whole sample means. This profile was named high-quality.

Table 2. Whole sample correlations and descriptive statistics for all variables.

Variables	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
Instructional support (OBS)												
1. ILF												
2. CU	0.56**											
3. AI	0.36**	0.72**										
4. QF	0.55**	0.87**	0.65**									
5. ID	0.34**	0.69**	0.81**	0.63**								
Instructional support (TR)												
6. IS1	0.28*	0.23*	0.08	0.20	0.19							
7. IS2	0.21	0.21	0.16	0.15	0.23	0.66**						
8. IS3	0.09	0.18	0.28*	0.22	0.32**	0.34**	0.52**					
9. IS4	−0.13	−0.14	0.02	−0.10	0.08	0.43**	0.34**	0.31**				
10. IS5	0.12	0.07	0.10	0.09	0.22	0.41**	0.39**	0.55**	0.28*			
Variables associated with profiles												
11. Job satisfaction	0.36**	0.21	0.16	0.13	0.22	0.39**	0.36**	0.24*	0.29*	0.43**		
12. Collegial collaboration	0.09	−0.14	−0.11	−0.18	−0.09	0.32**	0.27**	0.23	0.09	0.13	0.15	
Means	4.67	3.67	2.36	3.32	2.63	4.15	4.11	3.78	4.10	3.95	4.43	4.08
Standard deviation	0.89	0.82	0.72	0.75	0.84	0.62	0.72	0.81	0.69	0.71	0.50	0.74
Minimum	2.50	1.63	1.00	1.75	1.00	2.00	2.00	1.00	2.50	3.00	3.40	2.00
Maximum	6.75	5.50	4.75	5.25	5.25	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Kurtosis	−0.05	0.15	0.52	0.44	0.44	−0.41	−0.41	−0.64	−0.21	0.08	−1.19	0.01
Skewness	−0.44	−0.22	0.15	0.10	0.15	0.77	−0.28	0.85	−0.79	−1.09	−0.28	−0.77

Note. OBS: observation; TR: teacher report. Correlations marked with **($p<.01$) and *($p<.05$) are statistically significant.

Table 3. Goodness-of-fit statistics and group sizes for the estimated latent profiles.

No. of profiles	No. of free parameters	LL	AIC	BIC	SSABIC	Entropy	*p*VLMR/*p*LMR-LRT	Group sizes
1	20	−881.02	1802.05	1849.93	1786.86			81
2	31	−795.32	1652.64	1726.87	1629.10	0.87	0.169/0.174	52, 29
3	42	−749.00	1582.01	1682.58	1550.12	0.87	0.052/0.055	28, 30, 23
4	53	−713.69	1533.38	1660.29	1493.14	0.91	0.200/0.206	23, 25, 24, 9
5	64	−690.25	1508.50	1661.74	1459.91	0.92	0.531/0.536	21, 21, 18, 9, 12
6	75	−674.01	1498.03	1677.61	1441.09	0.92	0.656/0.659	4, 21, 16, 13, 18, 9
7	86	−664.42	1500.84	1706.76	1435.55	0.93	0.319/0.321	7, 21, 14, 14, 15, 9, 1

Note. LL: log likelihood; AIC: Akaike information criterion; BIC: Bayesian information criterion; SSABIC: sample-size adjusted BIC; *p*VLMR/*p*LMR-LRT: Vuong–Lo–Mendell–Rubin likelihood ratio test/Lo–Mendell–Rubin adjusted LRT test.

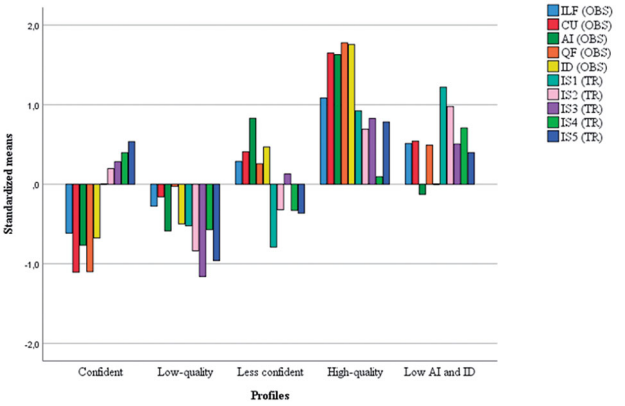

Figure 1. Profiles based on observed and teacher-reported instructional support quality. *Note.* OBS: classroom observation; TR: teacher report.

Profile 5 consisted of 12 teachers (14.8%) and showed low-quality observed AI and ID compared with the whole sample means, and low-quality on the corresponding teacher-reported items (IS3 and IS5), compared with the other three items. Therefore, this profile was named low AI and ID.

To further interpret the five profiles, MANOVA was used to test the profile mean differences in the instructional support dimensions (Table 4). The instructional support profiles differed statistically significantly, indicating that the profiles were supported empirically. Additionally, the effects sizes, η^2 in Table 4, across the profiles were large ($\geq$0.26; Cohen, 1988); the only exception was teachers' reports of quality of feedback ($\eta^2 = 0.21$). These mean differences indicated that 21–76% of the total variance in the instructional support dimension scores could be accounted for by group membership.

Associations between the profiles of instructional support quality, job satisfaction, and collegial collaboration

The means, standard deviations, and comparisons with profile means for job satisfaction and collegial collaboration are presented in Table 4. Concerning job satisfaction, the low-quality profile included teachers who were least satisfied with their job. The results show that the teachers who were most satisfied with their job were in the

Table 4. Profile-specific descriptive statistics, multivariate analysis of variance statistics, effect sizes, and pairwise comparisons for instructional support quality, job satisfaction, and collegial collaboration.

	1. Confident *M* (*SD*)	2. Low-quality *M* (*SD*)	3. Less confident *M* (*SD*)	4. High-quality *M* (*SD*)	5. Low AI and ID *M* (*SD*)	*F*	*df*	^{2}	Pairwise comparisons
ILF (OBS)[a]	4.07 (0.93)	4.37 (0.77)	4.88 (0.43)	5.63 (0.67)	5.16 (0.71)	7.74***	4	0.31	1 < 3, 4, 5; 4 > 2
CU (OBS)[a]	2.76 (0.45)	3.48 (0.45)	3.99 (0.41)	5.02 (0.40)	4.07 (0.48)	42.79***	4	0.72	1 < 2, 3, 4, 5 4 > 2, 3, 5; 5 > 2
AI (OBS)[a]	1.82 (0.42)	1.94 (0.37)	2.93 (0.35)	3.54 (0.51)	2.27 (0.43)	38.86***	4	0.70	4 > 1, 2, 3, 5 3 > 1, 2, 5; 5 > 1
QF (OBS)[a]	2.48 (0.32)	3.19 (0.43)	3.57 (0.32)	4.66 (0.51)	3.65 (0.43)	51.64***	4	0.76	4 > 1, 2, 3, 5 1 < 2, 3, 4, 5
ID (OBS)[a]	2.07 (0.61)	2.13 (0.52)	3.09 (0.53)	4.11 (0.49)	2.59 (0.44)	28.25***	4	0.63	4 > 1, 2, 3, 5 3 > 1, 2
IS1 (TR)[b]	4.14 (0.43)	3.82 (0.34)	3.68 (0.59)	4.72 (0.44)	4.86 (0.30)	18.86***	4	0.52	5 > 1, 2, 3 4 > 1, 2, 3; 1 > 3
IS2 (TR)[b]	4.23 (0.57)	3.48 (0.49)	3.83 (0.74)	4.61 (0.48)	4.81 (0.40)	11.86***	4	0.40	2 < 1, 4, 5 3 < 4, 5
IS3 (TR)[b]	3.98 (0.62)	2.80 (0.70)	3.84 (0.61)	4.44 (0.58)	4.18 (0.33)	14.65***	4	0.47	2 < 1, 3, 4, 5
IS4 (TR)[b]	4.35 (0.60)	3.65 (0.68)	3.90 (0.61)	4.17 (0.70)	4.55 (0.43)	4.73**	4	0.21	5 > 2, 3 1 > 2
IS5 (TR)[b]	4.32 (0.56)	3.25 (0.53)	3.65 (0.57)	4.50 (0.43)	4.23 (0.60)	12.60***	4	0.43	2 < 1, 4, 5; 3 < 1, 4
Job satisfaction[b]	4.46 (0.45)	4.02 (0.48)	4.43 (0.48)	4.75 (0.43)	4.73 (0.36)	4.70**	4	0.21	2 < 4, 5
Collegial collaboration[b]	4.43 (0.47)	3.74 (0.63)	3.95 (0.95)	3.95 (0.57)	4.27 (0.89)	1.98	4	0.12	

Note. [a]scores = 1–7; [b]scores = 0–5; OBS: observation; TR: teacher report; *M*: mean; *SD*: standard deviation; ^{2}: eta-squared effect size. Pairwise comparisons were tested using the Bonferroni *post hoc* test, significant at $^{**}p<.01$. $^{***}p<.001$.

high-quality and low AI and ID profiles. The mean differences between these profiles were statistically significant at $p < .01$. The lowest collegial collaboration was reported by teachers in the low-quality profile; the highest was reported by the confident profile. However, the mean differences between the profiles were nonsignificant for collegial collaboration. This may be due to the small sample size, limiting the extent to which statistically significant differences between the profiles could be found. The effects size (η^2) for collegial collaboration and job satisfaction was .12 and .21, respectively, that is, medium to large effect sizes (Cohen, 1988). Profile membership explained 12% of the total variation in collegial collaboration and 21% in job satisfaction.

Discussion

In this study, we examined patterns of instructional support quality and the association with teachers' job satisfaction and collegial collaboration. Supporting the first research question and Hypothesis 1, five profiles of instructional support quality emerged for teachers' and observers' similar and/or different perceptions. The five profiles were confident, low-quality, less confident, high-quality, and low AI and ID. Given the evidence that instructional support quality is positively associated with student learning (Hamre et al., 2013), and the generally large differences between the means of instructional support quality, we can assume that not all students have access to high-quality instructional support.

As expected, the second research question and Hypothesis 2 were supported by profiles differing not only in the patterns of instructional support quality but also regarding job satisfaction. In contrast to Hypothesis 2, no statistically significant profile differences in collegial collaboration were found. It could be beneficial for all teachers to exchange ideas, receive feedback, and discuss materials and strategies, independently of their level of instructional support quality. Teachers who provide high-quality instructional support may not have the same need to collaborate with colleagues as teachers who struggle with instructional support. However, knowing that collegial collaboration can benefit teachers, students, and schools (Vangrieken et al., 2015) and lead to more positive attitudes towards teaching and instruction (Brownell et al., 1997), teachers can be positive resources in supporting colleagues regarding improvement in their teaching practices (Levine & Marcus, 2010; Meirink et al., 2007).

The low-quality profile teachers showed generally low instructional support quality compared with the other profiles. These teachers showed patterns of instructional support characterised by rote instructional activities that required a discrete answer of correct or incorrect, teacher-dominated talk, and lack of discussion (Pianta et al., 2012). Simultaneously, these teachers also reported lower job satisfaction. As teachers who find their work meaningful and satisfying are more motivated to do their job (Caprara et al., 2006), the results support that these teachers provide low instructional support. In low-quality classrooms, teachers fail to effectively communicate the essential attributes of concepts to students, engage students in higher-order thinking skills, and provide effective feedback (Gitomer et al., 2014; Pianta & Hamre, 2009).

High-quality profile teachers showed patterns of high instructional support quality. In classrooms with high-quality instructional support, students experience teachers

who consistently provide feedback that 'pushes' learning and challenges them to think critically and spend time engaging in productive instructional activities (Pianta & Hamre, 2009; Pianta et al., 2012). In line with this, job satisfaction has been found to be associated with teachers' actual performance in the classroom (Jennings & Greenberg, 2009) and positively related to teachers' perception of interactions with students (Spilt et al., 2011; Virtanen et al., 2019). This was evident by teachers' reporting they were highly satisfied with their job. This satisfaction could result from experiencing students who are interested, pay attention, and engage in lessons, leading to finding their work meaningful, and motivating them to provide high-quality instructional support. When teachers use effective instructional strategies, students are more likely to engage in classroom activities (Pianta et al., 2012) and increase learning (Allen et al., 2013).

As expected, and in line with previous research, we found profiles with inconsistent perceptions of quality between observers and teachers. Low AI and ID profile teachers showed low-quality observed and teacher-reported AI and ID. Observations of specific dimensions of instructional support, particularly AI and ID, typically show lower quality compared with other dimensions (Virtanen et al., 2018; Westergård et al., 2019). Both dimensions include demanding and advanced skills that are highly important for students' academic learning and development (Hamre et al., 2013). At the same time, teachers in this profile reported generally high job satisfaction. Job satisfaction reflects teachers' affective reactions to their work and role as a teacher (Skaalvik & Skaalvik, 2010). This result indicates that although these teachers may struggle with some of the complex dimensions of instructional support, they are satisfied with their job.

Inconsistent reports from observers and teachers were revealed in the confident and less confident profiles. The results were not unexpected given similar results were found by Gitomer et al. (2014) indicating that teachers who scored high on the CLASS-S observations reported themselves as high as teachers who had lower observation scores. Hu et al. (2018) found groups of teachers reporting higher or lower quality compared with the CLASS observations in a kindergarten teacher sample. Accordingly, teachers observed as high (or low) quality constituted two distinct groups of teachers when teachers' perception of their instructional support quality was considered. Noteworthy, job satisfaction was high and similar for these two profiles, indicating that the teachers were satisfied with their job. Moreover, this result may be linked to that job satisfaction is positively associated with teachers' motivation to teach as well as high job performance (Judge et al., 2001).

Of particular interest is the less confident profile. If teachers' reports on instructional support are low due to low confidence in their abilities, high stress, or burnout, implications for interventions or professional development (PD) may be different from those for teachers in the high-quality profile. If teachers in the confident profile perceive that they have mastered the instructional settings, their perception of instructional support quality may prevent stress and burnout (Virtanen et al., 2019) but may hamper their students' learning. However, if the confident teachers experience success and high job satisfaction, they may also invest effort in their students, and in turn receive positive affirmation (Opdenakker & Van Damme, 2006). The inconsistency between observers and teachers' reports could be explained by many teachers having

little or no experience with observing other teachers' lessons and teaching practices, which can lead to having little to compare their own teaching with (Muijs, 2006). Without a point of reference, it may be difficult to reflect and report on one's own teaching quality.

The results of the present study indicate distinct patterns of teachers' instructional support quality and validate the contention that instructional support quality, job satisfaction, and collegial collaboration vary. Therefore, teachers with different instructional support quality and varying levels of job satisfaction and collaboration will likely have different needs for PD. For example, teachers who are observed and reported as generally providing high-quality instructional support require differentiated and modified PD similar to teachers who provide low-quality instructional support. Muijs and Reynolds (2018) argued that a one-size-fits-all approach with a uniform PD program delivered to the entire school is most often used. Indirectly, this approach assumes that teachers have the same level of knowledge and skills and have the same PD needs. However, the study results shed light on instructional support quality differences among teachers. These differences may, in turn, be related to teacher characteristics other than job satisfaction and collegial collaboration. Existing knowledge suggests that teachers differ with respect to age, work experience, and knowledge regarding subject areas (Muijs & Reynolds, 2018). The present study adds to the existing understanding that instructional support quality, job satisfaction, and collegial collaboration vary, suggesting that a differentiated approach to teachers' PD tailored to individual needs may be beneficial in the future.

Methodological considerations

A strength of this study is the use of observations and teacher reports, which provided a comprehensive representation of instructional support quality. However, classroom observations risk rater bias and drift (Casabianca et al., 2015), and the validity and reliability of teacher reports have also been criticised due to differences in how teachers (and students) perceive instructional quality (Desimone et al., 2010; Wagner et al., 2016). Nevertheless, when investigating classroom interactions, multiple measures are beneficial to ensure validity and reliability (Douglas, 2009). However, instructional support has been proven to be complex and difficult to score, which becomes evident through the interrater agreement including PWO. According to the standard CLASS procedure, PWO should be 80% or above (Pianta et al., 2012). Lower PWO for instructional support may be explained by instructional support involving complex interactions at the secondary level (Gitomer et al., 2014) and may be difficult to score compared with emotional support and classroom organisation. However, the same pattern of lower PWO for instructional support has been found in previous studies (Gitomer et al., 2014; Virtanen et al., 2018).

Another strength of this study is the use of a person-centered approach through LPA, which investigated patterns of instructional support quality. Using LPA provided more detailed profile-specific information than variable-centered methods. Multiple lessons per classroom were observed during one academic year, resulting in a

substantial number of lessons and segments from each classroom, thus leading to a reliable data set.

This study has limitations, such as the small sample, which may have affected the number of profiles identified and the association with job satisfaction and collegial collaboration. Replicating this study with a larger sample could provide a different profile model and association with job satisfaction and collaboration, which could better explain the results. The sample was also non-random because teachers volunteered to participate in classroom observations and questionnaires. Thus, the generalisability of the results may be limited to the most active and interested teachers. However, the sample included teachers from urban and rural, as well as small and large, schools in Norway, and thus, substantial diversity. Moreover, the study was part of a larger study in which all teachers in the participating schools were invited to respond to the survey. No significant differences in teacher-reported instructional support, job satisfaction, and collegial collaboration were found between teachers who were observed compared with those who were not observed.

Future directions and practical implications

The distinct patterns of instructional support quality found in this study support previous findings that teachers' instructional support quality varies among classrooms. Moreover, the profiles varied not only in the patterns of instructional support quality but also in job satisfaction and collegial collaboration.

Although the study results support the theoretical assumptions that patterns of instructional support quality differ among classrooms, further research is needed on how the pattern characteristics and classroom compositions affect instructional support. Although additional research is needed, we determined important aspects of teachers' differentiated needs for development of instructional support quality and to strengthen their job satisfaction and collegial collaboration. The findings indicate that teachers may benefit from more differentiated training. For example, teachers in the high-quality profile may need different training in instructional support compared with teachers in the low-quality profile. Accordingly, teachers in classrooms with high or low instructional support quality in most dimensions will still benefit from developing stronger interactions with their students in some dimensions. Other teachers, such as those in the low AI and ID profile, may strongly benefit from individualised training focussing on specific aspects of instructional support quality. However, even individualised training should not be uniform but customised to the individual teacher's instructional support practices that need improvement. Teachers who report higher or lower instructional support quality compared with observations may benefit from an individualised or a whole-school approach to training, depending on individual needs. Understanding why teachers in the less confident profile reported being less confident is important. For example, if lower self-reports are related to less teaching experience or low confidence in the teachers' abilities, this may affect the conditions for improvement. Providing these teachers with training that emphasises what they do well and improving their strengths within instructional support may increase the teachers' confidence and strengthen their skills. In contrast, teachers in the confident profile may

have higher confidence in their own abilities which could be related to their self-perceptions of mastering instructional support. Nonetheless, they could profit from customised training focussing on strengths and weaknesses in their instructional practices and from reflecting on self-improvement within their instructional support quality. Research-based coaching, such as My Teaching Partner (MTP), an intervention building on the TTI framework and CLASS, can promote an individual teacher's instructional support skills and quality (Gregory et al., 2017). Based on the findings of this study, a possible implication is to further investigate the effects and effectiveness of individual training taking individual teachers' own practice as a starting point.

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References

Allen, J. P., Gregory, A., Mikami, A., Lun, J., Hamre, B., & Pianta, R. (2013). Observations of effective teacher–student interactions in secondary school classrooms: Predicting student achievement with the Classroom Assessment Scoring System–Secondary. *School Psychology Review*, *42*(1), 76–98. https://doi.org/10.1080/02796015.2013.12087492.

Bell, C. A., Gitomer, D. H., McCaffrey, D. F., Hamre, B. K., Pianta, R. C., & Qi, Y. (2012). An argument approach to observation protocol validity. *Educational Assessment*, *17*(2–3), 62–87. https://doi.org/10.1080/10627197.2012.715014

Bransford, J., Brown, A. L., & Cocking, R. R. (Eds.). (2000). *How people learn: Brain, mind, experience, and school*. National Academy Press.

Brownell, M. T., Yeager, E., Rennells, M. S., & Riley, T. (1997). Teachers working together: What teacher educators and researchers should know. *Teacher Education and Special Education*, *20*(4), 340–359. https://doi.org/10.1177/088840649702000405.

Butler, D. L., Lauscher, H. N., Jarvis-Selinger, S., & Beckingham, B. (2004). Collaboration and self-regulation in teachers' professional development. *Teaching and Teacher Education*, *20*(5), 435–455. https://doi.org/10.1016/j.tate.2004.04.003.

Caprara, G. V., Barbaranelli, C., Steca, P., & Malone, P. S. (2006). Teachers' self-efficacy beliefs as determinants of job satisfaction and students' academic achievement: A study at the school level. *Journal of School Psychology*, *44*(6), 473–490. https://doi.org/10.1016/j.jsp.2006.09.001.

Carver, S. M., & Klahr, D. (Eds.). (2001). *Cognition and instruction: Twenty-five years of progress*. Lawrence Erlbaum.

Casabianca, J. M., Lockwood, J. R., & McCaffrey, D. F. (2015). Trends in classroom observation scores. *Educational and Psychological Measurement*, *75*(2), 311–337. https://doi.org/10.1177/0013164414539163.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Lawrence Erlbaum.

Davis, E. A., & Miyake, N. (2004). Explorations of scaffolding in complex classroom systems. *Journal of the Learning Sciences*, *13*(3), 265–272. https://doi.org/10.1207/s15327809jls1303_1.

Desimone, L. M., Smith, T. M., & Frisvold, D. E. (2010). Survey measures of classroom instruction: Comparing student and teacher reports. *Educational Policy*, *24*(2), 267–329. https://doi.org/10.1177/0895904808330173.

Douglas, K. (2009). Sharpening our focus in measuring classroom instruction. *Educational Researcher*, *38*(7), 518–521. https://doi.org/10.3102/0013189X09350881.

Ertesvåg, S. K. (2021). Exploring improvement in teachers' instructional support: Classifying and analyzing patterns of change in a national initiative on classroom management. *International Journal of Leadership in Education*, *24*(4), 533–557. https://doi.org/10.1080/13603124.2019.1613567.

Fauth, B., Göllner, R., Lenske, G., Praetorius, A.-K., & Wagner, W. (2020). Who sees what? Conceptual considerations on the measurement of teaching quality from different perspectives. *Zeitschrift Für Pädagogik*, *66*, 138–155.

Gitomer, D., Bell, C., Qi, Y., McCaffrey, D., Hamre, B. K., & Pianta, R. C. (2014). The instructional challenge in improving teaching quality: Lessons from a classroom observation protocol. *Teachers College Record*, *116*(6), 1–32.

Gregory, A., Ruzek, E., Hafen, C. A., Mikami, A. Y., Allen, J. P., & Pianta, R. C. (2017). My teaching partner-secondary: A video-based coaching model. *Theory into Practice*, *56*(1), 38–45. https://doi.org/10.1080/00405841.2016.1260402.

Hafen, C. A., Hamre, B. K., Allen, J. P., Bell, C. A., Gitomer, D. H., & Pianta, R. C. (2015). Teaching through interactions in secondary school classrooms: Revisiting the factor structure and practical application of the Classroom Assessment Scoring System-Secondary. *The Journal of Early Adolescence*, *35*(5-6), 651–680. https://doi.org/10.1177/0272431614537117.

Halpin, P. F., & Kieffer, M. J. (2015). Describing profiles of instructional practice: A new approach to analyzing classroom observation data. *Educational Researcher*, *44*(5), 263–277. https://doi.org/10.3102/0013189X15590804.

Hamre, B. K., Pianta, R. C., Downer, J. T., DeCoster, J., Mashburn, A. J., Jones, S. M., Brown, J. L., Cappella, E., Atkins, M., Rivers, S. E., Brackett, M. A., & Hamagami, A. (2013). Teaching through interactions: Testing a developmental framework of teacher effectiveness in over 4,000 classrooms. *The Elementary School Journal*, *113*(4), 461–487. https://doi.org/10.1086/669616.

Hu, B. Y., Chen, L., & Fan, X. (2018). Profiles of teacher–child interaction quality in preschool classrooms and teachers' professional competence features. *Educational Psychology*, *38*(3), 264–285. https://doi.org/10.1080/01443410.2017.1328488.

Jennings, P. A., & Greenberg, M. T. (2009). The prosocial classroom: Teacher social and emotional competence in relation to student and classroom outcomes. *Review of Educational Research*, *79*(1), 491–525. https://doi.org/10.3102/0034654308325693.

Joe, J. M., McClellan, C. A., & Holtzman, S. L. (2015). Scoring design decisions: Reliability and the length and focus of classroom observations. In T. J. Kane, K. A. Kerr, & R. C. Pianta (Eds.), *Designing teacher evaluation systems: New guidance from the Measures of Effective Teaching Project* (pp. 415–442). Jossey-Bass.

Judge, T. A., Thoresen, C. J., Bono, J. E., & Patton, G. K. (2001). The job satisfaction-job performance relationship: A qualitative and quantitative review. *Psychological Bulletin*, *127*(3), 376–407. https://doi.org/10.1037/0033-2909.127.3.376.

Levine, T. H., & Marcus, A. S. (2010). How the structure and focus of teachers' collaborative activities facilitate and constrain learning. *Teaching and Teacher Education*, *26*(3), 389–398. https://doi.org/10.1016/j.tate.2009.03.001.

Little, R. J. A. (1988). A test of missing completely at random for multivariate data with missing values. *Journal of the American Statistical Association*, *83*(404), 1198–1202. https://doi.org/10.1080/01621459.1988.10478722.

Mayer, R. E. (2002). Rote versus meaningful learning. *Theory into Practice*, *41*(4), 226–232. https://doi.org/10.1207/s15430421tip4104_4.

McCaffrey, D. F., Yuan, K., Savitsky, T. D., Lockwood, J. R., & Edelen, M. O. (2015). Uncovering multivariate structure in classroom observations in the presence of rater errors. *Educational Measurement: Issues and Practice*, *34*(2), 34–46. https://doi.org/10.1111/emip.12061.

Meirink, J. A., Meijer, P. C., & Verloop, N. (2007). A closer look at teachers' individual learning in collaborative settings. *Teachers and Teaching*, *13*(2), 145–164. https://doi.org/10.1080/13540600601152496.

Muijs, D. (2006). Measuring teacher effectiveness: Some methodological reflections. *Educational Research and Evaluation*, *12*(1), 53–74. https://doi.org/10.1080/13803610500392236.

Muijs, D., & Reynolds, D. (2018). *Effective teaching: Evidence and practice* (4th ed.). SAGE Publishing.

Munthe, E. (2003). Teachers' workplace and professional certainty. *Teaching and Teacher Education*, *19*(8), 801–813. https://doi.org/10.1016/j.tate.2003.02.002.

Muthén, B. (2004). Latent variable analysis: Growth mixture modeling and related techniques for longitudinal data. In D. Kaplan (Ed.), *Handbook of quantitative methodology for the social sciences* (pp. 345–368). SAGE Publishing.

Muthén, B., & Kaplan, D. (1992). A comparison of some methodologies for the factor analysis of non-normal Likert variables: A note on the size of the model. *British Journal of Mathematical and Statistical Psychology*, *45*(1), 19–30. https://doi.org/10.1111/j.2044-8317.1992.tb00975.x.

Muthén, L. K., & Muthén, B. O. (1998–2017). *Mplus user's guide* (8th ed.). Muthén & Muthén. https://www.statmodel.com/download/usersguide/MplusUserGuideVer_8.pdf.

Nylund, K. L., Asparouhov, T., & Muthén, B. O. (2007). Deciding on the number of classes in latent class analysis and growth mixture modeling: A Monte Carlo simulation study. *Structural Equation Modeling: A Multidisciplinary Journal*, *14*(4), 535–569. https://doi.org/10.1080/10705510701575396.

Opdenakker, M.-C., & Van Damme, J. (2006). Teacher characteristics and teaching styles as effectiveness enhancing factors of classroom practice. *Teaching and Teacher Education*, *22*(1), 1–21. https://doi.org/10.1016/j.tate.2005.07.008.

Pianta, R. C., & Hamre, B. K. (2009). Conceptualization, measurement, and improvement of classroom processes: Standardized observation can leverage capacity. *Educational Researcher*, *38*(2), 109–119. https://doi.org/10.3102/0013189X09332374.

Pianta, R. C., Hamre, B. K., & Allen, J. P. (2012). Teacher–student relationships and engagement: Conceptualizing, measuring, and improving the capacity of classroom interactions. In S. L. Christenson, A. L. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 365–386). Springer Nature.

Pianta, R. C., Hamre, B. K., & Mintz, S. (2012). *Classroom assessment scoring system: Secondary manual*. Teachstone.

Putnam, R. T., & Borko, H. (2000). What do new views of knowledge and thinking have to say about research on teacher learning? *Educational Researcher*, *29*(1), 4–15. https://doi.org/10.3102/0013189X029001004.

Skaalvik, E. M., & Skaalvik, S. (2010). Teacher self-efficacy and teacher burnout: A study of relations. *Teaching and Teacher Education*, *26*(4), 1059–1069. https://doi.org/10.1016/j.tate.2009.11.001.

Spilt, J. L., Koomen, H. M., & Thijs, J. T. (2011). Teacher wellbeing: The importance of teacher–student relationships. *Educational Psychology Review*, *23*(4), 457–477. https://doi.org/10.1007/s10648-011-9170-y.

Starnaman, S. M., & Miller, K. I. (1992). A test of a causal model of communication and burnout in the teaching profession. *Communication Education*, *41*(1), 40–53. https://doi.org/10.1080/03634529209378869.

Vangrieken, K., Dochy, F., Raes, E., & Kyndt, E. (2015). Teacher collaboration: A systematic review. *Educational Research Review*, *15*, 17–40. https://doi.org/10.1016/j.edurev.2015.04.002.

Veenman, M. V. J., Kok, R., & Blöte, A. W. (2005). The relation between intellectual and metacognitive skills in early adolescence. *Instructional Science*, *33*(3), 193–211. https://doi.org/10.1007/s11251-004-2274-8.

Virtanen, T. E., Pakarinen, E., Lerkkanen, M. K., Poikkeus, A. M., Siekkinen, M., & Nurmi, J. E. (2018). A validation study of Classroom Assessment Scoring System–Secondary in the Finnish school context. *The Journal of Early Adolescence*, *38*(6), 849–880. https://doi.org/10.1177/0272431617699944.

Virtanen, T. E., Vaaland, G. S., & Ertesvåg, S. K. (2019). Associations between observed patterns of classroom interactions and teacher wellbeing in lower secondary school. *Teaching and Teacher Education*, *77*, 240–252. https://doi.org/10.1016/j.tate.2018.10.013.

Vygotsky, L. S. (1991). Genesis of the higher mental functions. In P. Light, S. Sheldon, & M. Woodhead (Eds.), *Learning to think* (pp. 32–41). Routledge.

Wagner, W., Göllner, R., Werth, S., Voss, T., Schmitz, B., & Trautwein, U. (2016). Student and teacher ratings of instructional quality: Consistency of ratings over time, agreement, and predictive power. *Journal of Educational Psychology*, *108*(5), 705–721. https://doi.org/10.1037/edu0000075.

Westergård, E., Ertesvåg, S. K., & Rafaelsen, F. (2019). A preliminary validity of the Classroom Assessment Scoring System in Norwegian lower-secondary schools. *Scandinavian Journal of Educational Research*, *63*(4), 566–584. https://doi.org/10.1080/00313831.2017.1415964.

Wickrama, K. A. S., Lee, T. K., O'Neal, C. W., & Lorenz, F. O. (2016). *Higher-order growth curves and mixture modeling with Mplus: A practical guide.* Routledge.

Wubbels, T., & Brekelmans, M. (2005). Two decades of research on teacher–student relationships in class. *International Journal of Educational Research*, *43*(1–2), 6–24. https://doi.org/10.1016/j.ijer.2006.03.003.

Yang, Y., & Hu, B. Y. (2019). Chinese preschool teachers' classroom instructional support quality and child-centered beliefs: A latent profile analysis. *Teaching and Teacher Education*, *80*(1), 1–12. https://doi.org/10.1016/j.tate.2018.12.021.