Collective teacher culture: exploring an elusive construct and its relations with teacher autonomy, belonging, and job satisfaction

Einar M. Skaalvik[1] ⬤ · **Sidsel Skaalvik**[1]

Abstract

One purpose of this study was to analyze relations between four possible indicators of a collective teacher culture by means of confirmatory factor analyses. The indicators were termed "shared goals values", "value consonance", "collective teacher efficacy", and "supportive colleagues". A second purpose was to explore relations between collective teacher culture and teachers' experiences of autonomy, belonging, and job satisfaction. Participants were 760 Norwegian teachers in elementary school and middle school. The data were analyzed by means of confirmatory factor analyses and SEM analyses. The correlations between the four indicators of a collective culture ranged from .44 to .63 and both a model with first order factors and a model with a second order collective culture variable had good fit to the data. The analysis showed that a second order collective teacher culture variable was strongly and positively associated with the teachers' experiences of autonomy, belonging, and job satisfaction.

1 Introduction

The social environment at school has important implications for teacher motivation and well-being, for instance by influencing how teachers interact with each other (Moller et al., 2013; Vescio et al., 2008). Several studies reveal that positive and supportive social relations between the teachers and between the teachers and the

---

✉ Einar M. Skaalvik
skaalvikeinar@gmail.com

Sidsel Skaalvik
Sidsel.skaalvik@ntnu.no

1 NTNU Social Research, Norwegian University of Science and Technology, Dokkgata 2c, 7042 Trondheim, Norway

school administration are associated with job-satisfaction, engagement, and the feeling of belonging (Hakanen et al., 2006; Simbula et al., 2011; Skaalvik & Skaalvik, 2011a, 2019). Because teachers' motivation and well-being may affect their instruction, social relations between schoolteachers and between teachers and school administration may also bear consequences for student learning.

The quality of the social interactions between the teachers may also influence the teachers' abilities and willingness to work together, and therefore their experiences of succeeding through joint effort. Such experiences are important requirements for the development of collective teacher efficacy (Bandura, 1997). Previous research confirms that positive and supportive social relations among the teachers as well as between the teachers and the school administration are associated with collective teacher efficacy (Lee et al., 2011; Skaalvik & Skaalvik, 2019). The belief that one may succeed through joint effort may in turn increase the quality of the social interactions in the teaching staff. Thus, a positive and supportive social environment at school and collective teacher efficacy likely influence each other in a reciprocal manner. Previous research also indicates that teachers' experiences of the social environment as inclusive and supportive correlate strongly with the perception that they share educational goals and values with their colleagues and with the school administration (Skaalvik & Skaalvik, 2011a, 2011b, 2019). Also, research indicates that instructional leadership emphasizing common goals and values increases collective teacher efficacy (Cansoy et al., 2020).

Taken together, previous research indicates that teacher motivation and well-being as well as teacher collaboration are influenced by positive and supportive work-related social relations, beliefs in what teachers may achieve through collaboration (collective teacher efficacy), and the development of common educational goals and values. We suggest that positive social relations, supportive environment, collective teacher efficacy, and common goals and values are interrelated constructs, and that they may constitute what we term a collective teacher culture. Campoli (2017) offer a similar concept of a professional school culture. A professional school culture is often defined by teacher collaboration, the sharing of knowledge and experiences, and systematically using data and experiences to improve the educational practice (Schipper et al., 2020). Because cooperation in teacher teams has become mandatory and scheduled in many Norwegian schools (Skaalvik & Skaalvik, 2021), we did not include teacher cooperation in the collective teacher culture construct. Successful teacher collaboration may be dependent on common values, positive and supportive social relations, and beliefs in what teachers may achieve through collaboration (collective teacher efficacy). Previous research shows that when cooperation is mandatory and scheduled, it may not be a good indication of positive relations, social support, or agreement on goals and values (Skaalvik & Skaalvik, 2015, 2021). Teachers report that the meetings are used both for rough planning of the teaching and for discussing common educational issues and problems. The teachers also report quite different experiences with the collaboration, from well-functioning teams to teams that are described as dysfunctional (Charner-Laird, 2017; Skaalvik & Skaalvik, 2021). In an interview study of Norwegian teachers, Skaalvik and Skaalvik (2021) found dysfunctional teamwork to be a source of stress and a serious job demand.

In this study we conceptualized a collective teacher culture as one characterized by a common understanding of educational goals and values, a strong collective teacher efficacy, and positive and supportive social relations. This is a broader conceptualization than the one Skaalvik and Skaalvik offered in 2018, emphasizing shared values and common practices. It is also broader than the description of a "collective pedagogical teacher culture" given by Moller et al. (2013). These researchers described a collective pedagogical teacher culture as an environment where teachers perceive a strong community orientation which include teacher agreement on the school mission. However, our emphasis on common educational goals and values overlap agreement on the school mission. Our conceptualization of a collective teacher culture also differs from what Campoli (2017) terms "a culture of teacher collegiality" which includes common beliefs and values, teacher cooperation, and enforcing common rules of student behavior. As noted, we did not include teacher cooperation.

The purpose of the present study was to explore intercorrelations between measures of common goals and values, collective teacher efficacy, and positive and supportive social relations. Another purpose was, by means of confirmatory factor analysis, to test a model where common goals and values, collective teacher efficacy, and supportive social relations are indicators of a second order collective teacher culture. A third purpose was to explore relations between a collective teacher culture and teachers feeling of belonging, job satisfaction, and perceived autonomy.

2 Theoretical framework

2.1 Collective teacher culture

In this study, we analyzed four potential aspects or indicators of a collective teacher culture: (a) shared goals and values in the teacher staff and between teachers and the school administration, (b) perceived value consonance, (c) collective teacher efficacy, and (d) a supportive relation with colleagues. We distinguished between two overlapping categories of common goals: shared goals and values and value consonance (see below). We did not include collaboration because much collaboration among teachers is driven by administrative mandate rather than teacher initiative (Hargreaves, 1994; Skaalvik & Skaalvik, 2021) and may not always indicate a collective culture. Rather, in our conceptualization, a collective teacher culture is a prerequisite for rewarding teacher cooperation.

2.1.1 Shared goals and values

We perceive shared goals and values as an important aspect of a collective teacher culture. According to Hoy and Miskel (2008), the development of shared values binds the teachers together and gives the school a distinctive identity. Shared values are also perceived as an important prerequisite for adaptive teacher collaboration. For instance, Thomson and Perry (2006) argue that collaboration requires trusting relationships among willing partners (see also Montiel-Overall, 2005). In a study

of Norwegian teachers, Skaalvik and Skaalvik (2018) found that the perception of shared values among the teachers correlated positively with job satisfaction and negatively with symptoms of burnout and motivation to leave the teaching profession.

In this study shared goals and values was measured as the individual teachers' perception that the teachers at the school and the school administration had common educational goals and values, but with no reference to the individual teacher's personal values.

2.1.2 Perceived value consonance

Skaalvik and Skaalvik (2011a) defined perceive value consonance as "the degree to which teachers feel that they share the prevailing norms and values at the school where they are teaching, for instance what goals should be pursued, what content should be emphasized, and what educational means and methods should be used" (p. 1031). The construct of value consonance overlaps with what we have termed shared values. However, whereas value consonance focuses on the individual teacher and whether this teacher shares the prevailing goals and values at the school, shared values describe the degree to which there is a common understanding of educational goals and values in the teacher collegium and between the teachers and the school administration. That these constructs are separate but overlapping is previously shown by a moderate correlation of 0.58 (Skaalvik & Skaalvik, 2018). In a school with a high degree of shared values in the teacher staff, there may still be teachers who feel that the prevailing values in the teacher staff are not compatible with their personal values. These teachers may perceive that there is a high degree of shared goals and values among most teachers at school, but that they personally do not share these goals and values, which we conceptualize as lack of value consonance.

In a series of studies, Skaalvik and Skaalvik showed that teachers' perceptions of value consonance were positively associated with their teaching self-efficacy, engagement, feeling of belonging, and job satisfaction, whereas it was negatively associated with teacher burnout and teacher's motivation to leave the teaching profession (Skaalvik & Skaalvik, 2011a, 2017a, 2018, 2019). A possible explanation of these findings is that a teacher who feels that the prevailing norms and values at the school is compatible with his or her personal values may experience what Rosenberg (1979) referred to as contextual consonance. According to Rosenberg, a lack of contextual consonance or a contextual dissonance may result in a feeling of not belonging.

2.1.3 Perceived collective teacher efficacy

Bandura (1997) defines self-efficacy as beliefs about one's own ability to organize and execute the courses of action required to attain given educational goals. Accordingly, teacher self-efficacy may be conceptualized as teachers' beliefs in their own abilities to plan, organize, and carry out activities required to attain given educational goals (Skaalvik & Skaalvik, 2007). However, many challenges require that people work together. Bandura (1997) therefore emphasizes the importance of developing collective teacher efficacy, which he defines as beliefs that people, for instance

teachers, can succeed through their collective efforts. The most powerful source of collective efficacy is mastery experiences (Adams & Forsyth, 2006; Goddard et al., 2004). Skaalvik and Skaalvik (2019) therefore suggest that mastery experiences that result from collaboration and joint effort are particularly suited for increasing collective efficacy beliefs. However, we suggest that common goals and values among the staff as well as individual teachers' feeling of value consonance are prerequisites for both successful collaboration and for developing collective efficacy. Thus, there is likely reciprocal relations between shared values, perceived value consonance, and perceived collective efficacy. We suggest that these variables therefore are particularly well suited as indicators of a collective teacher culture.

Empirical research shows that collective teacher efficacy is positively associated with value consonance and with working in a supportive collegial environment (Skaalvik & Skaalvik, 2010, 2019). As could be expected, collective self-efficacy is also positively associated with commitment (Fathi & Rostami, 2018; Ross & Gray, 2006; Ware & Kitsantas, 2007) and with teacher collaboration (Ashton & Webb, 1986; Onsrud, 2015). Collective teacher efficacy is also found to be predictive of higher engagement (Skaalvik & Skaalvik, 2019) and less symptoms of burnout (Skaalvik & Skaalvik, 2007).

2.1.4 Supportive relations with colleagues

We also conceptualize positive and supportive social relations with colleagues as one aspect of a collective culture. Positive social relations may be seen both as a prerequisite and as an outcome of shared values and adaptive collaboration. According to Waddell (2010) colleagues can be a source of strength in the teaching profession and Geisler et al. (2019) argue that job resources in terms of a supportive environment is an important determinant of job satisfaction and organizational commitment. Research related to the Job Demands-Resources model developed by Demerouti et al. (2001) has consistently shown that positive and supportive social relations at work is associated with engagement, the feeling of belonging, collective teacher efficacy, and job satisfaction, and negatively associated with burnout (e.g., Hakanen et al., 2006; Leung & Lee, 2006; Pines & Aronson, 1988; Simbula et al., 2011; Skaalvik & Skaalvik, 2011a, 2017a, 2019).

2.2 Teacher autonomy

In self-determination theory, autonomy is regarded as a basic psychological need (Deci & Ryan, 1985, 2000). In support of this assumption, empirical research shows that teachers' perceptions of autonomy are associated with job satisfaction (Pearson & Moomaw, 2006; Skaalvik & Skaalvik, 2010, 2015; Zembylas & Papanastasiou, 2006). An important task for the present study, was to explore relations between a collective teacher culture and teachers' perceptions of autonomy. Because a collective culture is characterized by value consonance, social support, and collective efficacy one may expect that teachers in such an environment would experience a high degree of autonomy. Nevertheless, a collective culture may also be characterized

by joint decisions and expectations, and for some teachers, such expectations may diminish their experience of autonomy.

2.3 Feeling of belonging

Psychological researchers generally consider the need to belong as a fundamental human motivation (Baumeister & Leary, 1995; Deci & Ryan, 2000). The degree to which the need to belong is accommodated, for instance at the workplace, may affect motivation and commitment as well as well-being. Research on students repeatedly show that the feeling of belonging to the school or the school class correlates positively both with motivation for schoolwork (Furrer & Skinner, 2003; Goodenow & Grady, 1993) and with positive affect (McMahon et al., 2008). Skaalvik and Skaalvik (2011a, 2011b) also found that teachers' feeling of belonging at the school where they were teaching were associated with higher levels of job satisfaction and lower levels of emotional exhaustion.

Roeser et al. (1996) conceptualize belonging as a feeling of relatedness and of being valued. Similarly, Goodenow and Grady (1993) describe a sense of belonging as resulting from a feeling of being accepted, respected, and receiving social support from other members of the community. We therefore expected a positive association between teachers' perceptions of a collective teacher culture at the school where they were teaching and their feeling of belonging. Supporting this expectation, previous research reveals a moderate to strong association between value consonance and teachers' feeling of belonging (Skaalvik & Skaalvik, 2011b, 2019).

2.4 Job satisfaction

General job satisfaction is commonly defined as positive or negative evaluative judgments that people make regarding their work (Weiss, 1999). This definition is based on a conceptualization of job satisfaction as a pleasurable or positive emotional state resulting from the appraisal of one's job (Locke, 1976). Similarly, Author (2010) defined teacher job satisfaction as teachers' affective reactions to their work and their teaching role. Previous research shows that teacher job satisfaction is predictive of teachers' motivation to continue in the teaching profession (Skaalvik & Skaalvik, 2017a).

General job satisfaction should be distinguished from satisfaction with specific aspects of the job, for instance working hours, work tasks, or social climate (Geisler et al., 2019; Skaalvik & Skaalvik, 2011a). However, satisfaction with different aspects of the job may influence general job satisfaction. Because of the need to belong, we expected that a collective teacher culture would be positively associated with job satisfaction.

2.5 The present study

The present study had several purposes. One purpose was to explore correlations between four possible indicators of a collective teacher culture: shared values, value

consonance, collective teacher efficacy, and supportive relations with colleagues. Another purpose was to test a SEM model with shared values, value consonance, collective teacher efficacy, and supportive relations with colleagues as indicators of a second order collective teacher culture factor. A third purpose was to explore relations between indicators of a collective teacher culture and teachers' perceptions of autonomy, belonging, and job satisfaction.

3 Method

3.1 Participants and procedure

The participants in this study were 760 Norwegian teachers in elementary school (grade 1–7) and middle school (grade 8–10). The study was part of a larger survey. Twenty-two schools were drawn at random from three counties in central Norway, and all teachers in these schools were invited to participate. Eighty-one percent of the teachers at the selected schools participated in the study. The teachers were informed that participation was voluntary. A particular period of time during working hours was set aside for all teachers to fill out the questionnaire at the same time. When the questionnaires were filled out, they were put in envelopes and sealed on the spot to assure the teachers that they were anonymous. Sixty-nine percent of the participants were women. The participants' ages ranged from 23 to 68 years with a mean of 44 years, and their experience as teachers ranged from 1 to 47 years with a mean of 15 years.

3.2 Instruments

3.2.1 Shared goals and values

Shared goals and values were in this study defined as individual teachers' perception that the teachers at the school and the school administration had common educational goals and values, but with no reference to the individual teacher's personal values. It was measured by means of a previously tested three-item scale (Skaalvik & Skaalvik, 2017a, 2017b). The items were: ''The teachers and the school administration at this school have a common understanding of the direction in which the school should be developed'', ''The teachers at this school have a shared perception of goals and means of the school development'', and ''The teachers at this school practice a common set of norms and rules''. Responses were given on a 6-point scale from "Completely disagree" (1) to "Completely agree" (6). In the present study, Cronbach's alpha for the scale was 0.84.

3.2.2 Perceived value consonance

Perceived value consonance was defined as the degree to which teachers feel that they personally share the prevailing norms and values at the school where they are

teaching. It was measured by means of a previously tested three-item "Value consonance scale" (Skaalvik & Skaalvik, 2011a). The items were: "My educational values are in accordance with the values which are emphasized at this school", "My colleagues and I have the same opinion about what is important in education", and "I feel that this school shares my view of what constitutes good teaching". Responses were given on a 6-point scale from "Completely disagree" (1) to "Completely agree" (6). In the present study, Cronbach's alpha for the scale was 0.81.

3.2.3 Collective teacher efficacy

Collective teacher efficacy was measured by four items from the Perceived Collective Teacher Efficacy scale (Skaalvik & Skaalvik, 2007). The Scale measured collective efficacy related to instruction, motivating students, controlling student behavior, addressing students' needs, and creating a safe environment at school. Examples of items are: "As teachers of this school we can get even the most difficult students engaged in their schoolwork" and "Teachers in this school successfully address individual pupils' needs". Responses were given on a 6-point scale from "Completely disagree" (1) to "Completely agree" (6). Cronbach's alpha for the scale was 0.80.

3.2.4 Supportive relations with colleagues

Supportive relations with colleagues were measured by means of a previously tested three-item scale (Skaalvik & Skaalvik, 2011a). The items were: ''In educational matters, I can always get good help from my colleagues'', ''The relations among the colleagues at this school are characterized by friendliness and a concern for each other'', and ''Teachers at this school help and support each other''. Responses were given on a 6-point scale from "Completely disagree" (1) to "Completely agree" (6). Cronbach's alpha for the scale was 0.73.

3.2.5 Autonomy

Autonomy was in this study limited to the actual teaching and to working with students. It was measured by means of a previously tested three-item teacher autonomy scale (Skaalvik & Skaalvik, 2010). The items were: ''In my daily teaching I am free to choose teaching methods and strategies'', "In the subjects that I teach I feel free to decide what content to focus on", and "I feel that I can influence my working condition". Responses were given on a 6-point scale from "Completely disagree" (1) to "Completely agree" (6). Cronbach's alpha for the scale was 0.89.

3.2.6 Feeling of belonging

Feeling of belonging was measured by means of a previously tested three-item scale (Skaalvik & Skaalvik, 2011a). The items were: "I feel that I belong at this school", "I feel that I am accepted by the leadership at this school", and "I feel that my colleagues

have faith in me". Responses were given on a 6-point scale from "Completely disagree" (1) to "Completely agree" (6). Cronbach's alpha for the scale was 0.79.

3.2.7 Job satisfaction

Job satisfaction was measured by means of a previously tested four-item job satisfaction scale (Skaalvik & Skaalvik, 2011a). The items were: ''I enjoy working as a teacher'', ''I look forward to going to school every day'', ''Working as a teacher is extremely rewarding,'' and ''When I get up in the morning, I look forward to going to work.'' Responses were given on a 6-point scale from "Completely disagree" (1) to "Completely agree" (6). Cronbach's alpha in this study was 0.90**.**

3.3 Data analyses

The data were analysed by means of confirmatory factor analysis, and SEM analysis using the AMOS 25 program. These methods are powerful statistical tools for examining relations between latent variables and take a confirmatory, rather than an exploratory, approach to the data analysis (Byrne, 2001). Theoretical models can be tested statistically to determine the extent to which they are consistent with the data.

We first tested three measurement models by means of confirmatory factor analyses with maximum likelihood estimation of parameters. Model 1 consisted of four correlated first order factors that were considered as aspects of a collective teacher culture (collective teacher efficacy, shared values, value consonance, and supportive colleagues). In model 2, a second order collective teacher culture variable was indicated by the same primary factors as in model 1. The purpose of these analyses was to compare model 1 and 2 and to explore if the four measures of a collective teacher culture may be used as indicators of a second order factor. Model 3 consisted of one second order variable (collective teacher culture) and three primary factors (autonomy, belonging, and job satisfaction). Secondly, we tested a SEM model with a second order collective teacher culture as an exogenous variable and autonomy, belonging, and job satisfaction as endogenous variables.

We used well-established indices of model fit: CFI, IFI, TLI, and RMSEA. For the CFI, IFI, and TLI indices, values greater than 0.90 are considered acceptable, and values greater than 0.95 indicate a good fit to the data (Bollen, 1989; Byrne, 2001; Hu & Bentler, 1999). For well-specified models, an RMSEA of 0.06 or less reflects a good fit (Hu & Bentler, 1999). Missing values were treated based on maximum likelihood estimation in the AMOS program (Byrne, 2001). Compared to both listwise and pairwise deletion of missing data and to mean imputation, maximum likelihood estimation will exhibit the least bias (Little & Rubin, 1989; Muthén et al., 1987; Schafer, 1997).

Table 1 Zero order correlations among the study variables and descriptive statistics

Study variables	1	2	3	4	5	6	7
1 Shared values	–	.58	.63	.44	.39	.29	.21
2 Perceived value consonance		–	.47	.56	.39	.49	.36
3 Collective efficacy			–	.44	.36	.24	.28
4 Supportive colleagues				–	.43	.40	.30
5 Autonomy					–	.34	024
6 Belonging						–	.39
7 Job satisfaction							–
Statistical mean	4.54	4.83	4.58	4.35	4.80	5.18	5.06
Standard deviation	0.86	0.72	0.64	0.67	0.80	0.91	0.80
Alpha	0.84	0.81	0.80	0.73	0.89	0.79	0.90

All correlations are significant ($p < .001$)

Table 2 Correlations between four indicators of a collective teacher culture –latent factors from a confirmatory factor analysis of Model 1

Variables	1	2	3	4
1 Shared values	–	.73	.66	.48
2 Collective efficacy		–	.56	.54
3 Value consonance			–	.63
4 Supportive colleagues				–

4 Results

4.1 Zero order correlations

Zero order correlations between the study variables as well as statistical means, standard deviations, and Cronbach's alphas are shown in Table 1. The four indicators of a collective culture correlated between r. = 0.44 and r. = 0.63. All these indicators correlated positively and moderately with autonomy, belonging, and job satisfaction. These correlations ranged from r. = 0.21 to r. = 0.49. Also, autonomy, belonging, and job satisfaction were positively and moderately correlated (r. = 0.24, 0.34, and 0.39).

4.2 Confirmatory factor analyses

The next step in the analyses was to test three measurement models by means of confirmatory factor analyses. We first tested Model 1, which had four correlated primary factors (collective teacher efficacy, shared values, perceived value consonance, and supportive relations with colleagues). The model had good fit to the data ($\chi2$ (59, $N = 760$) = 201,22, $p < 0.001$, RMSEA = 0.06, IFI = 0.97, CFI = 0.97, TLI = 0.95). All factor loadings were high (standardized regression weights

ranging from 0.53 to 0.88). The correlations between the latent variables were moderate to strong, ranging from 0.48 to 0.73 (Table 2).

In Model 2, four latent primary factors (collective teacher efficacy, shared values, perceived value consonance, and supportive relations with colleagues) were used as indicators of a second order collective teacher culture variable. The model had good fit to the data ($\chi 2$ (61, $N = 760$) = 257,10, $p < 0.001$, RMSEA = 0.07, IFI = 0.96, CFI = 0.96, TLI = 0.93). All factor loadings (standardized regression coefficients) were strong and varied from 0.53 to 0.89 (Fig. 1).

The two models were compared using the Chi²-difference test (ΔChi^2) and difference in CFI (ΔCFI). An absolute difference in CFI higher than 0.01 would indicate a significant difference in model fit. The Chi²-difference test indicated that a model with primary factors fitted the data significantly better than a model with second order factors ($\Delta Chi^2 = 55.88$, $\Delta df = 2$). However, ΔCFI did not exceed 0.01. The fit indices indicated that both models would be adequate for SEM analysis. However, the strong correlations between the four indicators of a collective teacher culture indicated that a SEM model with collective teacher efficacy, shared values, perceived value consonance, and supportive relations with colleagues as primary factors might represent a collinearity problem. We therefore decided that a collective teacher culture should be represented by a second order factor in the SEM analysis.

Model 3 consisted of a second order collective teacher culture variable and three primary factors (autonomy, belonging and job satisfaction). The second order factor was indicated by collective teacher efficacy, shared values, perceived value consonance, and supportive relations with colleagues. The model had acceptable fit to the data ($\chi 2$ (220, $N = 760$) = 2891,56, $p < 0.001$, RMSEA = 0.06, IFI = 0.93, CFI = 0.93, TLI = 0.91). The correlations between the latent variables are shown in Table 3. Collective culture was positively and moderately associated with autonomy (r. = 0.47) as well as belonging (r. = 0.55) and job satisfaction (r. = 0.43).

4.3 SEM analysis

Based on the measurement models, we conducted a SEM analysis with a second order collective teacher culture as the exogenous variable and autonomy, belonging,
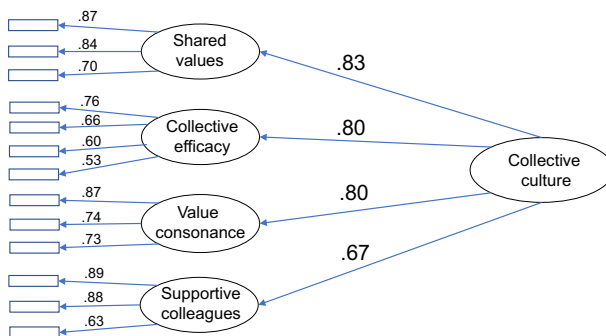

Fig. 1 Second order model of collective teacher culture—confirmatory factor analysis

Table 3 Correlations between a second order collective teacher culture variable and first order variables—confirmatory factor analysis

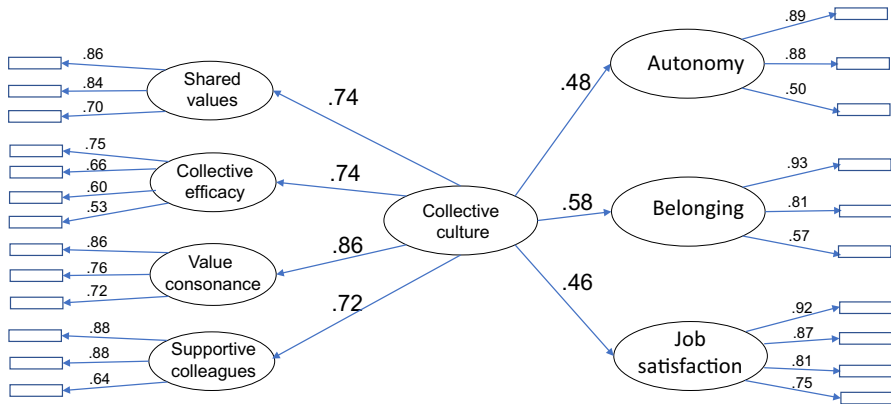| Variables	1	2	3	4
1 Collective culture	–	.47	.56	.43
2 Autonomy		–	.34	.21
3 Belonging			–	.45
4 Job satisfaction				–

Fig. 2 Structural model of relations between a second order collective teacher culture and autonomy, belonging, and job satisfaction

and job satisfaction as endogenous variables (Fig. 2). The model had acceptable fit to the data ($\chi 2$ (223, $N = 760$) $= 939,26$, $p < 0.001$, RMSEA $= 0.07$, IFI $= 0.92$, CFI $= 0.92$, TLI $= 0.90$). It should be noted that, in the SEM model no paths were included between autonomy, belonging, and job satisfaction. Including paths between these variables increases model fit, but was not done because there are likely reciprocal relations between these variables. The SEM analysis verify that the perception of working in a collective culture is positively related to autonomy (beta $= 0.48$), belonging (beta $= 0.58$), and job satisfaction (beta $= 0.46$).

5 Discussion and conclusion

One purpose of this study was to explore intercorrelations between four possible indicators of a collective teacher culture (CTC) at school: collective teacher efficacy, shared goals and values, value consonance, and supportive social relations (for definitions of these indicators, see "Theoretical framework" and "Method"). We conducted two confirmatory factor analyses, one specifying four correlated primary factors and one specifying a second order CTC factor. The correlations between the primary factors were moderate to strong and both models had good fit to the data. The results indicate that measures of collective teacher efficacy, shared goals and values, value consonance, and supportive social relations are interrelated constructs

that are well suited as indicators of a CTC. This is an important finding because teacher research tends to analyze such constructs separately.

Another purpose was to explore relations between a CTC and teachers feeling of belonging, job satisfaction, and perceived autonomy. These relations were tested by means of a SEM model in which CTC was represented by a second order exogenous variable. The analysis showed that a second order CTC factor positively predicted autonomy, belonging and job satisfaction (beta values = 0.48, 0.58, and 0.46, respectively).

The findings are in accordance with previous research exploring collective teacher efficacy, shared goals and values, value consonance, and supportive social relations separately. Previous research reveal that shared values are positively associated with job satisfaction (Skaalvik & Skaalvik, 2017a), that perceived value consonance is positively associated with belonging and job satisfaction (Skaalvik & Skaalvik, b, 2011a, 2019), that collective teacher efficacy is positively associated with commitment (Fathi & Rostami, 2018), teacher collaboration (Onsrud, 2015), and individual teacher self-efficacy (Skaalvik, 2007), and that having supportive colleagues is positively associated with belonging (Skaalvik & Skaalvik, 2011a, 2019).

This study clearly indicates the benefit of a CTC, not only for the teachers' feeling of belonging and job satisfaction, but even for their perceived autonomy (see Fig. 2). If everyone agrees about goals and values, collective decisions and teacher collaboration should not represent much strain, sacrifice, or loss of autonomy for the individual teacher. Instead, it may be a source of belonging and job satisfaction (Waddell, 2010). However, if common values only apply to a group of teachers, and particularly if they apply to a large majority of the teachers at the school, the effect on teachers who do not share the majority values may be negative. These teachers may experience the school environment as a dissonant context, which may result in lower feeling of belonging, lower job satisfaction and less feeling of autonomy. This interpretation is in accordance with previous research using qualitative interview data. Skaalvik and Skaalvik (2015, 2021) report that some teachers describe teamwork as a source of enjoyment whereas other teachers talk about it as a source of stress because they do not agree with the majority of teachers.

A practical implication of this study is that the school administration should work to develop a strong collective culture at school. We conceptualize this as a key element of instructional or educational leadership. Our findings imply that important aspects of a CTC include shared values, value consonance, collective efficacy, and supportive collegial relations. Such a culture cannot be dictated, but has to result from discussions and common effort. We believe that the different aspects of a CTC influence each other in a reciprocal manner. For example, experiencing that one can succeed through common effort (collective efficacy) may build trust and willingness to support each other (supportive colleagues), whereas collegial support adds to the willingness to seek common goals and values. In turn, common goals and values increases the motivation for collaboration and increases the quality of the social interactions. As shown in Fig. 2 this may result in positive affect such as the feeling of belonging, job satisfaction, and autonomy.

Development of the school's goals and values is a continuous process because the challenges change and new teachers and principals emerge. Educational goals and

values should therefore be discussed continuously at the school as part of the teachers' professional learning. Initiating and leading such discussions is an important responsibility for the school leadership. However, we suggest that, in order to ensure that a CTC is compatible with teachers' experience of autonomy, it is important that common goals and values are not developed into a method compulsion.

5.1 Limitations

This study has several limitations. It was designed as a cross-sectional study and causal relations are merely interpretations. Longitudinal studies are important in future research. Although all scales had high reliability, each dimension of a collective culture were measured with three to four items only. Also, we used four indicators of a CTC. Future research should explore other dimensions of a collective culture. In this study we avoided including collaboration as an indicator because in Norwegian schools much collaboration is mandated by the school leadership. Nevertheless, the role of collaboration in a CTC needs to be explored in future research. Also, the assumption that the different aspects of a CTC is interrelated and affects each other in a reciprocal manner, needs to be tested in longitudinal studies.

5.2 Conclusions

Shared values, collective teacher efficacy, value consonance, and supportive colleagues constitute a reliable measure of CTC at school. A CTC is associated with positive teacher experiences and emotions, such as perceived autonomy, feeling of belonging, and job satisfaction.

Appendix

Scales used in the study

Shared values

1. The teachers and the school administration at this school have a common. understanding of the direction in which the school should be developed.
2. The teachers at this school have a shared perception of goals and means of the school development.
3. The teachers at this school practice a common set of norms and rules.

Value consonanse

1. My educational values are in accordance with the values which are emphasized at this school.
2. My colleagues and I have the same opinion about what is important in education.
3. I feel that this school shares my view of what constitutes good teaching.

Collective teacher efficacy

1. As teachers of this school we can get even the most difficult students engaged in their schoolwork.
2. Teachers in this school successfully addresses individual pupils' needs.
3. At this school we have a common set of rules and regulations that enable us to handle disciplinary problems successfully.
4. Teachers in this school successfully address individual pupils' needs.

Supportive colleagues

1. In educational matters, I can always get good help from my colleagues.
2. The relations among the colleagues at this school are characterized by friendliness and a concern for each other.
3. Teachers at this school help and support each other.

Autonomy

1. In my daily teaching I am free to choose teaching methods and strategies.
2. In the subjects that I teach I feel free to decide what content to focus on.
3. I feel that I can influence my working condition.

Belonging

1. I feel that I belong at this school.
2. I feel that I am accepted by the leadership at this school.
3. I feel that my colleagues have faith in me.

Job satisfaction

1. I enjoy working as a teacher.
2. I look forward to going to school every day.
3. Working as a teacher is extremely rewarding.
4. When I get up in the morning, I look forward to going to work.

Responses on all items were given on a 6-point scale from "Completely disagree" (1) to "Completely agree" (6).

References

Adams, C. M., & Forsyth, P. B. (2006). Proximate sources of collective teacher efficacy. *Journal of Educational Administration, 44*(6), 625–642. https://doi.org/10.1108/09578230610704828

Ashton, P. T., & Webb, R. B. (1986). *Making a difference: Teachers' sense of efficacy and student achievement*. Longman.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. Freeman.

Baumeister, R. F., & Leary, M. R. (1995). The Need to belong: Desire for Interpersonal Attachments as a fundamental human motivation. *Psychological Bulletin, 117*(3), 497–529. https://doi.org/10.1037/0033-2909.117.3.497

Bollen, K. A. (1989). A new incremental fit index for general structural models. *Sociological Methods & Research, 17*(3), 303–316. https://doi.org/10.1177/0049124189017003004

Byrne, B. M. (2001). *Structural equation modelling with AMOS. Basic concepts, applications, and programming*. Mahwah, NJ: Lawrence Erlbaum Ass.

Campoli, A. K. (2017). Supportive principals and black teacher turnover. ESSA as an opportunity to improve retention. *Journal of School Leadership, 27*(5), 675–700.

Cansoy, R., Parlar, H., & Polatcan, M. (2020). Collective teacher efficacy as a mediator in the relationship between instructional leadership and teacher commitment. *International Journal of Leadership in Education*. https://doi.org/13603124.2019.1708470

Charner-Laird, M., Ng, M., Johnson, S. M., Kraft, M. A., Papay, J. P., & Reinhorn, S. K. (2017). Gauging goodness of fit: Teachers' responses to their instructional teams in high-poverty schools. *American Journal of Education, 123*(4), 553–584. https://doi.org/10.1086/692663

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behaviour*. Plenum.

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits. Human needs and the self-determination of behavior. *Psychological Inquiry, 11*(4), 227–268.

Demerouti, E., Bakker, A. B., Nachreiner, F., & Schaufeli, W. B. (2001). The job demands-resources model of burnout. *Journal of Applied Psychology, 86*(3), 499–512. https://doi.org/10.1037/0021-9010.86.3.499

Fathi, J., & Rostami, E. S. (2018). Collective teacher efficacy, teacher self-efficacy, and job satisfaction among Iranian EFL teachers: The mediating role of teaching commitment. *Journal of Teaching Language Skills, 37*(2), 33–64. https://doi.org/10.22099/jtls.2019.30729.2572

Furrer, C., & Skinner, E. A. (2003). Sense of relatedness as a factor in children's academic engagement and performance. *Journal of Educational Psychology, 95*(1), 148–162. https://doi.org/10.1037/0022-0663.95.1.148

Geisler, M., Berthelsen, H., & Muhonen, T. (2019). Retaining social workers: The role of quality of work and psychosocial safety climate for work engagement, job satisfaction, and organizational commitment. *Human Service Organizations: Management, Leadership & Governance, 43*(1), 1–15. https://doi.org/10.1080/23303131.2019.1569574

Goddard, R. D., Hoy, W. K., & Woolfolk Hoy, A. W. (2004). Collective efficacy beliefs: Theoretical developments, empirical evidence, and future directions. *Educational Researcher, 33*(3), 3–13. https://doi.org/10.3102/0013189X033003003

Goodenow, C., & Grady, K. E. (1993). The relationship of school belonging and friends' values to academic motivation among urban adolescent students. *Journal of Experimental Education, 62*(1), 60–71. https://doi.org/10.1080/00220973.1993.9943831

Hargreaves, A. (1994). *Changing teachers, changing times: Teachers' work and culture in the Postmodern age*. Cassell.

Hakanen, J. J., Bakker, A. B., & Schaufeli, W. B. (2006). Burnout and work engagement among teachers. *Journal of School Psychology, 43*(6), 495–513. https://doi.org/10.1016/j.jsp.2005.11.001

Hoy, W. K., & Miskel, C. G. (2008). *Educational administration: Theory, research, and practice* (8th ed.). McGraw-Hill.

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal, 6*(1), 1–55. https://doi.org/10.1080/10705519909540118

Johnson, S. M., Kraft, M. A., & Papay, J. P. (2012). How context matters in high-need schools: The effects of teachers' working conditions on their professional satisfaction and their students' achievement. *Teachers College Record, 114*(10), 1–39.

Lee, J. C., Zhang, Z., & Yin, H. (2011). A multilevel analysis of the impact of a professional learning community, faculty trust in colleagues and collective efficacy on teacher commitment to students. *Teaching and Teacher Education, 27*(5), 820–830. https://doi.org/10.1016/j.tate.2011.01.006

Leung, D. Y. P., & Lee, W. W. S. (2006). Predicting intention to quit among Chinese teachers: Differential predictability of the components of burnout. *Anxiety, Stress & Coping. an International Journal, 19*(2), 129–141.

Little, R. J. A., & Rubin, D. B. (1989). The analysis of social science data with missing values. *Sociological Methods and Research, 18*(2–3), 292–326.

Locke, E. A. (1976). The nature and causes of job satisfaction. In M. Dunette (Ed.), *Handbook of industrial and organizational psychology* (pp. 1297–1349). Rand-McNally.

McMahon, S. D., Parnes, A. L., Keys, C. B., & Viola, J. J. (2008). School belonging among low-income urban youth with disabilities: Testing a theoretical model. *Psychology in the Schools, 45*(5), 387–401. https://doi.org/10.1002/pits.20304

Moller, S., Michelson, R. A., Stearns, E., Banerjee, N., & Bottia, M. C. (2013). Collective pedagogical teacher culture and mathematics achievement: Differences by race, ethnicity, and socioeconomic status. *Sociology of Education, 86*(2), 174–194. https://doi.org/10.1177/0038040712472911

Montiel-Overall, P. (2005). Toward a theory of collaboration for teachers and librarians. Retrieved from ERIC document nr. EJ965627.

Muthén, B., Kaplan, D., & Hollis, M. (1987). On structural equation modeling with data that are not missing completely at random. *Psychometrica, 52*(3), 431–462.

Onsrud, K. J. (2015). *The relationship between collaboration and collective efficacy in two Wisconsin high schools* (Doctorate dissertation). Edgewood College, Madison, Wisconsin.

Pearson, L. C., & Moomaw, W. (2006). Continuing validation of the teacher autonomy scale. *Journal of Educational Research, 100*(1), 44–51.

Pines, A., & Aronson, E. (1988). *Career Burnout. Causes and cures*. The Free Press.

Roeser, R. W., Midgley, C., & Urdan, T. C. (1996). Perceptions of the school psychological environment and early adolescents' psychological and behavioral functioning in school: The mediating role of goals and belonging. *Journal of Educational Psychology, 88*(3), 408–422. https://doi.org/10.1037/0022-0663.88.3.408

Rosenberg, M. (1979). *Conceiving the self*. Basic Books.

Ross, J. A., & Gray, P. (2006). Transformational leadership and teacher commitment to organizational values: The mediating effects of collective teacher efficacy. *School Effectiveness and School Improvement, 17*(2), 179–199. https://doi.org/10.1080/09243450600565795

Schafer, J. L. (1997). *Analysis of incomplete multivariate data*. Chapman & Hall.

Simbula, S., Guglielmi, D., & Schaufeli, W. B. (2011). A three-wave study of job resources, self-efficacy, and work engagement among Italian schoolteachers. *European Journal of Work and Organizational Psychology, 20*(3), 285–304. https://doi.org/10.1080/13594320903513916

Skaalvik, E. M., & Skaalvik, S. (2007). Dimensions of teacher self-efficacy and relations with strain factors, perceived collective teacher efficacy, and teacher Burnout. *Journal of Educational Psychology, 99*(3), 611–625. https://doi.org/10.1037/0022-0663.99.3.611

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

Skaalvik, E. M., & Skaalvik, S. (2011a). Teacher job satisfaction and motivation to leave the teaching profession: Relations with school context, feeling of belonging, and emotional exhaustion. *Teaching and Teacher Education, 27*(6), 1029–1038. https://doi.org/10.1016/j.tate.2011.04.001

Skaalvik, E. M., & Skaalvik, S. (2011b). Teachers' feeling of belonging, exhaustion, and job satisfaction: The role of goal structure and value consonance. *Anxiety, Stress, and Coping. an International Journal, 24*(4), 369–385.

Skaalvik, E. M., & Skaalvik, S. (2015). Job satisfaction, stress and coping strategies in the teaching profession – what do teachers say? *International Education Studies, 8*(3), 1–12.

Skaalvik, E. M., & Skaalvik, S. (2017a). Still motivated to teach? A study of school context variables, stress and job satisfaction among teachers in senior high school. *Social Psychology of Education, 20*(1), 15–37. https://doi.org/10.1007/s11218-016-9363-9

Skaalvik, E. M., & Skaalvik, S. (2017b). Dimensions of teacher Burnout: Relations with potential stressors at school. *Social Psychology of Education, 20*, 775–790. https://doi.org/10.1007/s11218-017-9391-0

Skaalvik, E. M., & Skaalvik, S. (2018). Job demands and job resources as predictors of teacher motivation and well-being. *Social Psychology of Education, 21*, 1251–1275. https://doi.org/10.1007/s11218-018-9464-8

Skaalvik, E. M., & Skaalvik, S. (2019). Teacher self-efficacy and collective teacher efficacy: relations with perceived job resources and job demands, feeling of belonging, and teacher engagement. *Creative Education, 10*(7), 1400–1424. https://doi.org/10.4236/ce.2019.107104

Skaalvik, E. M., & Skaalvik, S. (2021). Teacher stress and coping strategies – the struggle to stay in control. *Creative Education*. https://doi.org/10.4236/ce.2021.126096

Schipper, T. M., de Vries, S., Goei, S. L., & van Veen, K. (2020). Promoting a professional school culture through lesson study? An examination of school culture, school conditions, and teacher self-efficacy. *Professional Development in Education, 46*(1), 112–129. https://doi.org/10.1080/19415257.2019.1634627

Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivatiate statistics*. Pearson/Allyn and Bacon.

Thomson, A. M., & Perry, J. L. (2006). Collaboration Processes: Inside the Black Box. *Public Administration Review, 66*(1), 20–32. https://doi.org/10.1111/j.1540-6210.2006.00663.x

Vescio, V., Ross, D., & Adams, A. (2008). A review of research on the impact of professional learning communities on teaching practice and student learning. *Teaching and Teacher Education, 24*(1), 80–91. https://doi.org/10.1016/j.tate.2007.01.004

Waddell, J. H. (2010). Fostering relationships to increase teacher retention in urban schools. *Journal of Curriculum and Instruction, 4*(1), 70–85. https://doi.org/10.3776/joci.2010.v4n1p70-85

Ware, H., & Kitsantas, A. (2007). Teacher and collective efficacy beliefs as predictors of professional commitment. *Journal of Educational Research, 100*, 303–310. https://doi.org/10.3200/joer.100.5.303-310

Weiss, E. M. (1999). Perceived workplace conditions and first-year teachers' morale, career choice commitment, and planned retention: A secondary analysis. *Teaching and Teacher Education, 15*(8), 861–879. https://doi.org/10.1016/S0742-051X(99)00040-2

Zembylas, M., & Papanastasiou, E. (2006). Sources of teacher job satisfaction and dissatisfaction in Cyprus. *Compare: A Journal of Comparative and International Education, 36*(2), 229–247.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Einar M. Skaalvik is a senior researcher at NTNU Social Research in Trondheim; Norway. He is also a professor emeritus in educational psychology at the Department of Education and Lifelong Learning at the Norwegian University of Science and Technology. His research interests are in the areas of motivation, self-concept, self-efficacy, well-being, and mental health among both students and teachers.

Sidsel Skaalvik is a professor emerita in special education at the Department of Education and Lifelong Learning at the Norwegian University of Science and Technology. Her research interests are in the areas of reading and learning difficulties, instructional methods, and motivation, self-perception, and well being among both students and teachers.