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To cite this article: Ida Katrine Riksaasen Hatlevik & Ove Edvard Hatlevik (11 Sep 2024): Variations in sources of job satisfaction and teacher efficacy between novice and experienced teachers, *Teachers and Teaching*, DOI: [10.1080/13540602.2024.2400170](https://doi.org/10.1080/13540602.2024.2400170)

To link to this article: <https://doi.org/10.1080/13540602.2024.2400170>



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Published online: 11 Sep 2024.



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Variations in sources of job satisfaction and teacher efficacy between novice and experienced teachers

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ABSTRACT

Low levels of job satisfaction and teacher efficacy can cause teachers to leave the profession. Few studies, however, have addressed possible differences in sources of job satisfaction and teacher efficacy for teachers in different professional life phases. This study uses data about Norwegian schoolteachers derived from TIMSS 2015 to investigate the relationship between job satisfaction, teacher efficacy in science instruction, support from school leadership, and collegial collaboration among novice and experienced teachers, respectively. The results add new insights to the findings of previous research and show that teacher efficacy in science instruction is related to job satisfaction in both groups. Additionally, the results suggest that support of school leaders plays a critical role in shaping the job satisfaction of novice teachers, whereas experienced teachers' job satisfaction is more strongly associated with collegial collaboration. Furthermore, the results indicate that support from school leadership and collegial collaboration is especially important for novice teachers' efficacy beliefs. Practical implications are outlined, and limitations are discussed.

ARTICLE HISTORY

Received 27 January 2021
Accepted 20 August 2024

KEYWORDS

Job satisfaction; teacher efficacy; support from leadership; collegial collaboration; novice teachers; experienced teachers

Introduction

Job satisfaction is the degree to which people enjoy their jobs; people who dislike their jobs will often try to find alternative employment (Spector, 1997). A high turnover rate, especially among novice teachers, is a major challenge in several countries (Burke et al., 2015; Gaikhorst et al., 2014; See & Gorard, 2020), regardless of differences in educational systems (J. -Y. Hong, 2010), and contributes to a shortage of qualified teachers (Ingersoll & May, 2012). Previous research has found that teacher turnover is negatively related to job satisfaction (Guarino et al., 2006; Ingersoll & May, 2012; E. M. Skaalvik & Skaalvik, 2023b) and efficacy beliefs regarding teaching (teacher efficacy) (J. -Y. Hong, 2012; R. M. Klassen & Chiu, 2011), which are two often correlated but separate work-related motivational concepts

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(Banerjee et al., 2017). Few studies, however, have specifically addressed possible differences in sources of job satisfaction and teacher efficacy between teachers in different professional life phases. Thus, investigating possible variations in sources of job satisfaction and teacher efficacy between novice and experienced teachers can inform strategies to prevent high turnover rates.

C. Day et al. (2007) identified six professional life phases for teachers. Our study concerns the first and the third phases, which we label novice teachers (0–3 years of teaching) and experienced teachers (8–15 years of teaching). According to C. Day et al. (2007), teachers experience specific challenges in each professional life phase. For this reason, novice teachers and experienced teachers should be studied separately. Novice teachers may experience several challenges when trying to cope with their new role as professional teachers. C. Day (1999) states that the first few years of teaching are characterised as a two-way struggle in which ‘teachers try to create their own social reality by attempting to make their work match their personal vision of how it should be, whilst at the same time being subjected to the powerful socializing forces of the school culture’ (p. 59). This might result in novice teachers having to come to terms with not being able to be the teacher they had envisioned as student teachers (Olsen, 2008). In addition, during this transition period, novice teachers move from the familiar role of student, characterised by being dependent, receiving support, and being mainly concerned with their own learning process, to the less familiar role of professional teacher, characterised by being independent and responsible for facilitating other people’s learning (Le Maistre & Pare, 2010). Feiman-Nemser (2012) described the transition from prospective teacher to professional teacher as ‘a time of intense learning’ and ‘intense loneliness’ (p. 10). In contrast, experienced teachers are more prone to experiencing tensions related to work-life balance and managing change in their professional lives (C. Day et al., 2007; van der Want et al., 2018).

Furthermore, support from school leadership and collegial collaboration are two contextual factors that previous studies have identified as influential sources of job satisfaction (E. M. Skaalvik & Skaalvik, 2011) and teacher efficacy (Caspersen & Raaen, 2014; C. Day et al., 2007; Goddard et al., 2007). However, previous research has not provided a clear picture of whether these two contextual factors are equally important to both novice and experienced teachers’ teacher efficacy and job satisfaction. In a much-cited study from the USA, M. Tschannen-Moran and Hoy (2007) found contextual factors to be much more salient in the teacher efficacy of novice teachers than more experienced teachers. In contrast, in a Norwegian study, Caspersen and Raaen (2014) found that collegial collaboration was positively associated with teacher efficacy for both novice and experienced teachers, whereas support from school leadership was only associated with experienced teachers’ teacher efficacy. Furthermore, in a qualitative study in Qatar, Chaaban and Du (2017) found differences between novice and experienced teachers regarding sources of job satisfaction. The only common source of job satisfaction reported was teacher efficacy. Collegial collaboration and support from school leadership were only important sources of job satisfaction for novice teachers. Based on these somewhat divergent findings of previous research, it is thus of interest to explore the possible differences between novice and experienced teachers regarding the relationship between support from school leadership, collegial collaboration, teacher efficacy in science instruction, and job satisfaction.

The present study, therefore, aims to investigate the relationship between job satisfaction, teacher efficacy in teaching science, support from school leadership, and collegial collaboration, using data on Norwegian lower secondary school derived from TIMSS 2015 (Trends in International Mathematics and Science Study). Separate correlation analysis and multiple regression analysis, where two or three models were tested, were conducted for novice and experienced teachers to detect possible group differences in the relationship between the variables studied.

Theoretical framework and previous research

Job satisfaction

Job satisfaction is a frequently studied variable that has been conceptualised and measured in slightly different ways (Banerjee et al., 2017). We understand job satisfaction as a motivational concept that refers to how people generally feel about their job (E. M. Skaalvik & Skaalvik, 2015). Teachers' job satisfaction involves the positive or negative judgements that they make about their job as a teacher (Chaaban & Du, 2017). Job satisfaction can, to some extent, be seen as a reflection of good treatment and how well a workplace is functioning (Spector, 1997).

Previous research indicates that the concept of work engagement to some degree overlaps with the concept of job satisfaction (E. M. Skaalvik & Skaalvik, 2014). Work engagement is defined as 'a positive, fulfilling work-related state of mind that is characterized by vigour, dedication and absorption' (Schaufeli et al., 2006, p. 702). Høigaard et al. (2012) found that the dedication dimension of work engagement is closely related to novice teachers' job satisfaction. Dedication refers 'to being strongly involved in one's work and experiencing a sense of significance, enthusiasm, inspiration, pride and challenge' (Schaufeli et al., 2006, p. 702).

Previous studies have concluded that teachers' job satisfaction has positive consequences for both the individual teacher and the school (Høigaard et al., 2012; Malinen & Savolainen, 2016). Job satisfaction has also been identified as a negative predictor of the intention to leave the profession (McCarthy et al., 2010; E. M. Skaalvik & Skaalvik, 2023b). Research that has specifically studied novice teachers has revealed that teachers who report high levels of job satisfaction are committed, motivated, and determined to remain in the profession, despite job demands (Tait, 2008). In addition, they report that they are able to focus their attention on their students' learning as well as their own professional development (Lam & Yan, 2011). In contrast, teachers who are dissatisfied report being demotivated for the teaching task (Moé et al., 2010) and having high levels of stress and burnout (R. M. Klassen & Chiu, 2010).

Previous research has found that teachers' job satisfaction is affected by personal factors, such as teacher efficacy (Caprara et al., 2006; Chaaban & Du, 2017; Malinen & Savolainen, 2016; Perera et al., 2018; E. M. Skaalvik & Skaalvik, 2014), and various contextual factors (Banerjee et al., 2017; E. M. Skaalvik & Skaalvik, 2011, 2023a; Song & Mustafa, 2015; Toropova et al., 2020). In the present study, we investigate the extent to which teacher efficacy in science instruction and two contextual factors—support from leadership and collegial collaboration—are associated with job satisfaction. In the following section, we explore the concept of teacher efficacy. Thereafter, we present findings

from research on the relationship between support from school leadership, collegial collaboration, teachers' job satisfaction, and teacher efficacy.

Teacher efficacy

Like job satisfaction, professional self-efficacy is a motivational concept. Some claim that the two concepts measure the same phenomenon to a certain degree (Weiss, 2002). We argue, however, that while job satisfaction describes how people generally feel about their job (E. M. Skaalvik & Skaalvik, 2015), the concept of self-efficacy refers to 'a belief in one's capabilities to organise and execute the courses of action required to produce given attainments' (Bandura, 1997, p. 3). Bandura (1997) argues that self-efficacy is domain-specific (i.e. not a global trait) and that there are four major influences on self-efficacy beliefs: mastery experiences, vicarious experiences, verbal persuasion, and psychological arousal.

In the teaching profession, teacher efficacy reflects 'teachers' beliefs that they are capable of carrying out good teaching in the classroom' (Christophersen et al., 2016, p. 241). Teacher efficacy 'is a judgement of his or her capabilities to bring about desired outcomes of student engagement and learning, even among those students who may be difficult or unmotivated' (M. Tschannen-Moran & Hoy, 2001, p. 783).

According to Bandura (1997), self-efficacy beliefs in a specific area like teaching affect individuals' thought processes, levels of persistence, degrees of motivation, and affective states within the same area. Consequently, teacher efficacy could become a self-fulfilling prophesy and influence an individual's teaching performance and job satisfaction. This claim is supported by research showing that teacher efficacy is associated with job satisfaction (Caprara et al., 2006; Chaaban & Du, 2017; Malinen & Savolainen, 2016; E. M. Skaalvik & Skaalvik, 2014, 2023b).

Previous research has identified a range of work-related factors, such as workload, time pressure, student discipline problems, and relationships with students, parents, colleagues, superiors, and administrative staff, as influencing teachers' efficacy beliefs (Caspersen & Raaen, 2014; Goddard et al., 2007; Grangeat & Gray, 2008) and job satisfaction (Johnson et al., 2012; Ma & MacMillan, 1999; Malinen & Savolainen, 2016; E. M. Skaalvik & Skaalvik, 2009; Toropova et al., 2020). In our study, we focus on two contextual factors: school leadership and collegial collaboration. In the following section, we present previous research on the impact of these factors on teachers' job satisfaction and teacher efficacy.

Support from school leadership and collegial collaboration

Schools that produce high achievement among students often have leadership that is involved in guiding the teaching process as instructional leaders and ensuring that teachers receive the necessary opportunities for professional development (Robinson et al., 2008), and 'the way school leaders organize the instructional environment has implications for teacher well-being and retention' (Fiegener & Adams, 2023). Thus, school leaders play a key role in setting direction and creating and sustaining a positive school culture (C. Day et al., 2020). Lambersky (2016) identified principal behaviour as a 'key factor in improving teachers' working emotions—or deteriorating them' (p. 401).

However, other studies that have distinguished between novice and experienced teachers have revealed somewhat divergent findings concerning the relationship between support from school leadership, teacher efficacy, and job satisfaction.

Previous research has identified support from school leadership as the most important factor for novice teachers' teacher efficacy (C. Day et al., 2007) and an important source of job satisfaction (Bogler, 2001; Chaaban & Du, 2017; Menon, 2014). C. Day et al. (2007) identified two sub-groups of novice teachers: those who had an easy start to their careers and were developing a sense of teacher efficacy, and those who had a difficult start to their careers and were experiencing a reduced sense of teacher efficacy. Both sub-groups reported poor pupil behaviour as challenging and negatively influencing their work. However, the novice teachers with an easy start benefited from support from school leadership and colleagues, whereas the teachers with a difficult start did not.

C. Day et al. (2007) also identified support from school leadership as a key influence on experienced teachers' teacher efficacy. In contrast, Caspersen and Raaen (2014) found that support from school leadership was associated with only experienced teachers' teacher efficacy; novice teachers perceived that they got less support than more experienced teachers.

Previous research has revealed that collegial collaboration has a positive impact on teacher efficacy (Caspersen & Raaen, 2014; Goddard et al., 2007; Grangeat & Gray, 2008; Skaalvik & Skaalvik, 2023a) and teachers' job satisfaction (Banerjee et al., 2017; Ma & MacMillan, 1999; E. M. Skaalvik & Skaalvik, 2011, 2021). Banerjee et al. (2017) elaborates on this by pointing out that collegial collaboration helps teachers resolve issues easily, fosters the learning of new teaching tools, enhances professional competence, and thereby promotes job satisfaction. However, in a recent Swedish study Karlberg and Bezzina (2022) found that experienced teachers to a higher degree than novice teachers identify collaborative and collegial forms of learning as having an impact on their professional development. In addition, M. Tschannen-Moran and Hoy (2007) found that novice teachers' teacher efficacy was negatively related to interpersonal support from colleagues. Conversely, Chaaban and Du (2017) found that collegial collaboration was only reported to be an influential source of job satisfaction by novice teachers.

It is worth noting that the previous research we identified pertains to studies of teachers in general, rather than science teachers specifically. However, the science teachers included in this study likely also teach other subjects besides science. For the purposes of the survey used (TIMSS 2015), they were asked to respond specifically about their science teaching (Martin et al., 2016).

Methods

Research context

Norway is one of the Nordic countries characterised by a welfare state that implies high levels of social equality, high education standards, and accessible education (Larsen et al., 2022). The educational policy is oriented towards a comprehensive educational project (Telhaug et al., 2006) which means that 'schools should be inclusive, comprehensive, with no streaming and with easy passage between levels' (Blossing et al., 2014, p. 1). Additionally, teacher preparation in Norway is university-

based, with the main part of the initial teacher education taking place at the university or university college campus, alongside practical training periods in schools. During the last 15 years Norwegian school leaders or school leader teams have been «expected to improve efficiency, test scores and standards» (Abrahamsen et al., 2015, p. 63). Thus, the school leaders are responsible for both administrative tasks, strategies, and instructional leadership. When TIMSS 2015 was conducted, there were no requirements in Norway for mentoring newly qualified teachers at schools. In 2018 a national framework for mentoring novice teachers was introduced. A recent evaluation reveals that 68% of teachers in primary and lower secondary schools state that they receive or have received mentoring. The evaluation, however, also highlights that many mentors lack formal mentoring competence (Halmrast et al., 2021). Furthermore, Norway, along with other Nordic countries, will experience a significant shortage of qualified schoolteachers in the next few years (Gunnes et al., 2018; Skoleverket, 2019). Therefore, it is crucial for educational researchers, school leaders, teacher educators, and policymakers to investigate factors related to teachers' job satisfaction and intentions to stay in the profession in Norway and elsewhere.

Aim of the present study

The aim of this paper is to investigate the relationship between job satisfaction, teacher efficacy in science instruction, support by school leadership, and collegial collaboration. The following five hypotheses regarding the relationships between said variables were developed from the existing research literature:

Hypothesis 1: Teacher efficacy in science instruction is positively related to job satisfaction.

Hypothesis 2: Support by school leadership is positively related to teacher efficacy in science instruction.

Hypothesis 3: Support by school leadership is positively related to job satisfaction.

Hypothesis 4: Collegial collaboration is positively related to teacher efficacy in science instruction.

Hypothesis 5: Collegial collaboration is positively related to job satisfaction.

In addition, we investigate possible differences between novice teachers and experienced teachers.

Participants and procedure

This study followed a cross-sectional, correlational design and involved a secondary analysis of existing data from a previous study, TIMSS 2015, which studied students and teachers from 57 countries, including 449 lower secondary

school teachers in Norway reporting about science instruction, specifically. The TIMSS is an educational research project conducted by the International Association for the Evaluation of Educational Achievement (IEA) which comply with principles stated in the Declaration of Helsinki. The collection, coding, and reporting of the data were conducted according to predefined quality standards (Martin et al., 2016).

The TIMSS 2015 had a two-stage sample procedure. First, researchers drew a representative sample of schools, and then school classes were drawn. Teachers who were connected to the school classes were selected and included in the study. This procedure ensures random selection of students and teachers. The response rate was 95% for Norway at the school level and 100% at the class level (Martin et al., 2016, p. 171). The length of teaching careers was ranging from 0 to 45 years. It was 18.9% between 0 and 3 years, and 27.2% between 8 and 15 years. The sample consisted of 53.5% female teachers. The proportion of female teachers is 62% across all subjects in lower secondary school (Utdanningsdirektoratet, 2024). We do not have access to public statistics on the proportion of females teaching each subject, but there is probably a lower proportion of female teachers in science than in the other subjects.

C. Day et al. (2007) identified six professional life phases for teachers (0–3, 4–7, 8–15, 16–23, 24–30, and 31+ years of teaching). This study concerns teachers who belong to the first and third phases. 85 teachers had 0–3 years of teaching experience and were identified as novice teachers; 122 teachers had 8–15 years of teaching experience and were labelled as experienced teachers.

Instruments

The participants answered a questionnaire that contained questions and statements about their academic and professional backgrounds, classroom resources, instructional practices, and attitudes towards teaching. All the questions and statements used in this study are presented in in [Appendix A](#) and [B](#), along with information about descriptive statistics (mean and standard deviation) and univariate normality (skewness and kurtosis) for each item.

Previous studies have used different scales to measure teachers' job satisfaction (Spector, 1997) and has identified that the dedication dimension of work engagement is closely related to novice teachers' job satisfaction (Høigaard et al., 2012). Therefore, in TIMSS, the teacher job satisfaction scale consists of items measuring job satisfaction and items measuring dedication, based on the Utrecht Work Engagement Scale (Martin et al., 2016; Schaufeli et al., 2006). Teachers' job satisfaction was measured using seven statements about the experience of being a teacher. Teachers were asked to rate how often they felt about the statements (e.g. I am content with my profession as a teacher; I am satisfied with being a teacher at this school; I am enthusiastic about my job). The corresponding response categories were: 1 = very often, 2 = often, 3 = sometimes, and 4 = never or almost never.

Teacher efficacy in science instruction was measured using 10 statements influenced by the Ohio State Teacher Efficacy Scale developed by M. Tschannen-Moran and Hoy (2001). Teachers were asked to characterise their confidence regarding various teaching activities (e.g. inspiring students to learn science; explaining science concepts or

principles by doing science experiments; assessing students' comprehension of science; adapting my teaching to engage students' interest). The corresponding response categories were: 1 = very high, 2 = high, 3 = medium, and 4 = low.

Three statements were used to measure teachers' perceptions of support from school leadership in both instruction and professional development (e.g. collaboration between school leadership and teachers to plan instructions; amount of instructional support provided to teachers by school leadership; school leaderships' support for teachers' professional development). The corresponding response categories were: 1 = very high, 2 = high, 3 = medium, 4 = low, and 5 = very low.

Collegial collaboration was measured by six statements about how often teachers had various forms of interactions with other teachers (e.g. discuss how to teach a particular topic; collaborate in planning and preparing instructional materials; work together to try out new ideas). The corresponding response categories were: 1 = very often, 2 = often, 3 = sometimes, and 4 = never or almost never.

Analytical strategy

The data were analysed using Statistical Product and Service Solutions (SPSS). Prior to testing the hypothesised relationships, the data were analysed with respect to the descriptive statistics (means and standard deviations) and measures of univariate normality (skewness and kurtosis) (see tables in Appendix). The univariate distribution was in the range of normality (between -1 and 1 for both skewness and kurtosis) for all the additive indices and for most of the observed variables for both novice and experienced teachers.

Furthermore, we created four additive indices (*job satisfaction*, *teacher efficacy in science instruction*, *support from school leadership*, and *collegial collaboration*) and performed a reliability analysis (Cronbach's α) for each index for novice and experienced teachers, respectively (see Table 1). Cronbach's α reliability coefficients for the respective additive indices for novice teachers were 0.89 for *teacher efficacy in science instruction*, 0.92 for *job satisfaction*, 0.84 for *support from school leadership*, and 0.86 for *collegial collaboration*. For experienced teachers, the additive indices were 0.91 for *teacher efficacy in science instruction*, 0.91 for *job satisfaction*, 0.64 for *support from school leadership*, and 0.84 for *collegial collaboration*. The Cronbach's α for all the indices is relatively high, except for support from school leadership for experienced teachers (0.64), where it is moderate. However, considering that it is based on only three items, it is acceptable. Overall, it seemed that most items worked quite well for both groups.

Correlation and multiple regression analysis were performed to investigate the relationship (H1–5) between the four additive indices for novice and experienced teachers, respectively. In the initial multiple regression analysis, collegial collaboration and support from school leadership were entered as predictors of teacher efficacy starting with collegial collaboration in model 1 to determine the contributions to the variation in teacher efficacy (see Table 2). In model 2, support from school leadership was added, revealing to what extent collegial collaboration and support from school leadership explained variation in the dependent variable teacher efficacy. Similarly, a multiple regression analysis was conducted, with collegial collaboration (model 1), support from school leadership (included in model 2 and 3), and teacher efficacy in science instruction

Table 1. Correlation matrix for all constructs, novice (left) and experienced (right) lower secondary science teachers. Means, standard errors, min, max, skewness, and kurtosis for all indexes.

Variables	Collegial collaboration	Support from school leadership	Teacher efficacy in science instruction	Job satisfaction
Collegial collaboration	–	.35**	.15	.41**
Support from school leadership	.26**	–	.16	.27**
Teacher efficacy in science instruction	.39**	.31**	–	.39**
Job satisfaction	.20	.49**	.44**	–
Novice teachers				
Cronbach's α	0.86	0.84	0.89	0.92
Means	15.31	7.76	20.90	11.28
Standard Errors	0.40	0.25	0.55	0.44
Min	6	3	10	7
Max	23	12	30	22
Skewness	–0.32	–0.03	–0.41	0.74
Kurtosis	–0.37	–0.52	–0.66	–0.37
Experienced teachers				
Cronbach's α	0.84	0.64	0.91	0.91
Means	15.77	7.97	20.93	10.88
Standard Errors	0.29	0.17	0.45	0.31
Min	7	4	10	7
Max	21	13	30	20
Skewness	–0.70	0.44	–0.49	0.50
Kurtosis	0.17	0.01	0.11	–0.82

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

Table 2. Multiple regression analysis with teacher efficacy in science instruction as dependent variable. Collegial collaboration (model 1 and 2) and support from school leadership (model 2) as predictors of variation in teacher efficacy.

Variables	Model 1			Model 2		
	B	β	SE	B	β	SE
Novice teachers						
Collegial collaboration	.52	.38***	.14	.44	.33***	.14
Support from school leadership				.48	.22**	.23
R ²	14.0%			17.6%		
Experienced teachers						
Collegial collaboration	.22	.14	.15	.16	.11	.15
Support from school leadership				.30	.12	.26
R ²	1.4%			1.7%		

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

(included in model 3) serving as predictors of variation in job satisfaction (see Table 3) (Cohen et al., 2013).

Results

For each group we analysed the correlations between the four indices. All six associations had significant moderate correlations for novice teachers. Whereas four out of six associations had a significant moderate correlation for experienced teachers. We did not identify any significant association between *support from school leadership* and *teacher efficacy in science instruction* and between *collegial collaboration* and *teacher efficacy in science instruction* for experienced teachers (see Table 1).

Table 3. Multiple regression analysis with job satisfaction as dependent variable. Collegial collaboration (Model 1 – Model 3), support from school leadership (Model 2 – Model 3) and Teacher efficacy in science instruction (Model 3) as predictors of variation in job satisfaction.

Variables	Model 1			Model 2			Model 3		
	B	β	SE	B	β	SE	B	β	SE
Novice teachers									
Collegial collaboration	.21	.20*	.12	.08	.07	.11	-.04	-.03	.12
Support from school leadership				.84	.47***	.17	.70	.40***	.18
Teacher efficacy in science instruction							.28	.33***	.09
R ²	2.6%			22.5%			30.8%		
Experienced teachers									
Collegial collaboration	.43	.41***	.09	.38	.36***	.10	.31	.29***	.09
Support from school leadership				.26	.14	.17	.20	.11	.17
Teacher efficacy in science instruction							.24	.33***	.06
R ²	15.9%			17.0%			24.9%		

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

Two multiple regression analysis was used to test the hypothesised relationships between variables for each of the two groups separately. The initial multiple regression analysis (see Table 2) indicated that, for novice teachers, *support from school leadership* ($\beta = 0.33$) and *collegial collaboration* ($\beta = 0.22$) were found to be significantly and moderately associated with *teacher efficacy in science instruction*, whereas no such associations were observed for experienced teachers.

The subsequent multiple regression analysis (see Table 3) indicated that, for novice teachers, the association between *collegial collaboration* and *job satisfaction* became non-significant upon including *support from school leadership* and *teacher efficacy in science instruction* as predictors. In this analysis, only *support from school leadership* ($\beta = 0.40$) and *teacher efficacy in science instruction* ($\beta = 0.33$) were found to be significantly and moderately associated with *job satisfaction* among novice teachers. Conversely, for experienced teachers, the results revealed that only *collegial collaboration* ($\beta = 0.29$) and *teacher efficacy in science instruction* ($\beta = 0.33$) demonstrated significant and moderate associations with *job satisfaction*.

Discussion and practical implications

Low levels of job satisfaction (Guarino et al., 2006; Ingersoll & May, 2012; E. M. Skaalvik & Skaalvik, 2023b) and teacher efficacy (J. -Y. Hong, 2012; R. M. Klassen & Chiu, 2011) are linked to a high turnover rate, which is a major problem. Previous research has found that teachers' job satisfaction is positively related to teacher efficacy (Banerjee et al., 2017) and that both support from school leadership and collegial collaboration are positively related to teacher efficacy (Goddard et al., 2007) and job satisfaction (E. M. Skaalvik & Skaalvik, 2011). However, previous research has not provided a clear picture of whether contextual factors are equally important for novice and experienced teachers' teacher efficacy and job satisfaction.

This paper addressed five hypotheses derived from the research literature on the relationships between four indices: *job satisfaction*, *teacher efficacy in science instruction*, *support from school leadership*, and *collegial collaboration* (H1–H5). Possible differences in the hypothesised relationships between novice and experienced teachers were

explored. The results (see [Tables 2 and 3](#)) revealed that four of the associations between the variables differed for novice and experienced teachers, which confirm that novice and experienced teachers should be studied separately (Caspersen & Raaen, 2014; Chaaban & Du, 2017; C. Day et al., 2007; Tiplic et al., 2015; M. Tschannen-Moran & Hoy, 2007).

First, the analysis showed that *teacher efficacy in science instruction* was positively related to *job satisfaction* for both novice and experienced teachers, thus supporting H1 and corroborating the findings of previous studies (Caprara et al., 2006; Chaaban & Du, 2017; Høigaard et al., 2012; E. M. Skaalvik & Skaalvik, 2014, 2023b). These findings suggest that novice and experienced teachers' beliefs regarding their ability to teach effectively in the classroom (Christophersen et al., 2016) impact how they generally feel about their job (E. M. Skaalvik & Skaalvik, 2015). The association between these two variables was significant but moderate, thus supporting the notion that job satisfaction and teacher efficacy are two distinct work-related motivational concepts (Banerjee et al., 2017).

According to Bandura (1997), mastery experiences in the teaching profession are the most influential source of teacher efficacy. Thus, our results point to the importance of mastery experiences in professional practice for both novice and experienced teachers. Schools should address difficult situations as a community rather than leaving them to individual teachers to manage. This implies that novice teachers should not be given assignments that other staff members do not want to take on, e.g. sole responsibility for teaching particularly difficult classes. However, experiencing work-related stress at some point in one's career is quite common. Like most teachers, novice teachers must find ways to cope successfully (Tait, 2008). Resources and support available within the school context may positively influence their ability to cope with stressful experiences (Caspersen & Raaen, 2014; J. -Y.Hong, 2010).

Second, the results revealed that *support from school leadership* was positively related to *teacher efficacy in science instruction* for novice teachers but not for experienced teachers; thus, H2 was supported for novice teachers and rejected for experienced teachers. This suggests that support from school leadership is especially important to reinforcing novice teachers' teacher efficacy.

Third, the analysis revealed that *support from school leadership* was positively related to *job satisfaction* for both novice and experienced teachers, thus supporting H3 and corroborating the findings of previous studies (Bogler, 2001; Menon, 2014). However, controlling for *collegial collaboration* and *teacher efficacy in science instruction*, the association between *support from school leadership* and *job satisfaction* was significant for novice teachers but not for experienced teachers. This is in line with Chaaban and Du's (2017) findings, which indicate that school leadership plays a more prominent role in influencing novice teachers' job satisfaction than experienced teachers' job satisfaction.

Considering the results related to H2 and H3, support from school leadership appears to be key to novice teachers' teacher efficacy and job satisfaction, as C. Day et al. (2007) pointed out. Previous research has revealed that novice teachers primarily need help solving practical and technical problems in their work, handling 'problem children', dealing with groups of children with great variation in knowledge and skills, using pedagogical methods effectively, setting grades, and understanding their timetable (Cains & Brown, 1998; Caspersen & Raaen, 2014; Joiner & Edwards, 2008). In addition, Vanderline and Kelchtermans (2013) emphasise that beyond

learning how to manage children in a classroom, novice teachers also need to develop and manage relationships with a variety of actors in the school (pupils, parents, colleagues, administrative staff, and school leadership). However, Caspersen and Raaen (2014) found that novice teachers generally lack ways to articulate their own needs and feel they get less support from their superiors than their experienced colleagues do. Our results imply that novice teachers may need more formalised support than their more experienced colleagues.

Fourth, the analysis revealed that *collegial collaboration* was positively related to *teacher efficacy in science instruction* only for novice teachers, thus supporting H4 for novice teachers, but not for experienced teachers. The result for novice teachers is in line with previous research that has emphasised collegial collaboration as influencing teachers' efficacy beliefs (Caspersen & Raaen, 2014; Goddard et al., 2007; Grangeat & Gray, 2008), whereas a lack of cooperation among colleagues may have the opposite result (Brouwers et al., 2001). Thus, our results suggest that collegial collaboration is key to promoting novice teachers' teacher efficacy but does not have the same impact on experienced teachers' teacher efficacy.

Fifth, the correlation analysis revealed that *collegial collaboration* was positively related to *job satisfaction* for novice and experienced teachers, meaning that H5 was supported for both groups. This is in line with previous research that identified a strong relationship between collegial collaboration and teachers' job satisfaction (Banerjee et al., 2017; Johnson et al., 2012; Ma & MacMillan, 1999; E. M. Skaalvik & Skaalvik, 2011, 2021), and indicates that collegial collaboration is an important source of job satisfaction in both groups. However, controlling for *support from school leadership* and *teacher efficacy in science instruction*, the association between *collegial collaboration* and *job satisfaction* was significant for experienced teachers but not for novice teachers, which is contradictory to Chaaban and Du's (2017) findings. However, interpreting our result with Chaaban and Du's (2017) findings in mind, collegial collaboration may be important to both groups' job satisfaction but for slightly different reasons. Collegial collaboration can provide novice teachers with support and opportunities to discuss how to teach a particular topic and collaborate in planning and preparing instructional materials. For experienced teachers, collegial collaboration can be a source of appreciation from other colleagues when they are sharing previous experiences and already developed teaching materials, which Chaaban and Du (2017) identify as an essential source, in addition to teacher efficacy, of job satisfaction for experienced teachers. However, novice teachers may not feel that they have much to contribute to collegial collaboration. We, therefore, suggest that it is important that novice teachers be made aware of and feel that they are not only receiving assistance but also have something to contribute to collegial collaboration. Thus, perceiving that one has something to contribute to others gives a sense of empowerment and may promote teacher efficacy and job satisfaction. Therefore, school leadership should make clear to the teaching staff that novice teachers can contribute new ideas and fresh perspectives, which is something that should be taken advantage of in instructional planning and discussions.

Finally, the correlation analysis revealed a connection between the level of *collegial collaboration* and *support from school leadership*, for both groups of teachers. If and how colleagues collaborate may be an indication of the dominant organisational culture present in a school. Another explanation for low levels of collaboration could be that

teachers don't have the time, support or other resources to collaborate together more frequently. Either way, it is the responsibility of the school leaders to allocate time, facilitate and promote an organisational culture characterised by collegial collaboration where teaching-related experiences are discussed, and resources are shared and developed collaboratively, which are necessary prerequisites in order to create and maintain a professional community (Banerjee et al., 2017; C. Day et al., 2020).

This study has implications for practice. The results emphasise the need for school leaders and educators to recognise the significance of supporting novice teachers and fostering collegial collaboration among all teachers. Our results suggest that novice teachers need formalised support and guidance as well as confirmation from their leaders that they are performing satisfactorily. With increasing experience, validation from colleagues becomes increasingly crucial. The way a school welcomes newly qualified teachers and the types of formal support organised by school leaders to cater to their needs can greatly influence novice teachers' sense of teacher efficacy and job satisfaction. This underscores the importance of school leaders selecting mentors for novice teachers who possess formal mentoring competence—a quality that is often lacking among mentors in Norway (Halmrast et al., 2021). Consequently, there is a pressing need to provide and finance mentor training specifically tailored to support mentors working with novice teachers.

In addition, our results regarding novice teachers are also important to teacher educators who are responsible for preparing prospective teachers for participation in professional communities. Based on our results, we suggest that initial teacher education programmes should introduce prospective teachers to what characterises participation in a professional community, what collegial collaboration involves, and what is expected and not expected of newcomers. Furthermore, prospective teachers need to be taught the importance of being proactive when it comes to seeking support from both school leaders and colleagues.

Moreover, our study contributes to a body of knowledge that is notable for policy-makers. It highlights the importance of guidelines and a financial framework that make it possible for school leaders to promote and enhance professional communities and support novice teachers.

Limitations and suggestions for further research

This study has a cross-sectional design; hence we cannot draw casual conclusions between the variables. The study was conducted within a specific sociocultural context, and it would be interesting to repeat the study with data from other countries, to see if the findings are generalisable.

The respondents in our study were science teachers in lower secondary schools. However, this study did not look at the degree to which this group of teachers is representative of other groups of teachers. However, Ingersoll and May (2012) found that science teachers do not have higher rates of turnover than other teachers. Furthermore, we do not find it likely that there should be a specific reason for the school leadership to treat science teachers any differently than teachers of other subjects within the same schools, nor do we find it probable that there is a systematic difference between collegial collaboration among science teachers compared to other groups of teachers.

Nonetheless, it would be interesting to replicate our study for other groups of teachers and at other school levels.

Our study is also limited to investigating the relationship between two contextual factors (*support from school leadership* and *collegial collaboration*) and *teacher efficacy in science instruction* and *job satisfaction*. It would thus be of interest to explore how other personal and contextual factors may act as sources of teacher efficacy and job satisfaction for novice and experienced teachers and if there are mediating or moderating factors. For instance, school leadership plays an important role in providing mentorship, supervision, professional support, counselling, and guidance for teachers.

In our analyses, we have used scales and items that the developers of TIMSS have chosen based on previous research. We argue that these items measure key aspects of the phenomena we want to study. However, a challenge in comparing new findings with previous research is that different studies use somewhat different scales when addressing the same phenomena. It would therefore be interesting for future research to investigate whether the correlations we have uncovered also apply when using different scales.

Our results underline the importance of how school leaders provide and organise support for novice teachers, which points to the importance of a good mentoring scheme for recent graduates. Specific induction and mentoring programmes have recently been launched in Norway to help newly qualified teachers in their first year of teaching. Our study, however, did not explore the respondents' experiences of specific mentoring activities they participated in when they were newly qualified. An interesting topic for further research would thus be to explore novice teachers' experience with various mentoring schemes and to investigate what, in their opinion, characterises especially helpful mentoring programmes and supports in their first years of teaching.

Disclosure statement

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

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Declarations

We confirm that this manuscript has not yet been published elsewhere and is not under consideration by another journal. Both authors have approved the manuscript and agree with its submission to *Teachers and Teaching—Theory and Practice*.

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Appendices

Appendix A. Means (M), Standard Deviations (SD), Skewness, and Kurtosis for All Items of the Administered Scales for Novice Teachers N = 85

Teacher efficacy in science instruction—Novice teachers

In teaching science to this class, how would you characterise your confidence in doing the following? (1 = Very high, 2 = High, 3 = Medium, 4 = Low)

Items	M (SD)	Skewness	Kurtosis
a) Inspiring students to learn science	1.62 (0.56)	0.18	-0.81
b) Explaining science concepts or principles by doing science experiments	2.04 (0.81)	0.07	-1.14
c) Providing challenging tasks for the highest achieving students	2.30 (0.75)	-0.56	-1.03
d) Adapting my teaching to engage students' interest	2.12 (0.73)	-0.20	-1.09
e) Helping students appreciate the value of learning science	1.96 (0.73)	0.06	-1.11
f) Assessing student comprehension of science	2.02 (0.72)	-0.04	-1.06
g) Improving the understanding of struggling students	2.32 (0.72)	-0.37	-0.69
h) Making science relevant to students	1.85 (0.59)	0.05	-0.22
i) Developing students' higher-order thinking skills	2.22 (0.69)	-0.35	-0.87
j) Teaching using science inquiry methods	2.31 (0.77)	-0.43	-0.88

Job satisfaction—Novice teachers

How often do you feel the following way about being a teacher? (1 = Very often, 2 = Often, 3 = Sometimes, 4 = Never or almost never)

a) I am content with my profession as a teacher	1.49 (0.63)	0.90	-0.13
b) I am satisfied with being a teacher at this school	1.51 (0.67)	0.97	-0.20
c) I find my work full of meaning and purpose	1.39 (0.58)	1.12	0.50
d) I am enthusiastic about my job	1.56 (0.70)	0.84	-0.51
e) My work inspires me	1.61 (0.69)	0.69	-0.66
f) I am proud of the work I do	1.69 (0.69)	0.48	-0.81
g) I am going to continue teaching for as long as I can	2.02 (0.94)	0.40	-0.95

Support from school leadership—Novice teachers

How would you characterise each of the following within your school? (1 = Very high, 2 = High, 3 = Medium, 4 = Low, 5 = Very low)

o) Collaboration between school leadership and teachers to plan instruction	2.84 (0.91)	0.05	-0.39
p) Amount of instructional support provided to teachers by school leadership	2.54 (0.93)	0.15	-0.46
q) School leadership's support for teachers' professional development	2.39 (0.80)	0.16	-0.37

Collegial collaboration—Novice teachers

How often do you have the following types of interactions with other teachers? (1 = Very often, 2 = Often, 3 = Sometimes, 4 = Never or almost never)

a) Discuss how to teach a particular topic	2.13 (0.84)	0.24	-0.65
b) Collaborate in planning and preparing instructional materials	2.39 (0.97)	0.04	-0.96
c) Share what I have learned about my teaching experiences	2.19 (0.82)	0.03	-0.81
d) Visit another classroom to learn about teaching	3.48 (0.73)	-1.42	1.74
e) Work together to try out new ideas	2.68 (0.66)	-0.84	0.78
f) Work as a group on implementing the curriculum	2.45 (0.78)	-0.21	-0.41

Appendix B. Means (M), Standard Deviations (SD), Skewness, and Kurtosis for All Items of the Administered Scales for Experienced Teachers N = 122

Teacher efficacy in science instruction—Experienced teachers

In teaching science to this class, how would you characterise your confidence in doing the following? (1 = Very high, 2 = High, 3 = Medium, 4 = Low)

Items	M (SD)	Skewness	Kurtosis
a) Inspiring students to learn science	1.70 (0.64)	0.36	-0.67
b) Explaining science concepts or principles by doing science experiments	2.05 (0.72)	-0.08	-1.07
c) Providing challenging tasks for the highest achieving students	2.31 (0.68)	0.03	-0.20
d) Adapting my teaching to engage students' interest	2.13 (0.64)	0.08	-0.20
e) Helping students appreciate the value of learning science	1.97 (0.62)	0.02	-0.34
f) Assessing student comprehension of science	2.01 (0.55)	0.01	0.35
g) Improving the understanding of struggling students	2.25 (0.66)	-0.33	-0.75
h) Making science relevant to students	2.03 (0.63)	-0.02	-0.43
i) Developing students' higher-order thinking skills	2.05 (0.63)	-0.04	-0.46
j) Teaching using science inquiry methods	2.48 (0.64)	-0.63	-0.30

Job satisfaction—Experienced teachers

How often do you feel the following way about being a teacher? (1 = Very often, 2 = Often, 3 = Sometimes, 4 = Never or almost never)

a) I am content with my profession as a teacher	1.54 (0.58)	0.49	-0.70
b) I am satisfied with being a teacher at this school	1.51 (0.58)	0.62	-0.58
c) I find my work full of meaning and purpose	1.40 (0.52)	0.75	-0.70
d) I am enthusiastic about my job	1.48 (0.58)	0.72	-0.46
e) My work inspires me	1.53 (0.59)	0.60	-0.57
f) I am proud of the work I do	1.55 (0.59)	0.54	-0.62
g) I am going to continue teaching for as long as I can	1.87 (0.80)	0.54	-0.45

Support from school leadership—Experienced teachers

How would you characterise each of the following within your school? (1 = Very high, 2 = High, 3 = Medium, 4 = Low, 5 = Very low)

o) Collaboration between school leadership and teachers to plan instruction	2.92 (0.82)	0.15	-0.10
p) Amount of instructional support provided to teachers by school leadership	2.52 (0.71)	0.49	-0.25
q) School leadership's support for teachers' professional development	2.53 (0.86)	0.60	-0.40

Collegial collaboration—Experienced teachers

How often do you have the following types of interactions with other teachers? (1 = Very often, 2 = Often, 3 = Sometimes, 4 = Never or almost never)

a) Discuss how to teach a particular topic	2.36 (0.78)	-0.21	-0.59
b) Collaborate in planning and preparing instructional materials	2.50 (0.76)	-0.23	-0.32
c) Share what I have learned about my teaching experiences	2.26 (0.74)	-0.21	-0.69
d) Visit another classroom to learn about teaching	3.48 (0.63)	-0.83	-0.32
e) Work together to try out new ideas	2.71 (0.68)	-0.40	0.27
f) Work as a group on implementing the curriculum	2.42 (0.72)	-0.41	-0.42