



# Collective teacher culture and school goal structure: Associations with teacher self-efficacy and engagement

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## Abstract

One purpose of this study was to test a model of a collective teacher culture (CTC) proposed by Skaalvik and Skaalvik (Skaalvik and Skaalvik, *Social Psychology of Education* 24:1389–1406, 2021). In this model, a second-order CTC variable was indicated by four first-order variables: positive and supportive social relations with colleagues, collective teacher efficacy, shared goals and values, and value consonance. A second purpose was to test how a CTC was associated with teachers' perceptions of the school goal structure (learning and performance goal structures). A third purpose was to explore relations between the two dimensions of the school goal structure, CTC, teacher self-efficacy, and teacher engagement. Participants in the study were 1145 teachers in elementary school, middle school, and high school. The data were analyzed by means of confirmatory factor analyses and SEM analysis. The factor analyses supported the proposed model and revealed that a CTC was positively and strongly associated with a learning goal structure and positively and moderately associated with both teacher self-efficacy and teacher engagement. In contrast, a CTC was negatively associated with a performance goal structure. A learning goal structure was also positively associated with teacher self-efficacy and engagement. In the SEM model, CTC partly mediated the associations between a learning goal structure and teacher self-efficacy and engagement.

**Keywords** Collective teacher culture · School goal structure · Teacher self-efficacy · Teacher engagement

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## 1 Introduction

Research reports consistently describe teaching as a demanding career with teachers experiencing high levels of stress and emotional exhaustion (e.g., Herman et al., 2018; Kyriacou, 2001; Skaalvik & Skaalvik, 2017a). Research also shows that the high level of stress in the teaching profession is associated with reduced motivation for teaching and increased levels of attrition (Klassen & Chiu, 2011; Skaalvik & Skaalvik, 2011a). Teacher stress has often been associated with demanding within-school factors or negative aspects of the school climate, for instance, work overload, discipline problems, and lack of decision latitude (McLean et al., 2017).

However, teacher research also reveals that positive social relations between the teachers and between the teachers and the school administration, including social support, have important positive implications for teacher motivation, well-being, and job satisfaction (Hakanen et al., 2006; Simbula et al., 2011; Skaalvik & Skaalvik, 2018; Vescio et al., 2008). Moreover, the quality of the social interaction, which is an important aspect of the school climate, may be influenced by collective teacher efficacy—teachers' beliefs that they may succeed through joint effort (Lee et al., 2011; Skaalvik & Skaalvik, 2021). Teachers' perceptions of the school environment as supportive and inclusive have also been shown to be positively associated with their perceptions that the teachers at school share educational goals and values (Skaalvik & Skaalvik, 2011a, 2019, 2021). We conceptualize the sharing of educational goals and values as prerequisites for adaptive teacher interaction.

Built on previous research, Skaalvik and Skaalvik (2021) hypothesized that positive social relations with colleagues, collective teacher efficacy, and common values were strongly interrelated constructs that could be used as indicators of a second-order *collective teacher culture* factor. In a study of 760 Norwegian teachers, they found that a model with a collective teacher culture as a second-order latent construct indicated by positive social relations, collective teacher efficacy, shared values, and value consonance was predictive of job satisfaction, feeling of belonging, and perceived autonomy.

One purpose of the present study was to test the model of a collective teacher culture as a second-order factor using a larger sample of teachers. A second purpose was, by means of confirmatory factor analysis and SEM analysis, to test how a collective teacher culture is associated with teachers' perceptions of the school goal structure. A third purpose was to explore relations between the school goal structure, collective teacher culture, teacher self-efficacy, and teacher engagement.

## 2 Theoretical framework

### 2.1 Collective teacher culture (CTC)

This study is based on a model of a CTC proposed by Skaalvik and Skaalvik (2021). They conceptualized a CTC as a multidimensional construct consisting of

positive and supportive social relations, collective teacher efficacy, and common educational goals and values. They also discriminated between two dimensions of common educational values, which they termed shared educational values, and value consonance (see Sects. 2.1.3 and 2.1.4). The model is grounded in social cognitive theory (Bandura, 1997, 2006) and theory of belonging (Baumeister & Leary, 1995).

### 2.1.1 Positive social relations with colleagues

Teacher research reveals that positive social relations and social support from colleagues and supervisors are predictive of teacher motivation and well-being (Avanzi et al., 2015; Brouwers et al., 2011; Mérida-López et al., 2020; Skaalvik & Skaalvik, 2018). Theoretically, the impact of the social environment, positive social relations, and supportive colleagues and supervisors have been explained by a fundamental need to belong (Baumeister & Leary, 1995). According to Baumeister and Leary (1995), the need to belong is a deeply rooted human motivation, and satisfying the need to belong is predictive of motivation and well-being. Allen et al. (2022) conceptualized the need to belong as a desire for positive interpersonal relationships or attachments—to be accepted, respected, and valued. According to Baumeister and Leary (1995), the need to belong can be satisfied both through close one-to-one relationships and by belonging to larger groups or organizations. They further explain that satisfying of the need to belong has two aspects: frequent positive interactions and mutual caring (see Allen et al., 2022). Self-determination theory also assumes that people have a basic need for relatedness, but also for autonomy and competence (Deci & Ryan, 2000; Ryan & Deci, 2017). A major concern in this theory is to what extent the basic psychological needs are supported or thwarted, for instance in a work environment.

The assumption of a need to belong is supported by numerous empirical studies showing that satisfying this need is predictive of lower levels of depression (Parr et al., 2020) and higher emotional well-being (Arslan, 2021; Arslan & Allen, 2021). Skaalvik and Skaalvik (2018) also found that teacher well-being and engagement were associated with positive social relations with colleagues. Moreover, motivation to leave the teaching profession has been shown to be negatively associated with positive social relations (Fiegener & Adams, 2022; Mérida-López et al., 2020; Skaalvik & Skaalvik, 2018).

Many challenges require that people work together. As explained by Bandura (1997), even a group of efficacious individuals may achieve poorly as a unit if they are not able or willing to work well together. Teaching in school, particularly in open landscape schools that flourish in Norway, includes teamwork both in planning and preparing teaching, team-teaching, and common responsibility for academic and social norms (Bandura, 1997). Such collaboration is likely more adaptive in schools and in teams characterized by positive and supportive social relations. Positive social relations both increase the motivation to work together and the ability to find common solutions.

### 2.1.2 Collective teacher efficacy

In social cognitive theory, human agency refers to intentional actions or actions intended to serve specific purposes. As explained by Bandura (1997), people are trying to control their life circumstances and to be able to predict them. The most important mechanism of human agency is self-efficacy—people’s beliefs in what they are able to do in given situations. As noted by Bandura (1997, p. 3), “If people believe they have no power to produce results, they will not attempt to make things happen”.

Teachers do not always work alone but collaborate in different ways. Bandura (2006) therefore underscores the importance of developing beliefs in what people can accomplish through joint effort, which he terms collective efficacy. We define collective teacher efficacy as individual teachers’ beliefs in the ability of the faculty of teachers at the school to execute courses of action required to attain given educational goals (see Guidetti et al., 2018; Skaalvik & Skaalvik, 2007). According to Bandura (1997), the four major sources of self-efficacy beliefs, mastery experiences, verbal persuasion, vicarious experiences, and physiological responses (see Sect. 2.3), are also important for the development of collective teacher efficacy. Mastery experiences that result from collaboration and joint teacher effort are particularly well suited for increasing collective teacher efficacy (Skaalvik & Skaalvik, 2019). Because positive social relations increase teachers’ motivation and ability to work adaptively together, positive relations are likely predictive of collective efficacy. In turn, collective teacher efficacy enhances both teachers’ motivation to work together and their accomplishments through joint effort, and therefore stimulates positive social relations and a positive atmosphere (Bandura, 1997, 2006). Thus, the CTC model builds on the assumption that positive social relations among the teachers and collective teacher efficacy affect each other reciprocally.

### 2.1.3 Shared educational goals and values

Both preparations for teaching and the teaching itself are activities based on goals and purposes. In social cognitive theory, teaching is therefore an agentic act described as an act done intentionally (Bandura, 1997). As explained by Bandura (1997) agentic acts rely on cognitive self-regulation, as people set goals for themselves, consider what is required to reach the goals, and plan the activities. Successful teacher collaboration, therefore, requires that the participants are working towards the same goals and have a shared opinion of what it takes to reach the goals. From an agentic perspective, it is also important that the participants share the same educational values because educational goals and purposes represent values and teaching is driven by values (Sahlberg, 2010). If teachers do not share important goals and values, both the motivation and the ability to cooperate will likely be reduced. In such cases, we suggest that forced cooperation may have negative effects on teacher motivation and well-being.

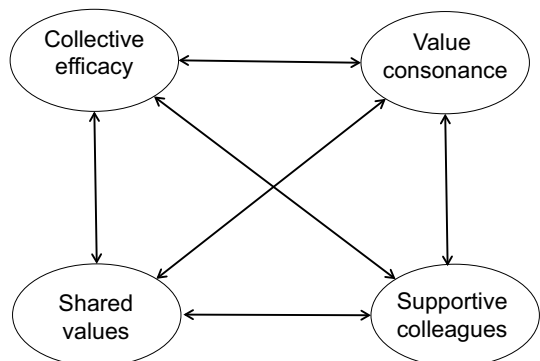
According to Thomson and Perry (2006), collaboration is facilitated by positive and trusting relationships. Such relationships are most easily developed in environments where people share goals and values (Hoy & Miskel, 2008).

Moreover, because shared educational values are essential for adaptive teacher cooperation, they also constitute a prerequisite for developing collective teacher efficacy—which Bandura (1997) defined as teachers’ beliefs that they can succeed through collective effort. The importance of shared goals and values is supported empirically in a study of Norwegian teachers, showing 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 (Skaalvik & Skaalvik, 2018).

#### 2.1.4 Value consonance

Skaalvik and Skaalvik (2021) distinguished between two dimensions of a common understanding of educational goals and values: shared values and value consonance. As already noted, they defined shared values as a common understanding of educational goals and values among (most) teachers and administrators. Thus, whereas shared values focus on the prevailing values in the teacher collegium, value consonance focuses on the individual teacher and whether this teacher shares the prevailing goals and values at the school. Even in schools with strong prevailing goals and values, there may be individual teachers who distance themselves from these goals and 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 Skaalvik and Skaalvik (2021) characterize as a lack of value consonance. In Rosenberg’s (1979) terms, such teachers may find themselves to be in a dissonant value context. According to Rosenberg, being in a dissonant context may result in a feeling of not belonging, a perception that one is mistaken, and a lack of self-confidence. Rosenbergs’ expectation is supported in a study of 372 Chinese teachers showing a positive association between value consonance and feeling of belonging (Yang et al., 2022).

**Fig. 1** Model of relationships between the four indicators of a collective teacher culture



### 2.1.5 Summary

In this section, we have argued that positive social relations among the teaching staff, collective teacher efficacy, and common goals and values, are interrelated constructs that affect each other in a reciprocal way, as illustrated in Fig. 1. Both positive and supportive social relations and common goals and values facilitate collaboration, which is a prerequisite for developing collective efficacy. In turn, collective teacher efficacy, teachers' beliefs in what they can do through joint effort, is an important determinant of teacher interaction and social relations. Also, positive social relations develop more easily in an environment characterized by common values, whereas positive social relations in turn may facilitate the development of common values. Previous research indicates that these constructs are well-suited as indicators of a CTC (Skaalvik & Skaalvik, 2021).

Because we have argued that a CTC likely facilitates teacher collaboration, a relevant question is if teacher collaboration might be added as a fifth dimension of a CTC. Skaalvik and Skaalvik (2021) explain that collaboration in teacher teams is mandatory in many Norwegian schools and therefore not included in the construct. Although teacher collaboration may satisfy the need to belong, collaboration may also be difficult and costly. Collaboration may be time-consuming and interfere with other tasks, leading to difficult relationships and to a lack of autonomy (Berglund, 2022). This may be especially true if collaboration is forced upon the participants. For this reason, we conceptualize the frequency of collaboration as a less adequate dimension of a measure of CTC.

As noted above, the importance of developing a collective teacher culture at school is previously indicated by positive associations with job satisfaction, belonging, and autonomy (Skaalvik & Skaalvik, 2021). An important issue is therefore to explore conditions that facilitate or thwart the development of a collective teacher culture. In this study, we will analyze associations between collective teacher culture and the school goal structure.

## 2.2 School goal structure

In achievement goal theory, goal structure refers to which goals and values are emphasized by the educational practices at the school or in specific classrooms (Ames, 1992; Skaalvik & Skaalvik, 2011b; Wolters, 2004). Research on students shows that classroom goal structure has important implications for student motivation (Anderman & Maehr, 1994; Kaplan et al., 2002; Patrick et al., 2011; Polychroni et al., 2012). Two types of goal structure have been explored by goal theorists: a learning-oriented (also termed mastery-oriented) goal structure and a performance-oriented goal structure (Patrick et al., 2011; Skaalvik & Skaalvik, 2013, 2017a). Teachers who endorse a learning goal structure emphasize and recognize student effort, improvement, and understanding, and consider mistakes as a natural part of the learning process. Most importantly, these teachers use progress and goal attainment as criteria for success and avoid comparing students with each other (Ames, 1992; Skaalvik & Skaalvik, 2011b, 2017a; Sproule et al., 2007). In contrast, teachers

endorsing a performance goal structure are more concerned with achievement and test scores rather than improvement (Skaalvik & Skaalvik, 2017a). In these classes, both teachers and students tend to associate success with doing better than others, which may lead to social comparison and competition both among students and teachers.

Most empirical investigations of goal structure are limited to classroom goal structure as perceived by the students. These studies repeatedly report that a learning goal structure is associated with a number of positive outcomes, for instance, feeling of belonging, positive social relations, effort, and persistence when facing obstacles (Polychroni et al., 2012; Walker, 2012; Wolters, 2004). In comparison, a performance goal structure is consistently shown to be related to less adaptive student behaviors and beliefs, for instance, less use of help-seeking behavior, the lower perceived value of schoolwork, and higher anxiety (Polychroni et al., 2012; Skaalvik et al., 2017).

There is a lack of research on teachers' perceptions of the goal structure at school. Skaalvik and Skaalvik (2017a) defined teachers' perceptions of the school goal structure as signals that teachers perceive regarding which goals and values (learning or performance goals) that are most emphasized at the school where they are teaching. Previous research shows that teachers' perceptions of learning and performance goal structures are negatively, but weakly correlated. Previous research also indicates that teachers who perceive a strong learning goal structure at the school where they are teaching are characterized by high teaching self-efficacy, feeling of engagement, job satisfaction, and belonging (Skaalvik & Skaalvik, 2011b, 2013, 2017a). A possible interpretation of these results is that the goals and values underlying a learning goal structure are compatible with teachers' motives for choosing the teaching profession, for instance helping children learn and develop (see Berg et al., 2023; Watt & Richardson, 2008). We suggest that an additional explanation of the findings by Skaalvik and Skaalvik (2017a), maybe that teacher collaboration, positive social relations, social support, collective teacher efficacy, and shared values are more easily developed in schools characterized by a learning goal structure than by a performance goal structure that may more easily result in social comparison and competition among the teachers. We, therefore, expected a positive association between teachers' perception of a learning goal structure and their perception of a CTC. We also expected a negative association between teachers' perception of a performance goal structure and their perception of a CTC.

### 2.3 Teacher self-efficacy

Bandura (1997, p. 3) defines perceived self-efficacy as "... beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments". Consequently, self-efficacy refers to a person's beliefs or expectations about what he or she is able to do rather than judgments about one's abilities (Bong & Skaalvik, 2003; Zimmerman & Cleary, 2006). Similarly, teacher self-efficacy refers to teachers' beliefs that they are able to organize and execute the courses of action required to produce given educational goals. Empirical studies show that teacher

self-efficacy is associated with several positive outcomes such as job satisfaction, engagement, and lower levels of stress and burnout (Aldridge & Fraser, 2016; Aloe et al., 2014; Shoji et al., 2016; Stephanou & Oikonomou, 2018).

The social cognitive theory describes self-efficacy beliefs as influenced by four principal sources of information: enactive mastery experiences, vicarious experiences, verbal persuasion, and physiological and affective states (Bandura, 1997). The primary and most influential source of self-efficacy is, according to Bandura (1997), mastery experiences. Success, particularly following high effort, contributes to strengthening one's self-efficacy, whereas self-efficacy is undermined by repeated failures (Bandura, 1997). Additionally, we suggest that teachers' perceptions of success (or mastery experiences) are dependent on the school goal structure. In schools characterized by a learning goal structure, where teachers endorse student progress and individual goal attainment, they will likely have repeated mastery experiences because all students may improve and reach individual and realistic goals. In contrast, in schools characterized by a performance goal structure, where the perception of success results from social comparisons, the perception of success becomes more limited. We, therefore, expected that teacher self-efficacy is positively associated with the perception of a learning goal structure, but that in a large group of teachers it is not significantly associated with the perception of a performance goal structure.

Another source of self-efficacy is what Bandura (1997) terms verbal persuasion, which for teachers includes signals from colleagues and the school administration that they are trusted, respected, and perceived as competent teachers. A third source is termed vicarious experiences, which includes the observation of what other teachers are able to do. Such observations are expected to stimulate the observers' mastery expectations. Consequently, a CTC, including positive social relations with colleagues and collective teacher efficacy may be expected to be positively associated with teacher self-efficacy. Positive and supportive social relations may also be instrumental in reducing negative physiological and emotional arousal, which is the fourth source of self-efficacy mentioned by Bandura (1997). These expectations are supported by empirical research showing that teacher self-efficacy is positively associated with perceived collective teacher efficacy (Skaalvik & Skaalvik, 2007, 2019) as well as with positive and supportive social relations (Skaalvik & Skaalvik, 2016).

## 2.4 Work engagement

Work engagement is commonly described as a positive motivational state characterized by high energy and high levels of dedication as well as a strong focus on the work (Schaufeli & Bakker, 2010). Engaged teachers show high levels of energy and enthusiasm in their teaching. Furthermore, they are often so immersed in their work that they do not perceive time passing (Bakker & Demerouti, 2008). Work engagement may vary both between individuals and within individuals, for instance as a result of job characteristics and of the work environment (Bakker, 2014; Sonnentag et al., 2010). Access to both job and social resources is found to be positively associated with engagement (Bakker & Albrecht, 2018). Guglielmi et al. (2016) also found teacher engagement to be related to positive social relations and interactions



with colleagues as well as to being acknowledged. We, therefore, expected teacher work engagement to be positively associated with a CTC that is characterized by common values, positive and supportive social relations, and collective efficacy. Research on teachers also shows that work engagement is associated with positive outcomes, for instance, teacher self-efficacy (Skaalvik & Skaalvik, 2016) and lower intentions of leaving the teaching profession (Bakker & Bal, 2010; Skaalvik & Skaalvik, 2016).

## 2.5 The present study

One purpose of the present study was to test how the model of a CTC as a second-order variable, as suggested by Skaalvik and Skaalvik (2021), fitted the data using a larger sample of teachers. A second purpose was, by means of confirmatory factor analysis, to test how a CTC was associated with teachers' perceptions of learning and performance school goal structures. We know of no previous research examining the associations between CTC and school goal structure. Given that a CTC has important implications for both teachers and students, it is important to explore conditions that facilitate or thwart the development of a CTC. Based on the theoretical analysis (see above), we expected teachers' perceptions of a CTC to be positively associated with the perception of a learning goal structure and negatively associated with the perception of a performance goal structure. A third purpose was to explore how teacher self-efficacy and teacher engagement were associated with teachers' perceptions of CTC and the school goal structure. We expected both a learning goal structure and a CTC to be positively associated with teacher self-efficacy and engagement. In contrast, we expected a performance goal structure to be negatively associated with teacher self-efficacy and with teacher engagement.

## 3 Method

### 3.1 Participants

Participants in this study were 1145 Norwegian teachers: 427 teachers in elementary school, 333 teachers in middle school, and 385 teachers in high school. Thirty-four schools were drawn by random from three counties in central Norway and all teachers in those schools were invited to participate. Based on the school statistics 81% of the teachers at the selected schools participated in the study. Participation was voluntary for both the schools and the individual teachers. A particular period 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 in order to assure the teachers that they were anonymous. Sixty-five percent of the participants were women. The age ranged from 23 to 68 years and the experiences as teachers ranged from 1 to 47 years.

## 3.2 Instruments

### 3.2.1 CTC

CTC was indicated by four subscales: positive social relations, collective teacher efficacy, shared educational values, and value consonance. (1) *Positive social relations* were measured by means of a previously tested three-item Relations with colleagues 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 0.84. (2) *Collective teacher efficacy* was measured by five items from the perceived collective teacher efficacy scale (Skaalvik & Skaalvik, 2007). The scale measures 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) *Shared goals and values* were 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 any particular values or to the individual teacher’s personal values. It was measured by means of a previously tested three-item scale (Skaalvik & Skaalvik, 2021). 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. (4) *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 0.82.

### 3.2.2 School goal structure

School goal structure was defined as teachers’ perceptions of the prevailing goals at the school where they were teaching. A learning goal structure was indicated by an emphasis on individual student improvement and a safe and inspiring learning

environment, whereas a performance goal structure was indicated by an emphasis on grades and test scores. A *learning goal structure* was measured by means of a previously tested five-item scale (Skaalvik & Skaalvik, 2017a). Examples of items are: “Developing a safe and inspiring learning environment is heavily emphasized at this school”, and “The primary emphasis at this school is on student improvement and that the students should be allowed to develop their abilities”. A *performance goal structure* was measured using a previously tested three-item scale (Skaalvik & Skaalvik, 2017a): “Students’ scores on achievement tests are heavily emphasized at this school”, “The leadership at this school is concerned that our students should do better on achievement tests than students at other schools”, and “The evaluation of teachers at this school is based on students’ achievement scores”. Responses were given on a six-point scale ranging from “Completely disagree” (1) to “Completely agree” (6). Cronbach’s alpha values for the learning and performance goal structures were 0.77 and 0.73, respectively.

### 3.2.3 Teacher self-efficacy

Teacher self-efficacy was measured by a short 20-item version of the Norwegian teacher self-efficacy scale (NTSES; Skaalvik & Skaalvik, 2007). The short version of the scale measures five dimensions of teacher self-efficacy: instruction, adapting education to individual students’ needs, motivating students, keeping discipline, and coping with changes and challenges. An example of an item is “How certain are you that you can wake the desire to learn even among the lowest achieving students?” Responses are given on a 7-point scale from “Not certain at all” (1) to “Absolutely certain” (7). The original scale shows good validity both in Norway and Italy (Avanzi et al., 2013). Cronbach’s alpha for the short version of the scale was 0.92.

### 3.2.4 Engagement

Teachers’ work engagement was measured by means of a short seven-item version of the Utrecht Work Engagement Scale (Schaufeli et al., 2006). The scale measures three dimensions of engagement: vigor, dedication, and absorption. An example of an item is: “At my work, I feel bursting with energy” (vigor). Responses were given on a 7-point scale from “Never (1) to “Every day” (7). Cronbach’s alpha for the scale was 0.89.

## 3.3 Data analyses

Descriptive statistics were first conducted by means of the SPSS 28 program. The data were further analysed by means of confirmatory factor analysis and structural equation modelling (SEM analysis) using the AMOS 25 program. We first tested a measurement model of CTC by means of confirmatory factor analysis. In this model, CTC was defined as a second-order factor indicated by four primary factors (positive social relations, collective teacher efficacy, shared values, and value consonance). Secondly, we tested a model with two second-order factors (CTC and

teacher self-efficacy) and three first-order factors (learning goal structure, performance goal structure, and teacher engagement). The second-order CTC was indicated by four first-order factors (see above). The second-order teacher self-efficacy factor was indicated by five first-order factors (see Sect. 3.2.3). We also tested a model with the indicators of a CTC as primary factors. Lastly, we tested a SEM-model. This model defined learning and performance goal structures as exogenous variables and tested if the goal structures were indirectly associated with engagement and self-efficacy, mediated through CTC. We used well-established indices of model fit: CFI, TLI, and RMSEA. For the CFI 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 (ML) estimation in the AMOS program (Byrne, 2001). Compared to both listwise and pairwise deletion of missing data and to mean imputation, ML estimation will exhibit the least bias (Little & Rubin, 1989; Muthén et al., 1987; Schafer, 1997).

## 4 Results

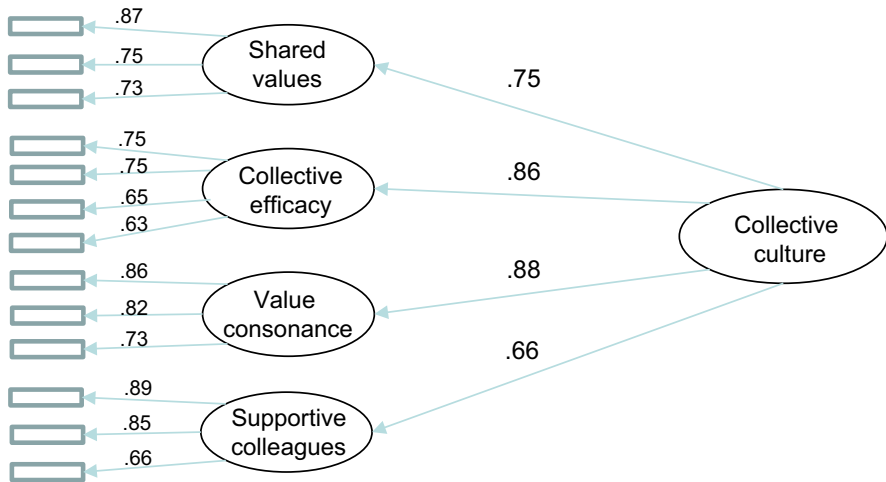
### 4.1 Descriptive statistics

Table 1 shows zero-order correlations between the subscales as well as statistical means, standard deviations, and Cronbachs' alphas. The correlations between the four dimensions of a CTC varied between .44 and .67. A particularly strong correlation ( $r = .67$ ) was found between shared values and value consonance. Nevertheless,

**Table 1** Zero order correlations and descriptive statistics

Scales	1	2	3	4	5	6	7	8
1 Shared values	–	.56	.67	.44	.55	-.11	.34	.24
2 Value consonance		–	.49	.54	.53	-.19	.33	.36
3 Collective efficacy			–	.48	.58	-.11	.43	.31
4 Supportive colleagues				–	.47	-.20	.28	.34
5 Learning structure					–	-.18	.37	.28
6 Performance structure						–	-.03	-.12
7 Teacher self-efficacy							–	.43
8 Engagement								–
Scale range	1–6	1–6	1–6	1–6	1–6	1–6	1–7	1–7
Statistical means	4.40	4.78	4.52	5.30	4.70	2.88	5.01	5.66
Standard deviations	0.89	0.74	0.67	0.71	0.59	0.91	0.67	1.01
Maximum	6	6	6	6	6	6	7	7
Minimum	1.00	1.33	1.80	1.00	1.00	1.00	2.63	1.89
Alpha	0.84	0.82	0.80	0.84	0.77	0.73	0.92	0.89

All correlations higher than 0.10 are significant ( $p < .001$ )



**Fig. 2** Second-order model of collective teacher culture—confirmatory factor analysis

this correlation clearly supports the expectation that shared values and value consonance are distinct constructs. For instance, shared values could only explain less than 50% of the variance in value consonance. All subscales of a CTC were positively associated with a learning goal structure (correlations between .47 and .58) and negatively associated with a performance goal structure (correlations between -.11 and -.20). All subscales of a CTC were also positively associated with individual teacher self-efficacy (correlations between .28 and .43) and with work engagement (correlations between .24 and .36). The teachers' experiences of working in a school characterized by a learning goal structure were also positively associated with both teacher self-efficacy ( $r=.37$ ) and engagement ( $r=.28$ ) whereas perceptions of a performance goal structure were negatively associated with engagement ( $r=-.12$ ) and not significantly associated with teacher self-efficacy.

With one exception, all statistical means were relatively high, for instance varying between 4.40 and 5.20 on a 6-point scale. The exception was teachers' perception of working in a school endorsing a performance goal structure that had a statistical mean of 2.88. In comparison, teachers' perceptions of working in a school endorsing a learning goal structure had a statistical mean of 4.70.

## 4.2 Confirmatory factor analyses

The construct of a CTC was first explored by means of confirmatory factor analysis. A model with CTC as a second-order factor indicated by the four primary factors was tested. The model had a good fit to the data ( $\chi^2(61, N=1145)=419.881$ ,  $p < .001$ , RMSEA=0.072, CFI=0.951, TLI=0.927), and all factor loadings were strong (see Fig. 2). The result supported previous findings by Skaalvik and Skaalvik (2021).

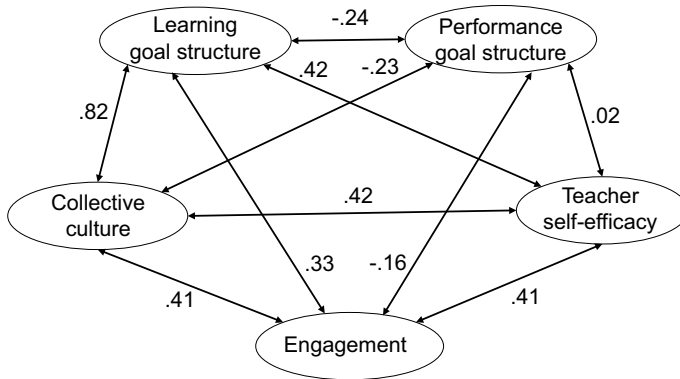
We then tested two extended models (extended model A and B) by means of confirmatory factor analysis. Besides CTC these models included teacher self-efficacy as a second-order factor and learning goal structure, performance goal structure, and work engagement as first-order factors. CTC was represented by a second-order factor in model A and by four separate first-order factors in model B.

Model A had an acceptable fit to the data ( $\chi^2(1061, N=1145)=3416.603$ ,  $p<.001$ ,  $RMSEA=0.44$ ,  $CFI=0.923$ ,  $TLI=0.915$ ), and the factor loadings were strong (see Table 2). The correlations between the five latent factors are shown in Fig. 3. Teachers' perception of a learning goal structure was strongly associated with a CTC ( $r=.82$ ) whereas the perception of a performance goal structure was weakly, but negatively associated with a CTC ( $r=-.23$ ). Teacher self-efficacy was positively associated with both a learning goal structure ( $r=.42$ ) and a CTC ( $r=.42$ ), but not significantly associated with a performance goal structure ( $r=.02$ ). Teacher engagement was positively associated with both a learning goal structure, a CTC, and

**Table 2** Confirmatory factor analysis of extended model A—factor loadings

Scales	1	2	3	4	5
1 Collective teacher culture	0.86				
	0.84				
	0.78				
	0.68				
2 Learning goal structure		0.70			
		0.63			
		0.62			
		0.61			
		0.61			
3 Performance goal structure			0.76		
			0.67		
			0.63		
4 Teacher self-efficacy				0.83	
				0.78	
				0.59	
				0.55	
				0.54	
5 Teacher work engagement					0.87
					0.80
					0.79
					0.75
					0.72
					0.68
					0.58

The table shows standardized regression weights on first-order factors for learning goal structure, performance goal structure, and engagement, and on second-order factors for collective teacher culture and teacher self-efficacy



**Fig. 3** Correlations between latent variables: results from a confirmatory factor analysis of extended model A

teacher self-efficacy ( $r = .33$ ,  $.41$ , and  $.41$ , respectively) and negatively associated with a performance goal structure ( $r = -.16$ ).

Model B also had acceptable fit to the data ( $\chi^2(1047, N=1145) = 3236.060$ ,  $p < .001$ ,  $RMSEA = 0.43$ ,  $CFI = 0.929$ ,  $TLI = 0.920$ ). Table 3 shows the correlations between the latent variables in model B. All indicators of a CTC correlated strongly and positively with a learning goal structure and negatively as weakly with a performance goal structure. All indicators of a CTC also correlated positively with teacher self-efficacy and engagement. The two extended models were compared by means of the  $\chi^2$ -difference test ( $\Delta\chi^2$ ) and differences in CFI ( $\Delta CFI$ ). An absolute difference in CFI greater than 0.01 would indicate a significant difference in model fit whereas the difference was 0.006. The  $\chi^2$ -difference test also indicated no significant difference in model fit ( $\Delta\chi^2 = 180$ ,  $\Delta df = 86$ ). Because we found no significant differences in model fit and model A is the most parsimonious of the two models, we propose that analysis of a second-order CTC variable for many purposes may be preferable (see Sect. 4.3).

### 4.3 SEM analysis

Finally, we conducted a SEM analysis with learning and performance goal structures as exogenous variables. One purpose of this analysis was to explore the extent to which the associations between (a) learning and performance goal structures and (b) teacher self-efficacy and engagement were mediated through CTC. For this purpose, CTC was represented by a second-order factor. In this model, using the four strongly correlated indicators of CTC as primary factors could represent a serious collinearity problem.

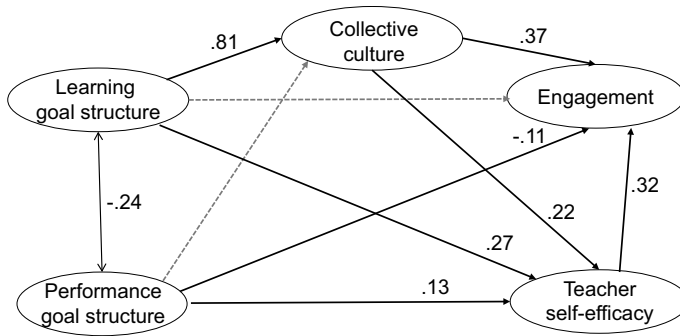
The empirical model is shown in Fig. 4. The model has acceptable fit to the data ( $\chi^2(1061, N=1145) = 3416.603$ ,  $p < .001$ ,  $RMSEA = 0.44$ ,  $CFI = 0.923$ ,  $TLI = 0.915$ ). The result confirms that a second-order CTC variable, where the shared variance across the four indicators is retrieved, is strongly associated with teachers' perceptions of a learning goal structure ( $\beta = 0.81$ ) but not significantly

**Table 3** Confirmatory factor analysis of extended model B—correlations between latent variables

Variables	1	2	3	4	5	6	7	8
1. Learning goal structure	—	-.24***	.66***	.68***	.71***	.55***	.42***	.33***
2. Performance goal structure		—	.25***	-.14***	-.15***	-.24***	.02	-.16***
3. Shared values			—	.66***	.59***	.63***	.30***	.40***
4. Value conservation				—	.80***	.51***	.34***	.26***
5. Collective efficacy					—	.56***	.43***	.34***
6. Supportive colleagues						—	.21***	.37***
7. Self-efficacy							—	.41***
8. Engagement								—

\*\*\* $p < .001$





**Fig. 4** Structural model of relations between learning goal structure, performance goal structure, CTC, teacher self-efficacy, and engagement. Standardized regressions weights are reported. Dotted lines indicate nonsignificant associations. Collective culture and self-efficacy are represented by second-order variables whereas learning goal structure, performance goal structure and engagement are represented by first-order variables

associated with perceptions of a performance goal structure. The empirical model also shows that a CTC is positively associated with both teacher self-efficacy ( $\beta=0.22$ ) and teacher engagement ( $\beta=0.37$ ). Learning goal structure is in the SEM model both directly and indirectly associated with teacher self-efficacy but only indirectly associated with teacher engagement. The indirect associations are mediated through CTC. The way the model was designed we also found a small indirect effect on engagement, mediated through self-efficacy.

## 5 Discussion

### 5.1 The collective teacher culture model (CTC model)

One purpose of this study was to test the CTC model proposed by Skaalvik and Skaalvik (2021). In this model, a second-order CTC variable was indicated by four first-order factors (positive and supportive relations with colleagues, collective teacher efficacy, shared values, and value consonance). The second-order factor analysis of CTC (Fig. 2) clearly supported the model. Both the first-order factors and the second-order factor had high factor loadings and the model fitted the data well. This is an important finding in itself, partly because it shows that a common understanding of educational goals and values among the teachers, positive and supportive collegial relations, and the belief in what the collegium can achieve through common effort are inter-related constructs. In previous research, associations with the indicators of a collective culture, for instance, collective teacher efficacy, have been analyzed separately. One problem with separate analyzes of intercorrelated constructs is that the importance of each individual construct may be overestimated. Another problem is that such analyzes may conceal complex processes and relations and therefore result in simplified analyses. Moreover, the problem with separate analyzes of intercorrelated constructs cannot be solved by including the constructs as

primary factors in SEM analyses due to statistical covariance problems. Therefore, analyzing CTC as a second-order variable may be a promising avenue for exploring teachers' work environment, motivation, self-efficacy, and work-related well-being.

Nevertheless, we have limited knowledge of the processes by which positive and supportive relations with colleagues, collective teacher efficacy, and common educational goals and values become strongly interrelated. Although we assume that these constructs affect each other reciprocally, more research is needed to analyze causal relations between the constructs in longitudinal studies. We propose that common values (shared values and value consonance) represent key variables influencing both social relations between colleagues, to which degree collaboration is perceived as adaptive, and teaches beliefs in what they can accomplish through a joint effort. However, these assumptions need to be explored through longitudinal studies.

## 5.2 Associations between CTC and teachers' perceptions of the school goal structure

The factor analysis revealed a strong positive association between a second-order CTC variable and teachers' perception of a learning goal structure and a weak negative association between CTC and teachers' perception of a performance goal structure (Fig. 3). The SEM analysis confirmed the strong positive association between a learning goal structure and CTC but revealed no significant association between a performance goal structure and CTC. Moreover, an inspection of Table 3, shows that all dimensions of a CTC were positively and moderately correlated with a learning goal structure and negatively and weakly correlated with a performance goal structure.

These findings imply that teachers who perceive their schools as characterized by a learning goal structure tend to have a common understanding of educational goals and values, support each other, and develop strong collective efficacy beliefs. In comparison, the factor analyses indicate that teachers who perceive their schools as characterized by a performance goal structure to a lesser extent develop a common understanding of educational goals and values, a supportive environment, and collective efficacy beliefs. A reasonable interpretation of these findings is that most teachers endorse educational goals and values that are compatible with a learning goal structure. As already noted, a widespread motive for choosing a teaching career is to help children learn and develop and to make a difference in their lives (e.g., Berg et al., 2023; Watt & Richardson, 2008). We propose that these motives build on values that are inherent in a learning goal structure. In contrast, a performance goal structure, emphasizing test results and stimulating social comparisons, seems to build on values that are less compatible with teachers' educational values and reasons for seeking a teaching profession. A performance goal structure may result in a climate less suitable for developing a supportive environment, adaptive interaction, and collective efficacy beliefs. This interpretation may explain why teachers at schools characterized by a learning goal structure tend to have a common understanding of educational goals and values.

Based on these interpretations, a crucial aim for the educational policy should be to find means to develop a learning goal structure in school. However, in Norway, as in many western countries, the national education governance has leaned heavily on performance-based accountability instruments to control education from a distance (Camphuijsen et al., 2021; Verger & Skedsmo, 2021). Studies of the effect of performance-based accountability are not conclusive, however, according to Camphuijsen et al. (2021), test-based accountability tends to result in performance goals, the monitoring of instruction, and performance contracts for school leaders. The strong emphasis on test results can also lead to unfortunate side effects that resemble a performance goal structure, for instance, a narrowing of the curriculum, an increase in social comparison, both among teachers and students, and a feeling among teachers of being evaluated based on goals that are not compatible with their own educational values (Amrein-Beardsley et al., 2010; de Wolf & Janssens, 2007; Falabella, 2016).

### 5.3 Associations with teacher self-efficacy and work engagement

In the present study, both the second-order CTC variable and the indicators of CTS analyzed as first-order factors were positively and moderately associated with both teacher self-efficacy and teacher work engagement. This finding supports a previous study where a CTC was found to be positively associated with teachers' experiences of job satisfaction, autonomy, and belonging (Skaalvik & Skaalvik, 2021). Moreover, the result is also in accordance with previous studies of separate indicators of a CTC. For instance, positive and supportive social relations are shown to be positively associated with work engagement (Minghui et al., 2018). Skaalvik and Skaalvik (2007, 2019) also reported that a measure of collective teacher efficacy, which is one of the dimensions of a CTC, was predictive of individual teacher self-efficacy. These findings indicate that teachers' experiences that they may succeed through joint effort likely strengthen their personal mastery experiences. Also, value consonance is previously shown to be positively associated with teacher engagement (Skaalvik & Skaalvik, 2018) whereas lack of value consonance (value dissonance) is predictive of all dimensions of teacher burnout (Skaalvik & Skaalvik, 2017b).

The factor analyses also showed that teacher self-efficacy and teacher work engagement were positively associated with the perception of a learning goal structure, which could be expected based on the assumption that teachers' educational values are most compatible with a learning goal structure. The SEM analysis indicates that these associations partly are mediated through CTC.

### 5.4 Implications

One conclusion that may be drawn from this study, is that the development of a CTC, based on shared values, likely will promote teacher engagement and self-efficacy. The study, therefore, implies that educational politicians and school administrators should make an effort to create conditions for the schools to develop a CTC. At the school level, principals and middle managers therefore should attend to the development of shared goals and values. The development of shared goals

and values is a continuous process that, in our conceptualization, should be a part of ongoing teacher professional learning, which refers to formal and informal learning in the workplace. Professional teacher learning involves a collegial exchange of work-related knowledge, skills, and experiences (Shengnan & Hallinger, 2021). We suggest adding goals, values, and attitudes to this process. The school leadership has an obvious role in defining and communicating goals and values. Nevertheless, values are not easily changed through instruction and individually held beliefs may act to either promote or inhibit the development of shared goals and values (Shengnan & Hallinger, 2021). Principals should therefore encourage discussions of goals and values and pay attention to the voices of teachers (Shengnan & Hallinger, 2021).

Another implication of this study is that a learning goal structure is a prerequisite for developing a CTC at school. Our findings indicate that a learning goal structure facilitates the development of a CTC whereas a performance goal structure works as a barrier to the development of a CTC. However, the development of the school goal structure is not entirely dependent on what is done at the individual school. In Norway, with a national curriculum and a national directorate of education, the school goal structure is probably also a result of the national school policy, including the national test regime. A challenge facing educational researchers is therefore to communicate the results of the research to politicians and bureaucrats at the national level.

## 5.5 Limitations

This study was designed as a cross-sectional study. Hence, one should be careful not to draw firm conclusions about causal relations. For that reason, we analyzed the data using both factor analyses and SEM analysis. Longitudinal studies of relations between a CTC, the school goal structure, teacher motivation, and teacher well-being are important tasks for future research. Another limitation of this study is that CTC and the school goal structure were analyzed in relation to only two possible teacher outcomes, self-efficacy and engagement. Relations with alternative cognitive and emotional variables are needed.

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## Declarations

**Conflict of interest** The authors have no conflicts of interest or competing interests to declare that are relevant to the content of this article.

**Ethical approval** Obtained from the Norwegian Centre for Research Data (NSD) which serves as a national ethical research committee.

**Consent to participate** Participation in this study was voluntary for both the participating schools and for the individual teachers. The teachers were informed that participating was anonymous and voluntary and that they provided consent by filling out and submitting the questionnaire.

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