A comparative analysis of predictors of teacher self-efficacy in student engagement, instruction and classroom management in Nordic, Anglo-Saxon and East and South-East Asian countries

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Going beyond previous studies, we investigated differential effects of teacher self-efficacy (TSE) across the three basic dimensions of educational equality in student engagement, instructional strategies and classroom management in East and South-East Asian, Anglo-Saxon and Nordic country clusters in a cross-cultural analysis. It was found that all three domains of TSE show different patterns of associations in relation to teacher, classroom, principal and school predictors across the three country clusters. Most variation occurred within the classroom and principal predictors, whereas the teacher and school predictors were more homogeneously related to the three country clusters and the three domains of TSE. However, there were more similarities between the Nordic and Anglo-Saxon clusters than the East and South-East Asian clusters and any of the other two. Cultural values, as found in the GLOBE study and by Hofstede, were used as a cultural framework to interpret the differences occurring in the country clusters.

Keywords TALIS, cross-cultural analysis, teacher self-efficacy, multi-level modelling.

Introduction

Teacher self-efficacy (TSE), or the degree to which 'teachers believe they can influence how well students learn, although they might be difficult or unmotivated' (Guskey & Passaro, 1994, p. 4) has been researched widely over the past 40 years. However, there are a few trends or imbalances in previous research (Klassen *et al.*, 2010; Klassen & Tze, 2014). First, most studies have been carried out in the United States, the country of origin of the concept of TSE. Secondly, there are few international comparisons of TSE and the contextual characteristics within which TSE emerges. Thirdly, there is a lack of studies that compare groups of countries with respect to their cultural differences (for an exception see Scherer *et al.*, 2016). In the present study we aim at moving the field forward by using data from the Teaching and Learning International Survey (TALIS) from 2013 (OECD, 2013), to compare associations between TSE and teacher, school and principal characteristics among

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country clusters of Nordic, Anglo-Saxon, and East and South-East Asian (ESEA) countries (Bulle, 2009, 2011) that were formed according to features of their education systems. Furthermore, the theoretical framework will be complemented by normative dimensions from the GLOBE study (House *et al.*, 2004) that describe how social relationships in the country clusters—and their schools—are formed. Integrating these different strands of country-related information adds a new perspective on the cultural environment, in which TSE develops.

Theoretical background

This study draws on three different strands of education research. First, there is theory and research on teacher self-efficacy, which is at the centre of interest. Secondly, information will be used on teaching styles and features of teaching and the classroom set-up in the Anglo-Saxon, Nordic and ESEA countries. These features partly set the scene for forming the country clusters. Thirdly, following Hofstede (1986), Hofstede *et al.* (1991) and House *et al.* (2004) we interpret the associations between TSE and teacher, school and principal characteristics in accordance with the cultural values within each cluster of countries.

Research on teacher self-efficacy

The first field of research, TSE, has been linked to desirable outcomes like the use of diverse teaching strategies (Chan, 2008), a better classroom climate (Aslan, 2015) and better student support (Emmer & Hickman, 1991). Hence, it seems to be a desirable characteristic of a teacher to investigate with respect to the lack of international research that takes into account the cultural environment in which TSE develops (Klassen *et al.*, 2010). The theory has first been introduced by Albert Bandura (Bandura, 1977, 1986) as the degree someone believes to have the abilities to achieve a certain level of performance. The 'efficacy belief' is informed by four sources: mastery experience of success; vicarious experience or role-model behaviour; verbal persuasion or praise; and emotional arousal. The first three sources are relevant to this study, as there is no data available on the last one.

Teachers' self-efficacy has been defined in various ways over the past 40 years or so of research in this area. However, most agreement evolved around a conceptualisation comprising TSE in the three basic dimensions of instructional quality of student engagement, instructional support and classroom management, which acknowledges that there are different facets of classroom processes in which a teacher can feel self-efficacious to a greater or lesser degree (Tschannen-Moran *et al.*, 1998). Similar conceptualisations have been used in other frameworks to assess the classroom and teaching environment and provide links with a wider strand of research like the CLASS system by drawing on emotional support, instructional support and classroom organisation (La Paro *et al.*, 2004).

The following sections will link the different research strands to form the theoretical framework.

Teacher characteristics.   With respect to the relationship between teacher gender and TSE, results are mixed, as a positive association for American and international

female teachers (Coladarci, 1992; Fackler and Malmberg, 2016), male Canadian teachers (Ross *et al.*, 1996) and no gender effect for UK teachers (Malmberg *et al.*, 2014) was found. Again mixed results exist for time-related characteristics like age and work experience, where a higher level of TSE was found for older and more experienced teachers in Asian, international and Canadian samples (Ross *et al.*, 1996; Chan, 2008; Fackler & Malmberg, 2016), but also a non-linear relationship where TSE first rises and then declines around mid-career for Canadian and American teachers (Woolfolk-Hoy & Burke-Spero, 2005; Klassen and Chiu, 2010), but also no effect for American teachers again (Pas *et al.*, 2012) and also no effect for the teachers' educational level. For TSE in classroom management in particular, a positive association was found with work experience for Greek teachers (Gkolia *et al.*, 2016) and more experienced Dutch teachers were found to be more sensitive towards their students' needs and respond more adequately (Zee & Koomen, 2016). The educational level was found to be positively related to TSE throughout for Hong Kong and Australian teachers (Giallo & Little, 2003; Cheung, 2008). In another Hong Kong study, TSE was found to be associated with the emotional and psychological well-being of teachers (Huang *et al.*, 2019). In relation to their behaviour towards students, American high-TSE teachers were found to use positive strategies of student support (Gibson & Dembo, 1984; Emmer & Hickman, 1991), to encourage students, reflect on their own teaching and use more reductive strategies like desists or warnings, but also more positive strategies to achieve a certain student behaviour. In Asian countries and as found in an international dataset using the TIMSS 2015 data, they furthermore use more diverse academic activities and provide more academically challenging tasks (Chan, 2008; Malinen, 2016; Teig *et al.*, 2019) and reported a higher level of mastery experience in the UK (Malmberg *et al.*, 2014). Concerning the four sources of TSE—mastery experience, vicarious experience, verbal persuasion and emotional arousal—all were found to be strongly related to a high level of self-efficacy (Clark & Newberry, 2019).

Classroom characteristics. Multiple studies found a positive association between a higher level of TSE and good student achievement in the United States and the UK (Ashton *et al.*, 1983; Midgley *et al.*, 1989; Malmberg *et al.*, 2010; Fackler & Malmberg, 2016). In terms of classroom composition, a bigger class-size in America (Coladarci, 1992; Raudenbush *et al.*, 1992) and more homogeneous classrooms in the Netherlands (Geerlings *et al.*, 2018) were associated with a higher level of TSE, but a higher number of minority students in the classroom were related to a lower level of TSE in instruction and student engagement, whereas teachers of ethnic majority students reported a lower level of TSE in classroom management (Geerlings *et al.*, 2018). Furthermore, internationally, high TSE teachers use more diverse teaching strategies and show a higher level of TSE when teaching students from an educated home (Fackler & Malmberg, 2016) and more teacher-centred approaches in a Canadian sample (Klassen & Chiu, 2010). Good interpersonal experiences like a good classroom climate in, for example, Germany were found for Germany (Aslan, 2015; Künsting *et al.*, 2016).

Table 1.   Sources of TSE (after Fackler and Malmberg, 2016)

Source of TSE	Characteristic of TSE
Mastery experience	● Educational level ● Teaching experience ● Classroom practices ● Student features
Vicarious experience	● Person-related features of the principal ● Instructional leadership style
Verbal persuasion	● Student behaviour ● Classroom climate ● School-related features ● Instructional leadership style
Emotional arousal	–

Principal and school characteristics.   Concerning the school environment and the principal, particular attention has been paid to a favourable leadership style of the principal, which has been identified as instructional leadership that comprises features like goal setting, a focus on academic achievement and a clear vision for the school in the USA (Coladarci, 1992; Hoy & Woolfolk, 1993; Kirk, 2016). In terms of time-related factors, work experience as principal and age (Raudenbush *et al.*, 1992; Chester & Beaudin, 1996; Guo *et al.*, 2011; Walker & Slear, 2011; Fackler & Malmberg, 2016) showed a positive association with TSE in various US studies. A fruitful environment for TSE to develop was found to be in urban rather than sub-urban or rural American areas (Knoblauch & Woolfolk Hoy, 2008) and teachers in private schools reported a higher level of TSE than their colleagues in public schools in an international sample (Fackler & Malmberg, 2016).

Summary.   The literature review above had two mains aims: First, to give an overview of the heterogeneity with which TSE has been researched in terms of the association of predictors across the different levels (teachers/classrooms and principals/schools). Second, to show that there are only few international studies, which makes the effort of the current study worthwhile. The Table 1 below shows a grouping of the variables according to the four sources of self-efficacy (mastery experience, vicarious experience, verbal persuasion, emotional arousal). As shown by Clark and Newberry (2019), they are significant predictors of TSE. It should also be mentioned that the associations between TSE and its characteristics mainly stem from correlational analyses as, for example, correlation, regression or multi-level analysis and come from self-reported questionnaire data, which contains potential social-desirability bias. Hence, the selection of variables is not based on causational effects but associations with respect to literature and TSE theory.

Country-specific characteristics of school systems

The second field of research concerns country-specific characteristics of the school systems, which serves a suitable framework to cluster countries in a study aiming at

comparing characteristics of TSE across those clusters. To categorise education systems, Bulle (2009, in Bulle, 2011), suggested using their curricular structures during lower secondary education and their educational objectives as guidelines. The curricular structure can be differentiated to different degrees (differentiated, mixed or undifferentiated), while the educational objectives are either academic or progressive. In academic school systems, the focus lays on structured learning and understanding of theoretical concepts in maths or physics, whereas the progressive type focuses on general skills and applied learning. As for the degree of differentiation, in undifferentiated school systems, students tend to learn together until the end of compulsory education, share a core curriculum and specialise academically only very late during secondary education (i.e. British comprehensive schools). The differentiated type, by contrast, uses academic selection at a rather young age to choose between different tracks (cf. Germany) and the mixed type, finally, bridges those two more extreme approaches by allowing for some variations at a local level, but still promotes a core curriculum (i.e. in the Netherlands).

With respect to these categories, the following country clusters are found: an Anglo-Saxon cluster with the USA, England and Australia; a Nordic cluster with Finland, Sweden, Norway and Denmark; and an East and South-East Asian (ESEA) cluster with South Korea, Japan, Singapore and Malaysia. The Anglo-Saxon cluster here represents a broadly mixed system with a progressive trend, where there is both an academic focus early on in secondary education, but at the same time, students tend to attend courses together for a rather long time and selection is not a major feature (Smithers & Robinson, 2010). The Nordic cluster, in contrast, is an undifferentiated cluster, but with a more progressive orientation. Here, students usually learn together until the age of 16, when they decide between academic education or vocational training. Furthermore, the Scandinavian countries apply progressive education with a focus on competencies, empirical learning and group teaching. Nonetheless, it is possible to follow individual interests or form ability groups in, for example, maths, which could be seen as 'hidden streaming' despite this rather egalitarian approach. Furthermore, at the end of compulsory lower secondary education, a selection process takes place by the upper secondary schools to choose students (OECD, 2004). Hence, school performance nonetheless plays an important role despite the progressive trend of the Scandinavian school systems.

Finally, the ESEA countries can be classified as a mixed cluster with an academic trend: despite a strict core curriculum, schools are allowed to offer extra courses according to the students' ability and aspirations, select students according to specific criteria and allow for private schools to differ from the core curriculum. Furthermore, in all countries belonging to the cluster there is some kind of performance-based selection system from lower to higher secondary education (Mokshein *et al.*, 2011; Abumiya, 2012).

We aimed to show that using similarities of education systems as a clustering criterion is appropriate for this research. However, there are also other unifying elements like language for the Anglo-Saxon countries or geographic proximity for the Nordic countries, but the study focus on education made using characteristics of the education systems most appropriate.

Country values and leadership

The third field of research stating the theoretical framework are country values and leadership attitudes that predominate in the clusters, to explore the values, beliefs and attitudes that are shared among cultural entities (Sternberg, 2004) and help to distinguish one society from another (Hofstede, 2011). We chose the four values used by Hofstede (1986), in his investigation of country values and classroom settings (gender egalitarianism, performance orientation, power distance and individualism/ collectivism). The country-cluster means (Table 2) are calculated from the available country means of the corresponding dimensions in the GLOBE study, which are newer than the values published by Hofstede (2004 as compared to 1983). Please note that countries tend to lean towards these categories rather than that being a dichotomous distinction, and characteristics of one or the other category can be found in a country cluster, which largely falls in one domain, without contradicting this.

Power distance is the degree to which members of a society believe that power should be distributed equally across hierarchies and hence define the relationship between teachers and students or teachers and principals, respectively (House *et al.*, 2004; Hofstede, 2011). Teachers in a society supporting flat hierarchies, for example, expect to be part of the decision-making processes, share responsibilities and tend to use student-centred teaching styles. Teachers in society with small power distances tend to use rather student-centred teaching styles, whereas teachers in societies accepting large degrees of power distance use teacher-centred methods and are expected to initiate communication and tend to be supported by the parents (Hofstede, 2011). In this study, the accepted degree of power distance is comparatively smallest in the Nordic countries and highest in the ESEA countries. Hence it is expected that lessons in the ESEA countries are more teacher-led, whereas those in

Table 2.   Country values according to cluster membership (cf. House *et al.*, 2004)

	Nordic	Anglo-Saxon	ESEA
Performance orientation	5.84	5.98	5.54
Gender egalitarianism	4.83	4.54	4.21
Power distance	2.55	2.81	2.85
Individualism/collectivism	4.08	4.29	5.03

	SWE	DEN	FIN	USA	ENG	AUS	SIN	JAP	SKO	MAL
Performance orientation	5.80	5.61	6.11	6.14	5.90	5.89	5.72	5.17	5.25	6.04
Gender egalitarianism	5.15	5.08	4.24	5.06	5.17	3.40	4.51	4.33	4.22	3.78
Power distance	2.70	2.76	2.19	2.85	2.80	2.78	3.04	2.86	2.55	2.94
Individualism/collectivism	3.97	4.19	4.11	4.17	4.31	4.40	4.55	5.26	5.41	4.87

SWE = Sweden, DEN = Denmark, FIN = Finland, USA = United States of America, ENG = England, AUS = Australia, SIN = Singapore, JAP = Japan, SKO = South Korea, MAL = Malaysia, ESEA = East and South-East Asia (cluster means were calculated from the country means). Norway was not part of the GLOBE study.

the Nordic countries are expected to be more student-centred and the Anglo-Saxon countries to be somewhere in between (Hofstede, 1986).

Gender egalitarianism describes the degree to which gender differences in societies are minimised. These differences mainly concern 'stereotypical' views of gender roles that are described as either 'male' or 'female' (House *et al.*, 2004). Male traits, for example, are strengths and dominance, whereas female traits include gentleness and empathy. In more egalitarian societies, women participate more often in the workforce and family chores are distributed more equally between men and women. In less gender egalitarian societies, in contrast, women tend to be less represented in the workforce and are not expected to be assertive or ambitious, which are appropriate characteristics of men only. In classrooms of countries, which accept a high degree of gender differences, there is a high recognition of ambitious teachers, competition in the classroom is supported and good students are publicly praised. In contrast, in countries that accept a low degree of differences, there is less open competition in the classroom, support is offered more equally to all students and not only high achievers, teachers tend to avoid open praise of student attainment and are appreciated for being friendly and concerned for student well-being (Hofstede, 1986). In this study, the most gender egalitarian cluster turned out to be the Nordic one, followed by the Anglo-Saxon cluster. The ESEA countries were revealed to have the highest acceptance of gender differences culturally.

In-group *collectivism and individualism* describes the extent to which members of a society define their identity and gain self-esteem through belonging to a certain group, like a family or colleagues at work. Collectivistic societies tend to prefer an indirect communication style, aim at forming long-term relationships and put emphasis on group membership. In individualistic societies, in contrast, communication is more direct, rationality is favoured over empathy, short-term social relationships tend to be more common and people take interest in a few close friends or family members (Hofstede, 1986, 2011). In classrooms in collectivistic societies, students tend to form cohesive sub-groups based on ethnic or religious affiliation; a good classroom climate is considered important and students only speak when called upon by the teacher. Education is also seen to provide social prestige through attending 'the right schools' or gaining certificates. In more individualist societies, in contrast, sub-groups are formed more pragmatically (i.e. availability or task-based), the classroom climate can be open and confrontational and students also speak upon general invitation to the whole class. Education and schooling are deemed important to gain skills, qualification and self-respect and thus certificates are less important than in collectivist societies and larger emphasis is put on competence (cf. Hofstede, 1986). In this study, institutional collectivism is supported by the ESEA countries to a fairly high degree, whereas the Nordic countries rather support individualistic values. In the Anglo-Saxon countries, there tends to be more support for individualistic values, but less so than in the Nordic cluster.

Performance orientation as a societal value is a means of striving for excellence and improvement in societies. Societies that appreciate performance orientation are thought to set demanding targets, value individual achievement, believe that success can be achieved through hard work and see schooling as a means for success. In contrast, societies that have low appreciation for performance orientation, value loyalty

over success, emphasise harmony over merit and demand respect for seniors. More-over, they regard the choice of an appropriate school as crucial for success in later life, value sympathy, and build on tradition and belonging to networks (Hofstede, 1986, 2011). It should be pointed out that performance orientation had the greatest level of support across all three country clusters, but was comparatively highest in the Anglo-Saxon clusters and comparatively lowest in the ESEA countries (House *et al.*, 2004).

Classroom practices and culture

The fourth and last field of research of the theoretical framework is to explore class-room practices and pedagogical and societal aims that prevail in the different country clusters and describe the aims and underlying philosophies that shape the education systems in each country. Those 'aims' are usually not part of the curriculum, but are stated as overarching structures, in which education and schooling take place and can be found in the classroom structure, the relationship between teachers and students and how knowledge is approached (cf. academic vs progressive education according to Bulle, 2011). They are meant to teach accepted social behaviour and prepare stu-dents for society and in this study help further contextualise the differences in TSE (see Figure 1).

Teaching and education in the Anglo-Saxon countries.   Despite being different in many aspects, the Anglo-Saxon education systems share being rooted in Dewey's idea of
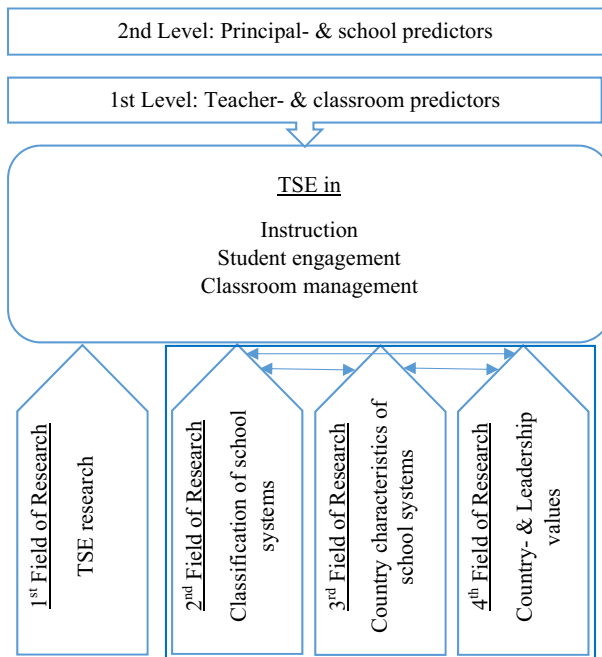

Figure 1.   Theoretical model. Fields of research # 2-4 provide the theoretical framework through an inter-cultural lens. The arrows between the three pillars indicate that there is exchange happening. TSE-research is somewhat different, as it does not particularly pay attention to cultural features of teaching, but focuses on school and classroom determinants

'democratic education' (Dewey, 1899, 1902, 1916): in addition to knowledge transmission, schools should educate future citizens and teach social skills and community life. Furthermore, education should be open for all, regardless of social class, and provide opportunities for both academic and vocational education, to minimise the gap between rich and poor and open educational opportunities besides the traditional pathways. This concept unfolded different education systems in the countries belonging to the Anglo-Saxon cluster.

In America, the focus is on learning tools to apply knowledge (Ravitch, 2008) by using linking techniques between theoretical knowledge and understanding of the application of those theoretical concepts. Hence, strategies like group teaching can help to enforce democratic exchange among students, to allow weaker students to learn from stronger ones, but also teacher-centred methods to provide all students with the equal chance to learn from the teacher's expertise (Norris, 2004). Furthermore, assessment and evaluation tools are used to provide detailed feedback and check the students' individual understanding and teachers initiate real-life scenarios that provide context for the lesson content (Muijs *et al.*, 2018). In particular, the student-centred approaches were linked to the classroom-management skills of the teachers, as teachers with better management skills provided feedback more successfully and their students showed better learning success (Lindorff & Sammons, 2018). American teachers tend to use grading strategies as summative feedback to assess their students' learning progress (Brookhart, 2009). In American classrooms, Dewey's approach to provide a space for both content and social learning are implemented, although traditional teaching approaches are also used.

In England, Dewey's idea of pragmatism was applied quite differently. There is a variety of types of schools: most schools are publicly funded and non-selective and offer different foci and opportunities for the students, as, for example, job-oriented practical courses alongside the usual curriculum. There are a few state selective grammar schools that have a strong academic focus. Alongside those, there are some highly prestigious private schools. Entry into these schools is mostly selective and entry exams are required (EURYBASE, 2010). Effective English teachers were shown to have a 'toolbox' of various teaching strategies they applied in the appropriate situation and they were able to adapt to cater for their students' needs. Furthermore, they equip students with meta-cognitive strategies to monitor their own learning process, give timely feedback and make links to other subjects. Hence, successful teaching in the UK can be seen as a combination of progressive constructivist student-centred and traditional teacher-centred approaches towards teaching (Ko *et al.*, 2016). In terms of assessment, there is high appreciation for formative assessment strategies, although practical circumstances like time constraints often make teachers use summative assessments. However, educational policy has released guidelines using the term 'assessment for learning' to foster these practices in English schools (Brookhart, 2009).

Finally, in Australia, teachers reported three different foci (Boulton-Lewis *et al.*, 2001): first, they focus on the students' development of their cognitive, behavioural and affective skills by providing a variety of activities. Secondly, they focus on competencies and knowledge through practical learning by linking theoretical knowledge to praxis-related tasks, in which they vary between whole-class and small-group

teaching. Thirdly, Australian teachers try to use communicative teaching methods and engage students in topic-related controversial conversations. Another feature is that Australian teachers aim at teaching students respect and responsibility for their own behaviour, despite feeling under pressure themselves and struggling with gaining respect from their students (Romi *et al.*, 2009). In terms of assessment, Australia is following two divergent strategies: on the one hand, they apply more teacher- and school-based assessments; on the other hand, they follow the international trend of national comparisons. Both are mostly applied summatively (Brookhart, 2009). Hence, Australia also has a strong emphasis to employ Dewey's values of democratic education in the school system and the discussion nowadays is on how this value-based approach can be brought back in a culture that emphasises a technocratic approach towards schooling (Webster, 2017; Appleby & Lim, 2018).

The Deweysian approach is applied differently in the Anglo-Saxon education systems, but is a strong unifying element among them. England allows for a variety of different types of schools and thus a lot of choice, America is largely using a student-centred teaching approach and Australia has a strong emphasis on responsibility and respect; elements that are part of Dewey's idea of democratic education, which is the shared underlying philosophy of them.

Teaching and Education in the East and South-East Asian countries.   Although the East and South-East Asian countries in this cluster are quite different from each other, their common denominator is Confucianism, which has also shaped their education systems (Pang, 2011). Key values in Confucianism are: living in harmony with one's environment, obedience to the elder, striving for excellence through hard work, pleasing the parents and developing a strong and virtuous character (Gardner, 2014). At school, those values are implemented through emphasising effort and strenuous learning and memorising and emulating the teachers to get as close to their level of expertise as possible. The teacher has a crucial role in that system and is highly respected. At home, parents are willing to make great financial sacrifices to equip their children with as-good-as-possible education that enables them to access prestigious universities and jobs. Finally, Asian countries aim at being recognised internationally and participate in the globalising world; also through education (Pang, 2011). However, this high level of pressure the students experience has shown to have a negative impact on their mental health (Zhao *et al.*, 2015).

To ensure high-quality knowledge transmission, the predominantly used teaching mode is whole-class teaching (Stevenson & Lee, 1995). In Japan, for example, the teachers see themselves as 'informed guides' and the students tend to mainly work individually or follow their teacher, but spend only a little time in group activities or discussions. There is nonetheless teacher-led classroom conversation, where the teacher provides critical feedback on the students' answers and makes sure the students develop a deeper understanding of the topic. Using work sheets or small group teaching, the teachers are able to cater towards different student needs and present material in different ways and support a constructivist style of teaching, which involves students as active learners (Stevenson & Lee, 1995).

In Shanghai, the teacher applies a variety of techniques to present topics most suitably and uses precise language to make sure the topic is conveyed unambiguously

(Lim, 2007). A similar structure was found by Stevenson and Lee (1995) for Chinese classrooms. Another overarching feature is that teachers are treated respectfully, classroom rules are usually followed and thus the focus is put on instruction. As teachers educate the 'most important resource' of the countries, the teaching profession is highly valued and respected (Sato & McLaughlin, 1998).

Malaysia stands out, compared to the other three countries in the cluster, as it is ethnically and religiously rather diverse (i.e. seven different religious groups and various ethnic minorities). With the 'vision 2020' the country seeks to develop an education system that educates a 'well-rounded' human being that is economically successful, morally strong and part of a developed, secure and united Malaysian society (Lee, 1999). One main aim is the economic and industrial development of the country through educational excellence, and hence teachers enjoy a very good reputation and are allowed to take part in decision-making processes; both at school and local level. In terms of the availability and variety of schools, private schools are rather rare and most education is being delivered by state schools (Lee, 1999).

Although Malaysia stands out from the other countries in the ESEA cluster as it is more heterogeneous, Confucianism as a 'system of ideas' shapes the understanding of public values and its ethical system is informed by the 'Confucian umbrella' as in the other ESEA countries (Rosker, 2016).

Teaching and education in the Nordic countries. The Nordic countries are—similarly to the ESEA countries above—only partly close with regard to their education systems: Norway, Sweden and Denmark share a larger part of their culture and history than Finland does with any country (Oftedal Telhaug *et al.*, 2006). Hence, distinctions will be made where necessary.

The general underlying philosophy of the education systems in the Nordic countries reveals that there is a progressive focus on social- and pupil-oriented teaching strategies; particularly in Norway, Sweden and Denmark. In those countries, children are meant to be educated as part of a civic society in an egalitarian way regardless of their social background, which is why private schools are rare, and publicly funded comprehensive schools dominate the educational landscape. In Norway, for example, an explicit value is 'solidarity' and the principals are encouraged to promote a culture that emphasises respect and tolerance (Oftedal Telhaug *et al.*, 2006). In Demark, the focus is on neo-liberal thinking and schools are given much freedom in finding their own pedagogic approaches towards education—the student is seen as a 'cultural, religious and spiritual human being' (Oftedal Telhaug *et al.*, 2006, p. 273) whose personal and intellectual development should flourish through knowledge and experience. In Finland, the school tradition has been academic for a very long time and has only begun to be replaced by a more progressive approach in recent years. Nonetheless, teacher training is highly regarded and professional in Finland. This is also the case for the other Nordic countries (Westbury *et al.*, 2005).

Those values to educate citizens for an egalitarian society are also reflected in the classroom practices. In Norwegian and Swedish classrooms, teacher-led discussions and peer learning are applied often, as is group work as a complementary approach to provide a micro-environment for the development of democratic skills (Galton *et al.*, 2009). In Finland, in contrast, the lessons are rather teacher-centred and discussions

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are used to provoke students' critical thinking by asking detailed questions and commenting or elaborating on the students' answers (Klette et al., 2018). In the other Nordic classrooms, the aim is to relate, for example, mathematical concepts to everyday situations and contextualise them, whereas in Finland the understanding of the concepts and a more focused classroom discourse is aimed at. Due to the differences in the Nordic countries with respect to their national curriculums, assessment strategies vary, too. Denmark, for example, has one national test that qualifies for higher education (Egelund, 2005), whereas Sweden uses teacher gradings for student evaluation and national tests are only available for a few subjects (Wikström, 2006).

The unifying element in the Nordic countries seems to be the socially oriented curriculum. Although Finland has traditionally a more academic approach towards schooling than the other Nordic countries, the countries share the main goal to educate citizens for a democratic society. Moreover, schools—and along with that teachers—enjoy a high reputation and are considered an integral part of society.

Effective teaching practices internationally. Internationally, school effectiveness research (SER) has identified a number of effective teaching practices that contribute to student learning regardless of cultural background or school system features. Kyriakides et al. (2013), for example, synthesised in the dynamic model of teaching that teachers should be well prepared in terms of teaching methods and strategies they use so they can apply—situation-specifically—the most appropriate one; regardless of ideological underpinnings. Another feature of these key teaching practices is that they can be 'practiced, learned and improved' (p. 151). This makes the case for professional development opportunities for teachers that help them to find their own ways of delivering lessons that engage students, deliver knowledge and foster understanding and reflection, as well as develop classroom disciplinary strategies and provide a stimulating and positive classroom climate (Muijs et al., 2014). Instruments like the ISTOF (International System for Teacher Observation and Feedback) have provided evidence on successful teacher practices across cultures and have provided useful insight into effective lessons; highlighting the strengths and weaknesses of a teacher and their developmental needs (Muijs et al., 2018).

Summary. For informing the current study we merge four fields of research: (1) TSE; (2) characterisation of educational systems along the dimensions of curriculum structure and educational; (3) values that shape human interaction in social settings as, for example, schools along the dimensions of performance orientation, gender egalitarianism, power distance and individualism/collectivism; and (4) teaching styles and societal aims along the dimensions of House et al. and Hofstede. Additionally, SER provides insight into effective teaching internationally. Positioning each country cluster along each of these dimensions allows us to interpret the findings in a coherent way.

Methodology

The data used come from the Teaching and Learning International Survey (TALIS) carried out by the OECD in 2013 in 34 of its member and partner countries (OECD, 2013; Rutkowski et al., 2013). In total, over 104,000 teachers in about 6,400 schools

in those 34 countries participated in the study. For the description of the variables see Table 3 and for the descriptive statistics see Table 4. The teachers and principals of the schools filled in questionnaires about themselves, their teaching, classrooms and schools and school leadership, respectively. Hence, teacher and classroom information operate at the same level as do principal and school information. For the present study, a dataset containing the Nordic countries (Denmark, Finland, Norway and Sweden), the Anglo-Saxon countries (England, Australia and the USA) and East and South-East Asian countries (Japan, South Korea, Singapore and Malaysia) was

Table 3. Description of variables

Variable name	Description	Variable name	Description
Teacher		*Classroom*	
Female gender	Male/female	Class size	*N* students
Educational level	1 = below ISCED level 5, 2 = ISCED level 5B, 3 = ISCED level 5A, 4 = ISCED level 6	Classroom climate	Four items, four-step Likert scale: 1 = Strongly disagree, 2 = Disagree, 3 = Agree and 4 = Strongly agree; items 1, 3 and 4 were reverse coded
Teaching experience	Years of teaching	Low student achievement	None, 1–10%, 11–30%, 31–60%, >60%
Hours teaching	Hours per week	Teaching and learning	% of classroom time spent
Hours planning	Hours per week	Keeping order	% of classroom time spent
Hours admin. work	Hours per week	Admin. tasks	% of classroom time spent
Constructivist beliefs	Four items; four-step Likert scale: 1 = Strongly disagree, 2 = Disagree, 3 = Agree and 4 = Strongly agree	Different language	None, 1–10%, 11–30%, 31–60%, >60%
		Disadv. background	None, 1–10%, 11–30%, 31–60%, >60%
Principal		*School*	
Female gender	Dichotomous	Student enrolment	N students
Age	Years of age	Type of school	public/private
Educational level	1 = below ISCED level 5, 2 = ISCED level 5B, 3 = ISCED level 5A, 4 = ISCED level 6	Community size	1 = hamlet, 2 = village, 3 = small town, 4 = town, 5 = city, 6 = large city
Work experience	Years of WE		
Instructional leadership	Three items; four-step Likert scale: 1 = Strongly disagree, 2 = Disagree, 3 = Agree and 4 = Strongly agree		

Table 4.   Descriptive statistics for all predictors for all three country clusters

	N Valid	N Missing	%	Mean	SE Mean	SD	Skewness	Kurtosis	N Valid	N Missing	%	Mean	SE Mean	SD	Skewness	Kurtosis	N Valid	N Missing	%	Mean	SE Mean	SD	Skewness	Kurtosis
Teacher																								
Female gender	12,510	–	0.00						6476	1	0.02						10,678	–	0.00					
Educational level	12,480	30	0.24	2.95	0.003	0.29	-4.08	23.30	6443	34	0.53	2.99	0.003	0.20	-4.79	60.81	10,621	57	.54	2.93	0.003	0.35	-4.09	19.03
Teaching exp.	12,267	243	1.98	14.40	0.093	10.25	0.48	-0.78	6333	144	2.27	14.10	0.128	10.16	0.75	-0.37	10,435	243	2.33	15.86	0.105	10.71	0.64	-0.58
Hours teaching	12,419	91	.73	17.74	0.070	7.79	3.24	21.64	6352	125	1.97	21.68	0.118	9.43	1.29	5.68	10,437	241	2.31	17.84	0.059	6.00	-0.03	1.55
Hours planning	12,326	184	1.49	7.83	0.064	7.16	3.42	20.28	6282	195	3.10	7.49	0.075	5.92	3.10	19.75	10,287	391	3.80	6.31	0.043	4.41	3.24	32.08
Hours admin. work	12,209	301	2.47	5.56	0.060	6.59	4.75	38.30	6165	312	5.06	3.93	0.059	4.62	4.75	42.87	9692	986	10.17	2.86	0.034	3.38	5.16	66.64
Constructivist beliefs	12,286	224	1.82	12.86	0.017	1.89	-0.03	0.33	6092	385	6.32	12.65	0.024	1.90	-0.10	0.26	10,031	647	6.45	12.20	0.018	1.79	-0.08	0.65
Classroom																								
Class size	10,058	2452	24.38	33.17	0.099	9.91	0.40	7.12	5182	1295	24.99	25.42	0.141	10.14	2.64	13.37	8232	2446	29.71	20.91	0.100	9.09	2.68	16.85
Classroom climate	10,105	2405	23.80	11.58	0.026	2.57	-0.44	0.04	5188	1289	24.85	11.66	0.038	2.75	-0.49	-0.10	8327	2351	28.23	11.41	0.029	2.64	-0.40	-0.11
Low student achievement	12,291	219	1.78	2.79	0.009	0.99	0.67	-0.14	6075	402	6.62	2.92	0.014	1.11	0.34	-0.61	10,116	562	5.56	2.75	0.009	0.93	0.81	0.35
Teaching and learning	9911	2599	26.22	74.36	0.186	18.53	-1.03	0.72	5166	1311	25.38	79.54	0.222	15.95	-1.46	2.33	8255	2423	29.35	81.87	0.148	13.47	-1.59	3.76
Keeping order	9911	2599	26.22	15.91	0.131	13.08	1.58	3.27	5166	1311	25.38	13.26	0.184	13.24	1.97	4.73	8255	2423	29.35	10.98	0.115	10.45	2.17	7.48
Admin. tasks	9911	2599	26.22	9.31	0.094	9.33	2.18	7.46	5166	1311	25.38	6.76	0.086	6.19	3.46	25.20	8255	2423	29.35	6.70	0.065	5.88	2.81	16.65
Different language	12,314	196	1.59	2.11	0.012	1.36	0.93	-0.50	6083	394	6.48	2.12	0.015	1.15	1.20	0.76	10,141	537	5.30	2.00	0.010	1.02	1.27	1.47
Disadv. background	12,295	215	1.75	2.49	0.009	0.99	0.65	0.04	6072	405	6.67	2.84	0.015	1.18	0.33	-0.82	10,017	661	6.60	2.11	0.009	0.86	0.95	1.41
	12,510								6477								10,678							
Principal																								
Female gender	645	33	5.12						366	31	8.47						544	76	13.97					
Age	647	31	4.79	54.96	0.225	5.72	-1.13	1.23	363	34	9.37	50.54	0.399	7.61	-0.33	-0.21	543	77	14.18	51.59	0.326	7.60	-0.18	-0.85
Educational level	647	31	4.79	3.02	0.007	0.17	1.42	49.66	365	32	8.77	3.07	0.015	0.29	1.56	12.95	544	76	13.97	2.97	0.011	0.26	-3.41	26.64
Work experience	644	34	5.28	5.46	0.162	4.11	1.38	2.50	359	38	10.58	7.81	0.307	5.82	1.10	1.36	534	86	16.10	9.67	0.297	6.86	0.82	0.29
Instructional leadership	637	41	6.44	8.73	0.077	1.94	0.06	-0.84	354	43	12.15	9.08	0.094	1.76	0.00	-0.50	539	81	15.03	7.58	0.074	1.72	0.25	0.00
School																								
Student enrolment	643	35	5.44	919.99	22.057	559.30	1.01	2.60	356	41	11.52	973.88	24.687	465.80	0.56	0.39	541	79	14.60	374.88	8.826	205.29	1.01	2.05
Type of school	645	33	5.12						360	37	10.28						543	77	14.18					
Community size	645	33	5.12	4.80	.051	1.28	-0.91	-0.02	361	36	9.97	4.43	0.067	1.28	-0.52	-0.18	542	78	14.39	3.51	0.054	1.25	-0.15	-0.58
	678								397								620							

created. Then, those countries were grouped to form homogeneous clusters without any further group distinction than the three clusters.

Methodologically, this research contains three main characteristics: First, a quite substantial amount of missing data occurred, which needed to be treated. Secondly, it was necessary to establish measurement invariance for all scales across levels. Thirdly, the nested data structure (teachers nested in schools in country clusters) makes the use of multilevel modelling necessary.

Missing data was accounted for by applying multiple imputation. In total, between 0% (teacher gender) and about 19% (time spent on either teaching, classroom management or administrative duties) were missing. Little's test[1] to check whether missing values occurred completely at random was significant and supported the use of multiple imputation as a comparatively robust method to account for non-random missingness (Rubin, 2009; Baraldi & Enders, 2013). At first, a raw dataset was created containing all variables relevant for the analysis. Then, five data sets containing plausible values for each missing data point were calculated, resulting in a sufficiently high relative efficiency of about 96.32% (Schafer & Graham, 2002). Country dummies were used as auxiliary variables to provide further information for the imputation.

To account for measurement invariance in the clusters, first three country clusters were formed using the country codes as dummy variables on the country level. There is then no distinction other than group membership of the three country clusters made in the subsequent analysis. Measurement invariance needed to be established for the three scales of TSE (instruction, student engagement, and classroom management), constructivist beliefs about teaching, classroom climate and instructional leadership. As will be seen in the tables below, metric invariance (factor loadings across levels in the MSEM) could be reached in all three country clusters for the respective scales. It has to be mentioned, however, that not all goodness-of-fit indices strictly stayed below the thresholds of 0.08 for the SRMR and RMSA or above 0.900 for CFI and TLI (i.e. instructional leadership style in the Nordic cluster). Hence, the meaning of the scale in the countries belonging to the cluster might slightly differ and hence the results should be interpreted with caution. Tables 5–7 display the levels of measurement invariance for the independent and dependent variables (Tables 5 and 6), and the reliability statistics (Table 7).

The nested data structure was accounted for by applying multi-level modelling (Goldstein, 1995; Hox, 2002; Raudenbush & Bryk, 2002; Hox, 2013), with teachers (*t*) nested in schools (*s*) nested in country clusters. At first, a baseline model was calculated against which the following model, containing all predictors, was compared.

Full model: Teacher, Classroom, Principal and School predictors

$$TSE_{ij} = \beta_{BLOCK1} Teacher\ characteristics_{ij} + \beta_{BLOCK2} Classroom\ characteristics_{ij}$$
$$+ \beta_{BLOCK3} Principal\ characteristics_{ij} + \beta_{BLOCK4} School\ characteristics_{ij} + u_{0j} + e_{ij}$$

$$(1)$$

where i = teacher, j = school, β = predictor, u_{0j} = random term on the school level, e_{ij} = random term on the teacher level.

Model fit and explained variance could be improved in all three country clusters across all three domains of TSE, as will be seen in the following results section.

Substantial multicollinearity of the predictors could be excluded, as no correlation between any predictor variable was greater than 0.80 (Tabachnick & Fidell, 2007). Furthermore, all independent variables were grand-mean centred to alleviate the correlation between the intercept and slope estimates across groups, which reduces multicollinearity between level 2 predictors and so yields more reliable estimates (Kreft *et al.*, 1995; Raudenbush & Bryk, 2002; Enders & Tofighi, 2007).

To partition the variance between teachers and schools the intra-class correlation (ICC) was calculated (Hox, 1995). The ICC for the baseline model was again calculated at first, and then the full model was compared against it.

Results: To what extent is TSE in instruction, student engagement and classroom management predicted by teacher, classroom, principal and school characteristics?

The results are presented in Table 8. In the discussion, the effect sizes[2] (ES) according to Marsh *et al.* (2009) will be used to compare the results, as in contrast to the *p*-value, the effect size is independent of the sample size, which is rather different in the three country clusters. In terms of magnitude, no ES below 0.10 will be interpreted, as this is deemed too small to draw sound conclusions. ES of 0.10 or above have shown to be common in this research area and have furthermore shown evidence of real-world impact (Scheerens *et al.*, 2013; Scheerens, 2017).

The model-fit information described by the −2-log likelihood, which improved for all models, the explained variance on each level by the new model, as well as the ICC are displayed in Table 9.

Teacher characteristics

For female teacher gender and instructional TSE, the associations indicated that in the Anglo-Saxon (ES = 0.67) and Nordic (ES = 0.69) cluster female teachers felt more self-efficacious in regard to their instructional abilities than their ESEA peers (ES = 0.25). This is consistent with western countries being more gender egalitarian (House *et al.*, 2004) and as such more supportive of ambitious women. Previous TSE research has shown mixed results (Coladarci, 1992; Malmberg *et al.*, 2014), which is why both results seem plausible. However, those results came from US and UK classrooms mostly and hence were refined by contrasting them against different cultural contexts. The results for engagement TSE look similar, though the effect sizes are different with ES = 0.32 in the Anglo-Saxon cluster, ES = 0.03 in the Nordic- and ES = 0.10 in the ESEA countries, but the ES in the Nordic countries was smaller now than in the ESEA countries. This is against the hypothesis, but is in line with the comparatively higher score for gender egalitarianism and thus support for women in the workforce in the Anglo-Saxon countries (House *et al.*, 2004). For the ESEA and Nordic clusters the effect sizes are too small to derive meaningful comparisons. For management TSE, differences between all three country clusters appeared: the ESs were positive for the western clusters (ES = 0.39 in the Anglo-Saxon countries and ES = 0.27 in the Nordic countries), but was negative in the ESEA cluster (ES = −0.17), which is in line with the hypothesis that male teachers have a higher level of

Table 5. Measurement invariance for latent independent variables

Constructivist beliefs about teaching

Model fit indices	Anglo-Saxon			Nordic			ESEA		
	Config. IV	Metric IV	Δ	Config. IV	Metric IV	Δ	Config. IV	Metric IV	Δ
SRMR_t	0.011	0.046	0.035	0.021	0.052	0.031	0.025	0.107	0.082
SRMR_s	0.068	0.077	0.009	0.058	*0.084*	0.026	*0.082*	*0.095*	0.013
RMSEA	0.025	0.106	0.081	0.044	0.080	0.036	*0.088*	0.046	−0.042
CFI	0.997	0.990	−0.007	0.983	0.899	−0.084	0.970	0.907	−0.063
TLI	0.991	*0.892*	−0.099	0.948	*0.826*	−0.122	0.910	*0.841*	−0.069

Classroom climate

Model fit indices	Anglo-Saxon			Nordic			ESEA		
	Config. IV	Metric IV	Δ	Config. IV	Metric IV	Δ	Config. IV	Metric IV	Δ
SRMR_t	0.013	0.021	0.008	0.004	0.022	0.018	0.004	0.016	0.012
SRMR_s	0.011	0.020	0.009	0.059	0.100	0.041	0.021	0.060	0.039
RMSEA	0.039	*0.101*	0.062	0.034	0.116	0.082	0.031	*0.072*	0.041
CFI	0.997	0.966	−0.031	0.997	0.948	−0.049	0.998	0.981	−0.017
TLI	0.991	0.941	−0.050	0.992	0.910	−0.082	0.994	0.968	−0.026

Instructional leadership

Model fit indices	Anglo-Saxon			Nordic			ESEA		
	Config. IV	Metric IV	Δ	Config. IV	Metric IV	Δ	Config. IV	Metric IV	Δ
SRMR	0.000	0.021	0.021	0.000	*0.159*	0.159	0.000	0.056	0.056
RMSEA	0.000	*0.068*	0.068	0.000	0.037	0.037	0.000	0.024	0.024
CFI	1.000	0.991	−0.009	1.000	0.938	−0.062	1.000	0.978	−0.022
TLI	1.000	0.981	−0.019	1.000	*0.876*	−0.124	1.000	0.975	−0.025

SRMR: Standardised Root Mean Residual; RMSEA: Root Mean Square Error of Approximation; CFI: Comparative fit Index; TLI: Tucker-Lewis Index; _t: teacher level; _s: school level; IV: invariance.

TSE. The ESEA countries showed the lowest support for gender egalitarianism, which might mean that female teachers are facing more difficulties to manage their students' behaviour or to maintain classroom discipline than teachers in the western countries, who showed higher acceptance of female authority (House *et al.*, 2004).

The teachers' educational level was only significant for ITSE in the ESEA countries, which is in line with Cousins *et al.* (1996) or Fackler and Malmberg, 2016. Culturally, in a high demanding Confucian environment, where teachers are considered experts, a higher educational level might be particularly important (Pang, 2011; Gardner, 2014). For ETSE, the educational level was not significant in either cluster.

Table 6.   Measurement invariance for tripartite structure of TSE

| Model fit indices | Tripartite measure of TSE | | | | | | | | |
| | Anglo-Saxon countries | | | ESEA countries | | | Nordic countries | | |
	Config. IV	Metric IV	Δ	Config. IV	Metric IV	Δ	Config. IV	Metric IV	Δ
SRMR_t	0.047	0.059	0.012	0.051	0.050	−0.001	0.054	0.052	−0.002
SRMR_s	0.046	0.059	0.013	0.021	*0.060*	0.039	*0.051*	*0.069*	0.018
RMSEA	0.061	0.060	−0.001	0.064	0.065	0.001	*0.056*	0.059	0.003
CFI	0.911	0.921	0.010	0.943	0.933	−0.010	0.913	0.905	−0.008
TLI	0.932	*0.926*	−0.006	0.949	*0.943*	−0.006	0.933	*0.920*	−0.013

SRMR: Standardised Root Mean Residual; RMSEA: Root Mean Square Error of Approximation; CFI: Comparative fit Index; TLI: Tucker-Lewis Index; _t: teacher level; _s: school level; IV: invariance.

Table 7.   Reliability statistics

| | α | | |
	Nordic	Anglo-Saxon	ESEA
ETSE	0.80	0.84	0.89
ITSE	0.79	0.78	0.76
MTSE	0.84	0.84	0.93
Constructivist beliefs	0.83	0.93	0.76
Classroom climate	0.92	0.91	0.93
Instructional leadership	0.71	0.88	0.86

For MTSE, the only significant but negative association was found in the Anglo-Saxon cluster (ES = −0.49). Possibly, highly educated teachers experience a lack of authority if they are not able to bring across the intended content due to a lack of classroom structure (Norris, 2004), as pedagogy and classroom management skills have been found missing in formal teacher training (König *et al.*, 2011).

The years of work experience were similarly weakly associated with ITSE across all three country clusters (ES = 0.02 – ES = 0.04) and ETSE (ES = 0.03 in all clusters), which makes sound interpretation difficult. But it seems to be noteworthy that previous research has found mixed results; ranging from no associations to strong associations (Chester & Beaudin, 1996; Pas *et al.*, 2012; Fackler & Malmberg, 2016) and a non-linear relationship, where TSE first rises and drops after mid-career (Klassen & Chiu, 2010). For MTSE, again only negligibly small effect sizes were found (ES = 0.02–0.04). It should be noted, nonetheless, that previous research suggests that through work experience teachers learn to interpret their students' signals and are better prepared to respond adequately (Gkolia *et al.*, 2016; Zee & Koomen, 2016).

All predictors of weekly hours spent on teaching, planning or administrative duties showed a very low or no association with ITSE in any of the country clusters. The

Table 8. Results

	MTSE						ITSE						ETSE					
	Baseline model			Full model			Baseline model			Full model			Baseline model			Full model		
				ASC	NC	ESEA				ASC	NC	ESEA				ASC	NC	ESEA
Response	β	p	S.E.	ES	ES	ES	β	p	S.E.	ES	ES	ES	β	p	S.E.	ES	ES	ES
Fixed part																		
Intercept	3.367	***	0.019				3.187	***	0.010				3.285	***	0.016			
Teacher																		
Female gender				0.39	0.27	−0.17				0.32	0.03	0.10				0.67	0.69	0.25
Educational level				−0.49	−0.10	−0.13				−0.15	0.20	0.06				0.22	0.05	0.19
Teaching exp.				0.02	0.03	0.04				0.03	0.03	0.03				0.03	0.02	0.04
Hours teaching				0.02	0.05	0.01				0.03	0.09	0.01				0.01	0.04	0.01
Hours planning				−0.02	−0.01	−0.01				0.02	0.02	0.00				0.03	0.03	0.01
Hours admin. work				0.04	0.04	0.02				0.04	0.02	0.00				0.03	0.05	0.01
Constructivist beliefs				0.08	0.16	0.29				0.35	0.55	0.27				0.26	0.34	0.34
Classroom																		
Class size				0.00	0.02	0.00				0.00	0.02	0.00				−0.01	0.02	0.00
Classroom climate				0.35	0.42	0.33				0.40	0.42	0.16				0.23	0.24	0.19
Low student achievement				0.18	0.27	0.12				0.06	0.11	−0.07				.10	0.21	−0.06
Teaching and learning				−0.01	0.00	0.01				0.01	0.01	0.01				0.00	−0.01	0.02
Keeping order				−0.01	−0.01	0.02				−0.02	0.01	0.00				0.00	−0.01	0.01
Admin. tasks				−0.02	−0.01	0.02				−0.03	−0.01	0.02				−0.03	−0.02	0.03
Different language				−0.01	−0.04	0.16				0.15	0.10	0.14				0.03	0.22	0.19
Disadv. background				0.21	0.23	0.31				0.27	0.33	0.26				0.23	0.20	0.36
Principal																		
Female gender				−0.15	−0.14	0.61				0.21	−0.11	0.71				0.05	0.01	0.57
Age				−0.01	0.01	−0.06				−0.01	0.01	−0.08				−0.01	0.01	−0.07
Educational level				−0.09	−0.01	−0.29				−0.15	−0.24	0.11				−0.22	−0.47	−0.01
Work experience				−0.02	0.02	0.05				−0.02	0.04	0.04				0.00	0.00	0.04
Instructional leadership				0.02	0.00	0.36				0.05	−0.02	0.46				.02	0.06	0.33
School																		
Student enrolment				0.00	0.00	0.00				0.00	−0.06	0.00				0.00	0.00	0.00
Private school				−0.09	−0.89	−0.41				−0.22	−0.22	−0.38				−0.10	−0.93	−0.28
Community size				0.03	−0.03	−0.50				0.22	−0.34	−0.32				0.10	−0.06	−0.28

ASC = Anglo-Saxon Cluster, NC = Nordic Cluster, ESEA = East and South-East Asian Cluster.
Effect sizes: < 0.30 small; < 0.50 medium; > 0.80 large (ES < 0.10 are not deemed practically relevant and hence not interpreted).

Table 9.   Model-fit information and explained variance for MTSE, ETSE and ITSE

Anglo-Saxon countries

TSE in classroom management/MTSE
Random part

School	0.007	***	0.003	0.006	***	0.002
Teacher	0.184	***	0.005	0.236	***	0.006
−2*loglikelihood	192,537.168			188,697.972		
Δ −2*loglikelihood				−3839.196		

% variance

			Explained variance		
School	3.66%		School	14.29%	
Teacher	96.34%		Teacher	n.s.	

ICC

School	3.66%	***	0.008	2.48%	**	0.008
Teacher	96.34%	***	0.008	97.52%	***	0.008

TSE in student engagement/ETSE
Random part

School	0.005	***	0.002	0.008	***	0.002
Teacher	0.259	***	0.006	0.206	***	0.006
−2*loglikelihood	215,098.354			211,595.078		
Δ −2*loglikelihood				−3503.276		

% variance

			Explained variance		
School	1.89%		School	n.s.	
Teacher	98.11%		Teacher	20.46%	

ICC

School	1.89%	***	0.010	3.74%	***	0.009
Teacher	98.11%	***	0.010	96.26%	***	0.009

TSE in instruction/ITSE
Random part

School	0.008	***	0.002	0.001	n0.s0.	0.001
Teacher	0.260	***	0.004	0.117	***	0.004
−2*loglikelihood:	214,489.176			211,360.426		
Δ −2*loglikelihood				−3128.750		

% variance

			Explained variance		
School	3.00%		School	87.50%	
Teacher	97.00%		Teacher	55.00%	

ICC

School	3.00%	**	0.008	0.80%	***	0.008
Teacher	97.00%	***	0.008	99.20%	***	0.008

Nordic countries

TSE in classroom management/MTSE

Table 9. (Continued)

Nordic countries

Random part						
School	0.005	***	0.001	0.009	***	0.002
Teacher	0.187	***	0.004	0.231	***	0.005
−2*loglikelihood	192,537.168			188,697.972		
Δ −2*loglikelihood				−3839.196		
% variance	% variance			Explained variance		
School	School	2.60%		School	n.s.	
Teacher	Teacher	97.40%		Teacher	n.s.	
ICC						
School		2.60%	***	0.008	3.75%	***	0.007
Teacher		97.40%	***	0.008	96.25%	***	0.007

TSE in student engagement/ETSE

Random part						
School	0.014	***	0.002	0.022	***	0.002
Teacher	0.266	***	0.005	0.156	***	0.004
−2*loglikelihood	215,098.354			211,595.078		
Δ −2*loglikelihood				−3503.276		
% variance	% variance			Explained variance		
School	School	5.00%		School	n.s.	
Teacher	Teacher	95.00%		Teacher	70.51%	
ICC						
School		5.00%	***	0.015	12.36%	***	.013
Teacher		95.00%	***	0.015	87.64%	***	.013

TSE in instruction/ITSE

Random part						
School	0.023	***	0.003	0.008	***	0.001
Teacher	0.271	***	0.005	0.114	***	0.003
−2*loglikelihood:	214,489.176			211,360.426		
Δ −2*loglikelihood				−3128.750		
% variance	% variance			Explained variance		
School	School	7.80%		School	65.20%	
Teacher	Teacher	92.20%		Teacher	57.90%	
ICC						
School		7.80%	***	0.011	6.60%	***	0.010
Teacher		92.20%	***	0.011	93.40%	***	0.010

East & South-East Asian Countries

TSE in classroom management/MTSE

Random part						
School	0.275	***	0.010	0.042	***	0.003

Table 9.   (Continued)

East & South-East Asian Countries

Teacher	0.169	***	0.003	0.271	***	0.005	
−2*loglikelihood	192,537.168			188,697.972			
Δ −2*loglikelihood				−3839.196			
% variance	% variance			Explained variance			
School	School	61.94%		School	84.73%		
Teacher	Teacher	38.06%		Teacher	n.s.		
ICC							
School		61.94%	***	0.014	13.42%	**	0.010
Teacher		38.06%	***	0.014	86.58%	***	0.010

TSE in student engagement/ETSE

Random part

School	0.020	***	0.025	0.074	***	0.005	
Teacher	0.213	***	0.004	0.190	***	0.004	
−2*loglikelihood	215,098.354			211,595.078			
Δ −2*loglikelihood				−3503.276			
% variance	% variance			Explained variance			
School	School	8.58%		School	n.s.		
Teacher	Teacher	91.42%		Teacher	12.11%		
ICC							
School		8.58%	***	0.015	28.03%	***	0.015
Teacher		91.52%	***	0.015	71.97%	***	0.015

TSE in instruction/ITSE

Random part

School	0.042	***	0.002	0.138	***	0.003	
Teacher	0.193	***	0.003	0.020	***	0.031	
−2*loglikelihood:	214,489.176			211,360.426			
Δ −2*loglikelihood				−3128.750			
% variance	% variance			Explained variance			
School	School	17.90%		School	n.s.		
Teacher	Teacher	8.21%		Teacher	89.60%		
ICC							
School		17.90%	***	0.014	87.30%	***	0.011
Teacher		8.21%	***	0.014	12.30%	***	0.011

positive association between planning lessons or hours spent on administrative duties and ITSE in the Nordic and Anglo-Saxon countries could be explained by the protestant work ethics supported in these countries (McClelland *et al.*, 1955), which emphasize hard work and achievement. This could possibly be reflected in the effort put into planning lessons. A similar result with negligibly small effect sizes was found for ETSE and MTSE across all country clusters and the weekly work allocations with ESs ranging between 0.00 and 0.09.

The last teacher predictor is the constructivist belief about teaching. For ITSE in the ESEA and Nordic countries, an equally strong association was found (ES = 0.34), but the association in the Anglo-Saxon countries was comparatively weaker (ES = 0.26). For ETSE, in contrast, the strongest association with the constructivist beliefs about teaching was in the Nordic countries (ES = 0.55) and the weakest in the ESEA cluster (ES = 0.27). Features are, for example, the view of the student as an active and self-responsible learner and recognition of the importance of cognitive processes for student enquiry. The relative importance is in line with previous research, which has found that high TSE teachers employ more diverse teaching strategies (Emmer & Hickman, 1991) and is in accordance with the preference for student-centred teaching approaches in the Nordic countries (Westbury *et al.*, 2005). In the ESEA countries, in contrast, the view of shared responsibility for education success between the student and the teacher might alleviate some of the pressure from the teacher in a success-oriented environment (Sato & McLaughlin, 1998; Lim, 2007; Gardner, 2014). Moreover, teachers who take on the responsibility for their students' learning and see themselves as part of their students' learning success, might well try to make them part of their lessons. This is in line with both the teaching approaches found in the Nordic and Anglo-Saxon countries (Oftedal Telhaug *et al.*, 2006; Klette *et al.*, 2018; Lindorff & Sammons, 2018; Muijs *et al.*, 2018). For MTSE, the effect sizes ranged from 0.08 in the Anglo-Saxon countries to 0.29 in the ESEA countries. Given the comparatively high perceived pressure on teachers in the ESEA countries (Sato & McLaughlin, 1998; Lim, 2007), a shared responsibility between students and teachers for learning might remove some of the burden from the teachers' shoulders and they are able to develop a more positive attitude towards their abilities in maintaining a beneficial classroom climate. Furthermore, in Confucian societies, where the elders are granted respect by cultural norms, students might be more supportive of a good classroom climate anyway (Gardner, 2014). Given the magnitude of the effect sizes, constructivist beliefs about teaching are comparatively most important for explaining variation in TSE across all domains and country clusters.

Classroom characteristics

The class size only showed a significant, but negligibly small association for ITSE, ETSE and MTSE in the Nordic countries, (ES = 0.02).

The associations for the classroom climate and ITSE were similar in all three country clusters and ranged from ES = 0.19 to ES = 0.24, which suggests that a positive classroom climate contributes approximately equally to explaining ITSE in all three country clusters, regardless of cultural differences as a feature of successful teaching. Theory suggests that it is both a source of mastery experience and verbal persuasion (Bandura, 1977, 1986), as this measure consists of features like students who take care of a good classroom climate themselves and hence contribute actively to a productive atmosphere. For ETSE, the differences among the country clusters were a bit more refined: in the Nordic cluster, the effect size was the largest (ES = 0.42); closely followed by the Anglo-Saxon countries (ES = 0.40). In the ESEA countries, the effect size was only small (ES = 0.16). In the ESEA countries, where a stricter

classroom management and greater respect for the elder has been observed (Pang, 2011), misbehaviour could be less of an issue than in the western countries, where teachers tend to face difficulties in enforcing discipline in the classroom (Hargreaves, 2009). Alternatively, students in classrooms in cultures with flat hierarchies like the Nordic countries are expected to be more independent and responsible themselves (Hofstede, 1986), which is supported by this measure of classroom climate. For the association of MTSE and classroom climate, a moderately strong effect size was found (ES = 0.33/ESEA to ES = 0.42/Nordic) and is in line with previous research, but also the results for ITSE and ETSE. This measure comprises students who take care of a good and stimulating learning environment themselves and thus teachers might feel supported in their efforts (Künsting *et al.*, 2016) and it is a source of mastery experience and verbal persuasion (Bandura, 1986) and should be valid across countries, regardless of cultural norms. High-TSE teachers employ stricter classroom management (Rimm-Kaufman & Sawyer, 2004) and are more likely to achieve a good classroom climate, if they are not coercive. In the ESEA countries, whole-class teaching, which requires attentive students, is often applied (Stevenson & Lee, 1995) and the teacher is to be treated with respect (Sato & McLaughlin, 1998); bad classroom climate could be interpreted as disrespectful behaviour. However, also in the Anglo-Saxon countries, classroom discipline can be regarded as important, especially as teachers tend to receive low levels of unconditional respect from students (Romi *et al.*, 2009).

The percentage of low achievers in the class only showed a significant association with ITSE in the Nordic (ES = 0.21) and Anglo-Saxon (ES = 0.10) clusters, but not the ESEA countries. It might be that due to the private education effort of families in Asian countries and the support teachers experience from the state and parents, low achievers are more rare in those countries, and hence the ITSE of ESEA teachers might be less affected by them. The positive association in the Nordic and Anglo-Saxon countries is against the hypothesis (Ashton *et al.*, 1983; Malmberg *et al.*, 2014) that high achieving students predict a high level of TSE. However, for low achievers there is more room for improvement, teachers tend to adjust their expectations (Speybroeck *et al.*, 2012) and allocate success rather to their own than parental effort.

For ETSE, the associations were either insignificant or negligibly small. In contrast, for MTSE, all country clusters showed a significant relationship (ES = 0.27/Nordic to ES = 0.12/ESEA) and is in all three cases against the hypothesis that high student achievement should be associated with a high level of TSE (e.g. Caprara *et al.*, 2006; Alivernini & Lucidi, 2011; Mojavezi & Tamiz, 2012). Here, it could be that regardless of different values and cultural background, teachers seem to adjust their expectations towards the students' abilities (Speybroeck *et al.*, 2012) and this, in turn, is associated with MTSE; but similar explanations as for ITSE and ETSE might be possible here.

The time allocation to teaching and learning, administrative duties and keeping order showed either no relationship or a miniscule relationship with ITSE, ETSE and MTSE in either country cluster.

Out of the predictors describing the social context of the classroom, the percentage of students with a different mother tongue had a significant association with ITSE in

the Nordic (ES = 0.22) and the ESEA (ES = 0.19) countries, but not in the Anglo-Saxon cluster, where a diverse classroom environment has existed for a long time due to the migration history of the country. This contradicts previous research, where a lower level of ITSE has been found in classrooms with a higher percentage of minority students (Geerlings *et al.*, 2018)—language is the means of knowledge transmission and can be deemed a source of mastery experience. For ETSE, in contrast, the association was significant in the ESEA (ES = 0.14) and Anglo-Saxon (ES = 0.15) cluster and for MTSE only in the ESEA cluster (ES = 0.16). In the ESEA countries, there is a lesser influx of migrants and a more homogeneous classroom with a focus on Chinese and English, which was found to be supportive of a higher level of MTSE (Zee *et al.*, 2016), while in the countries of the Anglo-Saxon cluster, migration and hence linguistically heterogeneous classrooms have long been part of the teachers' work environment.

The percentage of students from a socio-economically disadvantaged background was significantly related to ITSE in all three country clusters, but comparatively the strongest in the ESEA countries (ES = 0.36 vs ES = 0.23 and ES = 0.20). In a British study, Strand (2014) found that British low-SES students were outperformed by low-SES students with migration background due to the higher educational aspirations of those parents, and in the Anglo-Saxon countries special attention is paid to not let disadvantaged students fall behind (Norris, 2004). In the ESEA countries with its focus on school performance and largely teacher-centred methods, students might be less likely to 'slip through the net' (Lim, 2007) and teachers are able to recognise students' needs more quickly than in the more progressive western classrooms, where students tend to work more group-based or individually. This might explain the bigger effect size for the ESEA countries. For ETSE, the comparatively smallest effect size occurred in the ESEA countries (ES = 0.26) and the comparatively largest in the Nordic countries (ES = 0.33). It could be that teachers in settings they perceive as more challenging, adjust their expectations and are thus satisfied and experience mastery more easily (Speybroeck *et al.*, 2012). Hence, teachers might find it more difficult to get through to students with a different mother tongue or face more behaviour difficulties (West & Woessmann, 2010). Given the restrictive migration policies in the ESEA countries (United Nations, 2017) in favour of qualified workers, a different mother tongue might not necessarily be associated with a low social status but, in contrast, with family backgrounds where education is highly appreciated. Especially in the ESEA countries parents are highly educationally ambitious regardless of their social status (Pang, 2011) and work towards their children's success in later life and upward mobility in society. Accordingly, these children could be particularly well engaged in the lessons and supported at home. In the western clusters, in contrast, the responsibility for student success is often rather attributed to the school system. Finally, for MTSE, the relationship was positive in all three country clusters ranging from ES = 0.31/ESEA countries down to ES = 0.21/Anglo-Saxon cluster, which is contrary to previous research, where a low SES has been found to be associated with difficult behaviour (West & Woessmann, 2010). However, in all three clusters expectation management could play a role (Speybroeck *et al.*, 2012): first, teachers could adjust their expectations to the students' perceived level of discipline; secondly, the parents' higher aspirations are reflected in the students' behaviour. From the current

state of the art in research on cultural values, it is not possible to draw conclusions with respect to cultural differences.

Principal characteristics

The principal's female gender only showed a significant relationship to ITSE (ES = 0.57), ETSE (ES = 0.71) and MTSE (ES = 0.61) in the ESEA cluster. In the Nordic cluster, the association with ETSE was negligibly small (ES = 0.04). It has been suggested that female principals tend to employ a more empathetic leadership style (Eagly *et al.*, 1992), which could be supportive in a demanding work environment (Pang, 2011) and fruitfully bridge a hierarchical gap in countries supporting a higher degree of power distance (House *et al.*, 2004; Hofstede, 2011). Given the relevant association for all three dimensions of TSE, female principals seem to be beneficial for all types of TSE investigated.

The principal's age, in contrast, has a miniscule negative relationship with ITSE in the ESEA countries only. With ETSE, the association was very small and negative in the ESEA countries (ES = −0.08) and a very small negative association was found for MTSE in the ESEA countries (ES = −0.06), too. However, this relationship is negligibly small.

The principal's work experience is again only very weakly or not at all related to ITSE, MTSE and ETSE in all three country clusters.

The educational level was only significantly, but negatively, related to ITSE in the Nordic countries (ES = −0.47). As a proxy for the principal's seniority it could be that in egalitarian countries such feature is perceived rather negatively, but more research would need to be done on this topic. It had no significant relationship with ETSE or MTSE in either cluster.

Finally, the principal's instructional leadership style showed moderate effect with ITSE in the ESEA countries (ES = 0.33), as well as ETSE (ES = 0.46) and MTSE (ES = 0.36), which is in line with the hypothesis (Kirk, 2016). This leadership style comprises features like a supportive principal, who gives the teachers guidance and security and provides a source of vicarious experience. However, in the Nordic and Anglo-Saxon countries teachers might rather expect to be given freedom and be involved in school decision-making than being told top-down, which is supported by Ashton *et al.* (1983). This might explain the lack of association here. In the ESEA countries, a top-down leadership style might in contrast rather fit with societal values and can provide teachers with an environment where TSE can develop safely (Bandura, 1977; Guskey & Passaro, 1994; Walker & Slear, 2011).

School characteristics

The size of the community in which the school is located had a comparatively strong but negative association with ITSE in the ESEA countries (ES = −0.28) and a weak but positive association with the Anglo-Saxon countries (ES = 0.10). The community size could be an indicator for school composition: a rural-urban divide is often found, as parents with high-income aspirations tend to work in bigger cities, who in turn tend to focus on their children's educational attainment (Copus *et al.*, 2006). In

countries focusing on performance orientation like the ESEA countries, this might be related to more pressure on the shoulders of the teachers and hence be associated with a lower sense of TSE. For ETSE, the results were slightly different: the association was negative in the ESEA countries (ES = −0.32) and the Nordic cluster (ES = −0.34), but positive in the Anglo-Saxon cluster (ES = 0.22). In addition to the interpretation of the results of ITSE, it can be assumed that in bigger cities there are not only more highly educated people, but also a more diverse population with potentially challenging students. With respect to the composition of the ESEA cluster, it seems to be worth pointing out that with Singapore, there is one particularly big city in the cluster, which might shape the result in this direction. Overall, it is not possible to draw sound conclusions from the findings about the contrary association of community size with ETSE in the three clusters. For MTSE, the community size was only significantly related to the ESEA cluster (ES = −0.50), which could be associated with the more diverse student body often found in larger communities (Copus *et al.*, 2006).

For private schools, a negative association with ITSE appeared for the Anglo-Saxon (ES = −0.10) and the Nordic (ES = −0.93) clusters and ETSE for the Anglo-Saxon countries (ES = −0.22) and Nordic countries (ES = −0.22), but none for the ESEA countries, which is contrary to prior research, where teachers at private schools were found to have a higher level of TSE (Fackler & Malmberg, 2016). In the Anglo-Saxon cluster with England, where private schools have a long tradition (EURYBASE, 2010), there might be a more positive perception of private schools in general, although the countries are rather egalitarian (House *et al.*, 2004). Furthermore, private schools are often carefully chosen by the parents and paid for, with parental demands that might be difficult to juggle (Yun & Reardon, 2005). In the Nordic countries, in contrast, where private schools are rather rare and are less publicly supported due to the social-oriented and progressive focus on schooling (Oftedal Telhaug *et al.*, 2006), private schools attract different types of students, teachers might experience a lower degree of ITSE and ETSE: parents with high aspirations might put particular pressure on teachers and tend to question the teacher's competence more often. What might look like a potential source of mastery experience at first sight, could turn into a setback. In the ESEA countries, where families make huge educational efforts regardless of their financial situation, public schools might in fact not be that different from private schools and thus the school type might not make a difference in TSE. However, the international literature on this is not very well developed and could benefit from more research. A slightly different picture evolved for MTSE, which showed a significant association in the ESEA (ES = −0.41) and the Nordic (ES = −0.89) countries. For the Nordic countries, this was the strongest ES for any predictor and MTSE. This is contrary to previous research, where students from more affluent backgrounds were found to display less problematic behaviour (West & Woessmann, 2010), but it was also shown that high TSE is associated with good teacher-parent relationships (Caprara *et al.*, 2003; Pinnock, 2006), which tend to be more difficult in private schools. However, it could also be that here the teacher adjustment for the expectations of student behaviour works the other way round than in the classroom (Speybroeck *et al.*, 2012): if the students fail the teacher's expectations, this might be perceived worse in private schools. In this context, culture seems to mediate teacher's perceptions.

School enrolment numbers show a too-small-to-interpret association with ITSE, ETSE and MTSE in either cluster.

Discussion and Conclusion

The aim of the study was to offer a new perspective on the environment in which teacher self-efficacy develops by using an integrated model that draws on four different theoretical strands and the findings were interpreted through the lens of these pillars. First, research on TSE; secondly, country-specific features of the school systems and approaches to education; thirdly, literature on values that are supported to different degrees in the country clusters and deemed important to define human relationships; and fourthly, teaching styles and culture. The discussion will highlight and interpret the differences and similarities in the country clusters in the order of teacher, classroom, principal and school characteristics.

Although there are a few differences both across clusters and dimensions of TSE, there are also a number of similarities in the findings across the countries (e.g. the importance of constructivist beliefs about teaching for ETSE, ITSE and MTSE across all three country clusters); in particular with regard to characteristics that concern the teachers themselves, these being female gender, the educational level or work experience. It might be that schools are rather similar across countries due to characteristics they share regardless of wider culture or political systems like the teaching and education of young people and their preparation for work and life in an institutionalised context. Classrooms tend to be set up similarly and thus teachers work in similar environments across the globe. This might explain why there is less variation found between the country clusters and the three domains of TSE the more the characteristics concern the direct environment, as, for example, the classroom setting. When the wider environment is taken into account as determined by the principal and the school, the more variation there is and the more differently these predictors are associated across countries and dimensions of TSE.

One difference, in contrast, is the amount of variance explained on each level across the clusters and domains of TSE. The ESEA countries stood out in terms of MTSE, where a comparatively large share of unexplained variance occurred between schools (61.94%), which could be explained to a large degree in the full model. In the Nordic countries, in contrast, neither on the teacher nor the school level, the predictors contributed to explaining variance in MTSE while the distribution of unexplained variance in the other models tends to be around 95% and 5%, respectively. It seems that ESEA teachers are less different with respect to their sense of MTSE, but schools seem to be linked to a bigger difference in the variance component. For ETSE, among schools in no country cluster any additional variance could be explained, but more among teachers (70.52%–12.11%), where most initially unexplained variance resided (98.11%–91.42%). In the Nordic countries, the largest amount of explained variance was identified in the fitted models, the smallest in the ESEA countries. For ITSE, in contrast, the explained variance on both levels and within each cluster was more balanced. Most notably, within the Anglo-Saxon cluster, almost all variance on the school level was explained, but no additional variance in the ESEA countries. This shows that the predictors contribute to different degrees in explaining variation

in: (a) the three country clusters; and (b) differences among teachers and schools. This is a new finding that shows that in different cultural environments the same set of predictors seem to work differently at the three levels modelled.

Furthermore, teacher and classroom characteristics were in sum more important for explaining variation across country clusters and domains of TSE than school or principal predictors. Differences were only found for, for example, the teachers' workload, but those were only small. Some more variation occurred with respect to the classroom characteristics. One major difference was found for the Nordic countries, where the fewest number of classroom predictors was significant; particularly time allocation in the classroom and measures of student SES. Most classroom predictors, in contrast, were significantly explaining variation of TSE in the ESEA countries. Finally, the biggest variation with respect to classroom characteristics was found in the Anglo-Saxon cluster: student achievement, for example, contributed only significantly to explaining variation in MTSE, whereas the students' mother tongue only to explaining variation in ETSE. Hence, in the Anglo-Saxon countries the three domains of TSE seem to show the greatest variability with regards to classroom compositional factors of all three country clusters. Across all clusters, a focus should be on professional development opportunities for teachers, as the classroom level was found to be the one for most direct improvement opportunities for effective teaching. More effective practices could also boost their feelings of self-efficacy but appropriate experimental research would be needed, as the cross-sectional TALIS data does not allow any experimental analyses.

For the principal characteristics, the biggest difference occurred between the Anglo-Saxon countries, where none contributed to explaining differences in any dimension of TSE and the ESEA countries, where all except the principal's educational level were significant. The Nordic countries were somewhere in between, where some of the characteristics like work experience or the instructional leadership style contributed to explaining variation in TSE. Between the western clusters, there are more similarities with regard to the principal traits than between them and the ESEA cluster, which might be due to the egalitarian structures they support.

The school characteristics, finally, show a more homogeneous pattern: all three predictors contributed to explaining variation in the Anglo-Saxon countries for ITSE and ETSE, which was the case for the ESEA countries and MTSE, too. In the Nordic countries, the relationships were more diverse. Nonetheless, school characteristics seem to make more of a difference in explaining variation in TSE than the principal.

This study is the first to explore the relationship between three dimensions of TSE and three culturally different country clusters and hence adds to the cultural understanding on how the cultural environment and the school system may contribute to explaining differences in the teachers' perceptions of three domains of TSE. The cultural values like gender egalitarianism, power distance or individualism versus collectivism, can be seen as philosophical underpinnings that shape the ideas of how a society should operate and the role of the education system in it, and constitute a cultural framework that offers insight in the work conditions of teachers. Furthermore, the tripartite measure of TSE comprising classroom management, student engagement and instruction has not yet been applied in many different cultural settings (e.g. Klassen, 2004; Poulou, 2007; Künsting *et al.*, 2016; Zee *et al.*, 2016), although it is

widely accepted. This study contributes to filling this gap by comparing three cultur-ally different country clusters. Finally, reporting effect sizes helps to distinguish pre-dictors with less explanatory power from predictors with more explanatory power and offers suitable links for future studies.

A new theoretical contribution has been made as the study was able to show that the tripartite structure of TSE applies both statistically and theoretically in three very different cultural settings and is the first to show that. Furthermore, it reveals that the grouping of countries according to features of their school systems is a valid way to investigate educational characteristics in relation to different domains of TSE.

Limitations

There are also a few limitations of the study that should be borne in mind when read-ing the results: first, the data is cross-sectional, not longitudinal, and thus causal claims cannot be made. Due to the large sample size in the clusters, the estimates are robust and the results trustworthy. However, the sample is only partly random, as the participation of the countries was based on voluntary choice and only the selection of the schools and teachers within the schools followed a two-stage random sampling plan (Rutkowski *et al.*, 2013). Second, the data are self-reported and as such poten-tially biased, as respondents may tend to overestimate themselves (Bryman, 2008). Thirdly, as this is a secondary data analysis, the choice of variables depends on the availability in the TALIS study and is limited in that sense (Vartanian, 2011). In pri-mary research, different variables as, for example, school statistics instead of teacher reports for student achievement or SES might have been chosen, but the TALIS study offered nonetheless a comprehensive source of comparable data for a wide number of countries. Fourthly, measurement invariance could not be achieved for all scales at the necessary level (i.e. instructional leadership style in the Nordic cluster), which means that the meaning of the scale across all clusters is not strictly the same and interpretations of the results are to be derived carefully and no strong conclusions possible.

Future research should look at more countries by taking into account the school systems and cultural values. Furthermore, this conceptualisation offers links to other classroom observation tools like CLASS and ISTOF (La Paro *et al.*, 2004; Teddlie *et al.*, 2006) that could be used to explore the quality of teaching and classroom pro-cesses internationally.

Implications for education policy and practice

Implications for policy and practice derived from this study might operate at different levels of responsibility with respect to different authorities involved internationally. Hence, suggestions will be made with respect to general application.

In the training phase, student or novice teachers should be provided with the opportunity to gain first classroom experience guided through supervision by an expe-rienced colleague to have a source of mastery and vicarious experience, but also social persuasion and the teachers' awareness for classroom situations can be sensitised (Bandura, 1977, 1986; Tucker *et al.*, 2005; Pinnock, 2006). Given the comparatively

strong association of constructivist beliefs about teaching with all domains of TSE identified in the study, a focus in teacher training should be on teaching strategies that foster students' own inquiry and critical thinking (Teig *et al.*, 2019). Furthermore, incorporating a gender perspective in teacher training could be worthwhile, as female teachers have shown a higher level TSE in almost all models (except MTSE in the ESEA countries) and students should benefit from a high TSE teacher regardless of their sex. Also, fostering appropriate pedagogy in teacher training seems to be worthwhile, as especially well-educated teachers reported a lower level of several types of TSE across country clusters, which seems to be an important element for successfully delivering lessons (König *et al.*, 2011).

For the principal, it seems to be particularly important to be involved in leadership training that supports goal-setting and defining a clear vision for the school. This has not become relevant in all country clusters across all domains, as for example in the more egalitarian Nordic countries where the association was negligibly small, but in the other clusters this leadership had a positive association with TSE, which makes it a desirable trait for principals. Finally, given the association the community size as a proxy for school composition, such as a highly educated work force or difficult social environment, has shown with different types of TSE across countries, it might be worthwhile for education policy to cater towards the schools' respective needs to help create flexible and individual support structures that foster an environment for TSE to flourish in different contexts. This can be a potential source of mastery experience for teachers, if they are equipped with the necessary tools and training to flourish in their work environment.

Conflict of interest

There is no potential conflict of interest to report.

Data availability statement

The data are publicly available here: http://www.oecd.org/education/talis/talis-2013-data.htm.

NOTES

1 Teacher variables: χ^2: 23265,320; df = 16659; Sig. > .001. Classroom variables: χ^2: 7423,450; df = 1612; Sig. > .001. Principal variables: χ^2: 16320,433; df = 623; Sig. > .001. School variables: Chi-square: 785,600; df = 46; Sig. > .001.
2 Strength of effect sizes according to Marsh *et al.* (2009) and Tymms (2004), for multilevel models (comparable with Cohen's *d*) ES = $(2 * B * SD_{Predictor})/\sigma_e$, where $SD_{predictor}$ is the standard deviation of the predictor variable at L2, and σ_e is the residual standard deviation at L1.

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