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Testing a Four-factor Model for the Teachers' Sense of Efficacy Scale: An updated Perspective on Teachers' Perceived Classroom Efficacy

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ABSTRACT

The Teachers' Sense of Efficacy Scale (TSES) is one of the most diffused tools for assessing teachers' self-efficacy. Despite a strong background, professionals brought concerns on TSES structural feasibility due to changes experienced by education in the last decade. The aim of this study is to test an alternative structure of TSES (A-TSES) that includes a fourth factor, efficacy in student misbehaviour. A sample of 775 teachers were asked to fill TSES. Results showed that, while the original TSES is a good fit for the dataset, A-TSES represents a more appropriate model. Future research should focus on testing A-TSES in different educational systems, as well as on delving into the development of its four-factor structure for future practical application.

Evaluación de un modelo de cuatro factores para la *Teachers' Sense of Efficacy Scale*: una perspectiva actualizada sobre la percepción de los maestros de su eficacia en el aula

Palabras clave:
Evaluación
Conductas en el aula
Autoeficacia de los maestros

RESUMEN

La *Escala sobre el sentido de autoeficacia de los profesores* (TSES) es uno de los instrumentos más usados para la medición del sentido de eficacia de los maestros. A pesar de su amplio respaldo científico, los cambios sufridos por la educación en la última década han llevado a los expertos a cuestionar la viabilidad de su actual estructura. El objetivo de este trabajo es poner a prueba una estructura alternativa a la TSES (A-TSES) que incluye un cuarto factor, la eficacia en el mal comportamiento de los estudiantes. Los resultados obtenidos de una muestra de 775 maestros muestran que aunque la estructura original de la TSES puede ser considerada buena la A-TSES representa un modelo más robusto. En futuro, la investigación en este campo debería enfocarse en poner a prueba la A-TSES en diferentes sistemas educativos, al mismo tiempo que será necesario profundizar en el análisis de la estructura de cuatro factores para futuras aplicaciones prácticas.

Self-efficacy (SE), defined by Bandura (1997, p. 3) in his social-cognitive theory (SCT) as the "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments", has become the focus of researchers in several fields of social sciences in the last decades. Bandura (1977) suggests that these beliefs function as a mediator of peoples' skills and knowledge on their perception of what they can do. Thus, SE is believed to have an influence on an individual's goals, choice of activities, and their accomplishments, as well as the amount of effort people invest, and the resistance or resilience they demonstrate when facing a difficult or challenging task (Bandura, 1977, 1993). A considerable amount of research supports the claim that SE has a significant relationship with human behaviour in a variety of contexts and/or cultures (Kim & Beehr, 2017; Osteen et al., 2017; Parkinson et al., 2017).

In the area of education, when looking for possible variables that could explain and determine the quality of teachers' classroom behaviour and effectiveness, Tschannen-Moran et al. (1998) adapted the concept of Bandura's SE to the teaching context defining it as the beliefs teachers hold towards their capabilities in conveying successfully different teaching tasks through a variety of actions. Several studies have demonstrated that high teachers' self-efficacy (TSE) has a direct influence on stronger commitment, willingness to adapt to new reforms, implement new teaching strategies, and improve the overall teaching-learning process (Brighton, 2003; Chesnut & Burley, 2015; Derrington & Campbell, 2015; Donnell & Gettinger, 2015; Tschannen-Moran & Woolfolk Hoy, 2007). On the other hand, teachers with lower SE are more likely to feel less enthusiastic, to have less control on the educational environment, to

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experience higher level of stress, job anxiety, as well as burnout, and are more likely to abandon their profession (Malinen & Savolainen, 2016; Schunk & Pajares, 2009; Skaalvik & Skaalvik, 2007; Zee & Koomen, 2016). Although Bandura (1997) viewed SE as a universal construct valid across distinct cultural settings, authors such as Tschannen-Moran and Woolfolk Hoy (2007) and Schunk and Pajares (2009) suggested that TSE is context-specific. As a result, TSE has been studied in different educational and cultural settings, the former looking closely at its relation to educational level and subjects taught, school setting, socio-economic matters, or school leadership (Lee et al., 2013; Paletta et al., 2017; Raudenbush et al., 1992; Walan & Chang Rundgren, 2014).

According to Tschannen-Moran et al. (1998) the need for understanding teachers' judgements about their abilities to influence student achievement has its roots related to the Research ANd Development organization (RAND), which, for that purpose, created two questionnaire items in the mid 1970s, followed by a measure proposed by Gibson and Dembo (1984), extending the original RAND's instrument to two factors measuring: 1) personal teaching efficacy (i.e., belief that one has abilities and skills to promote students' learning) and 2) general teaching efficacy (i.e., belief that any teacher's efficacy is affected by external factors, such as family influence/background, or social environment). However, many concerns occurred questioning the instrument's relevance and conceptual soundness related to the variable of environmental obstacles within the "general teaching efficacy" factor (Klassen et al., 2009). Since then, there have been many attempts in creating suitable TSE instruments with the intention to more precisely reflect the vast concept of teaching environment. Yet, the Teachers' Sense of Self-Efficacy Scale (TSES) developed by Tschannen-Moran and Woolfolk Hoy (2001), both in the long (24-item) and the short (12-item) form, remains the most prominent one (Fives & Buehl, 2010; Klassen et al., 2011). Its original structure was built on a three-factor model: efficacy in instructional strategies (EIS), which addresses to the strategies teachers use in order to help their students learn a specific material; efficacy in classroom management (ECM) refers to teachers' perception of their abilities to run a smooth class, which in fact underlines the effectiveness of the instructional strategies applied; and efficacy in student engagement (ESE), concerning how well a teacher can motivate students and create an appropriate learning environment in which its participants would be present both physically and psychologically. TSES is claimed to be among the leading instruments explaining the interpretation and conceptualization of any teacher's success, upon which TSE beliefs are fostered. This model has been widely tested and supported in other studies, proving its construct validity and reliability (Holzberger et al., 2013; Skaalvik & Skaalvik, 2007).

Although a vast number of findings from prior research generally indicates that TSES represents a multidimensional construct with three latent correlated factors, recent studies have raised questions and issues regarding this structure. For instance, Nie et al. (2012) suggested that the three-factor structure may not be the only fitting solution to understand the relation between TSE and classroom occurrences, adding that some items within the same factor seem to refer to distinct skills. This finding may explain why, when conducting exploratory factor analysis, some items of the TSES were found with low or double loading (Wolters & Daugherty, 2007) or were not loaded (Fives & Buehl, 2010). Also, a study carried out in China, Korea, and Japan obtained contradictory results for the 24-item long form of TSES, raising concerns on the content validity of the instrument (Ruan, et al., 2015). Among the main problems that authors have displayed about the structure of TSES, students' misbehaviours and how teachers feel capable of coping with them have covered a large portion of the recent literature. Sun (2015) mentions that misbehaviours are those students' conducts that prevent the teaching-learning process to follow its regular course. They are characterized by violation of both implicit and explicit classroom norms and require an intervention of teachers in order to be contained and/or stopped (Sun & Shek, 2012).

In TSES, teachers' perceived efficacy about dealing with problem students is embedded in the larger ECM factor. However, in recent years several authors have underlined the need to consider SE towards students' misconduct as a separate concept. For instance, Sass et al. (2016) describe efficacy in classroom management as a combination of two distinct domains, instructional and behavioural management, only moderately correlated (Martin & Sass, 2010). Another research on TSE recognized two domains, "support of learning and organization of classroom" and "engagement and behaviour" (Malmberg et al., 2014). These findings are supported by Di Santo et al. (2017), who considered classroom practices and children's behaviour as separate constructs, both correlated with pre-service teachers' beliefs. The direct relation between students' misconducts and TSE is addressed in several recent studies (Butler & Monda-Amaya, 2016; Hasting & Bham, 2003; Sorlie et al., 2016). According to Tsouloupas, Carson, and MacGregor (2014), students' misbehaviours can negatively affect teachers' psychology; consequently, an effective management of these conducts is necessary in order to improve general classroom climate, academic achievement, and individual productivity. The authors add that it is important to specifically analyse teachers' efficacy beliefs in coping with misconduct situations, as they are key indicators of the quality of the teaching-learning process. This idea is the basis of a conceptual stream called Teacher Efficacy in Handling Student Misbehaviour (TEHSM; Tsouloupas et al., 2010). Zee, Koomen, et al. (2016) mention that TSE may change significantly based on the type of students a teacher has to deal with, emphasizing the role of pupils' misbehaviours as a factor determining important fluctuations across domains in teachers' perceived efficacy (Zee, de Jong, et al., 2016). The authors continue stating that SE could be affected by whether teachers' affirm that teachers may respond too optimistically about general class management situations, whereas they show less self-confidence in items on coping with disruptive students for they tend to connect those questions with concrete and real previous experiences (Zee et al., 2016). Therefore, isolating efficacy towards disruptive students may enhance the predictive validity of TSES (Wyatt, 2014).

For all the above-mentioned, the objective of this study was to test and compare two structural models of TSES, the first (T-TSES) being a three-factor model based on the original theory by Tschannen-Moran et al. (1998) and the second (A-TSES) using a four-factor structure in accordance with the latest scientific and practical evidence on TSE.

Method

The design of this study is quantitative, non-experimental with observational character.

Participants

The sample comprised 775 in-service teachers (378 males, 397 females) from several states of the Mexican Republic, teaching across preschool, primary, secondary, and university levels in both private (61 schools) and public (104 schools) sectors. Participants were aged 18 to 69 years and had a mean teaching experience of 13.24 years (Mean = 13.24, *SD* = 9.69). Only those individuals who were actively teaching at the moment of the data collection were eligible for the final sample.

Our sampling technique was based on convenience. Participants were approached in two different ways. Firstly, we visited schools from the Metropolitan area of Monterrey, Nuevo Leon, Mexico, and school principals were contacted and asked for permission to collect data from their teachers. Once the permission was obtained, members from the research team went to each school to make a

Table 1. Demographic Information of the Teachers Participating in the Study (N = 775)

Educational level	Gender (n)	Experience ($M_{years} \pm SD$)	Age category (years)				
			< 20	20-29	30-39	40-49	50-59
Preschool	m (22)	7.73 ± 4.66	5	13	2	2	-
	f (31)	9.39 ± 6.36	7	13	8	2	1
Elementary school	m (176)	11.79 ± 8.61	43	57	45	25	6
	f (93)	10.44 ± 8.38	25	25	24	14	5
Middle school	m (123)	16.27 ± 10.70	19	21	32	26	19
	f (203)	15.12 ± 10.41	21	52	60	42	28
High school	m (34)	12.91 ± 11.09	9	11	8	1	5
	f (20)	11.55 ± 7.00	1	8	7	2	2
University	m (23)	10.09 ± 6.58	5	9	7	2	-
	f (50)	15.60 ± 10.37	5	7	17	13	7

Note. m = male; f = female.

short presentation on the study purpose and procedure and recruited volunteers. Secondly, in order to get a larger sample of participants that would represent other states of the Mexican Republic, participants were also approached at two international educational conference and asked to volunteer in our study by filling out a brief questionnaire.

Detailed information on the characteristics of the final sample are shown in Table 1 above.

Instruments

The original long version of TSES (Tschannen-Moran & Woolfolk Hoy, 2001) consists of 24 items using a 9-point Likert scale ranging from 1 = *nothing* to 9 = *a great deal*. The items are distributed into 3 variables – domains: 1) EIS (e.g., "How well can you respond to difficult questions from your students?"); 2) ECM (e.g., "To which extent can you make your expectations clear about student behaviour?"); and 3) ESE (e.g., "How much can you do to help your students think critically?").

In our sample, the official Tschannen-Moran's Spanish version of the instrument (available at https://wmpeople.wm.edu/site/page/mxtsch/researchtools) was employed. All items of TSES and their correspondent factor in T-TSES and A-TSES are described in Table 2.

Data Analysis

Firstly, we carried out an exploratory factorial analysis (EFA) on a random sub-sample composed by 250 participants using the SPSS software. This was performed with the maximum likelihood (ML) method and Varimax rotation with Kaiser normalization. Successively, answers from the remaining 525 participants were used as follows in order to assess the validity of the questionnaire in terms of reliability and structural fit, for both tested models. Reliability analyses were carried out by means of Cronbach's alpha and McDonald's omega, which were applied to each factor separately. Structural validity of the models was verified by means of confirmatory factorial analysis (CFA). These analyses were used to verify factor saturations of the items in each dimension and cross-check the results with those from reliability analysis. In addition

Table 2. Items of the Teachers' Sense of Efficacy Scale (TSES) and their Distribution into Three (T-TSES) and Four (A-TSES) Factors

n	Item	T-TSES factor	A-TSES factor
1	How much can you do to go through the most difficult students?	ESE	ESE
2	How much can you do to help your students think critically?	ESE	ESE
3	How much can you do to control disruptive behavior in the classroom?	ECM	ESM
4	How much can you do to motivate students who show ow interest in school work?	ESE	ESE
5	To which extent can you make your expectations clear about student behavior?	ECM	ECM
6	How much can you do to get students to believe they can do well in school work?	ESE	ESE
7	How well can you respond to difficult questions from your students?	EIS	EIS
8	How well can you establish routines to keep activities running smoothly?	ECM	ECM
9	How much can you do to help your students value learning?	ESE	ESE
10	How much can you do to gauge student comprehension of what you have taught?	EIS	EIS
11	To what extent can you craft good questions for your students?	EIS	EIS
12	How much can you do to foster student creativity?	ESE	ESE
13	How much can you do to get children to follow classroom rules?	ECM	ECM
14	How much can you do to improve the understanding of a student who is failing?	ESE	ESE
15	How much can you do to calm a student who is disruptive or noisy?	ECM	ESM
16	How well can you establish a classroom management system with each group of students?	ECM	ECM
17	How much can you do to adjust your lessons to the proper level of individual students?	EIS	EIS
18	How much can you use a variety of assessment strategies?	EIS	EIS
19	How well can you keep a few problem students from ruining an entire lesson?	ECM	ESM
20	To what extent can you provide an alternative explanation or example when students are confused?	EIS	EIS
21	How well can you respond to defiant students?	ECM	ESM
22	How much can you assist families in helping their children do well in school?	ESE	ESE
23	How well can you implement alternative strategies in your classroom?	EIS	EIS
24	How well can you provide appropriate challenges for very capable students?	EIS	EIS

Note. T-TSES = Traditional Teachers' Sense of Efficacy Scale; A-TSES = Alternative Teachers' Sense of Efficacy Scale; ESE = Efficacy in Student Engagement; EIS = Efficacy in Instructional Strategies; ECM = Efficacy in Classroom Management; ESM = Efficacy in Student Misbehavior.

to this, CFA was employed to test two models, the first corresponding to the original three-factor structure proposed by Tschannen-Moran et al. (1998); the second comprising four factors, based on the latest research and advances in TSE assessment. ML estimation method was run setting standardized estimates, residual moments, and modification indices as output for model fit evaluation. The assessment of each model fit was further scrutinized with the following goodness of fit indexes: chi square/degrees of freedom ratio (χ^2/df), adjusted goodness of fit index (AGFI), normed fit index (NFI), Tucker-Lewis index (TLI), comparative fit index (CFI), and root mean square error of approximation (RMSEA). Cut-off points for the indexes were set as follows: for χ^2/df, values should be 3.00 or lower (Tabachnick & Fidell, 2012), but in large samples scores up to 5.00 are considered acceptable (Wheaton et al., 1977); for AGFI, it is recommended to have values above .90 (Hooper et al., 2008); for NFI and TLI, Bentler and Bonnet (1980) set a lower limit of .90 for the model to fit properly; Hu and Bentler (1999) advice that scores above .90 should be obtained for CFI; and for RMSEA, Steiger (2007) proposes an upper limit of .07, above which the model should be considered as a poor fit. Finally, comparison of competing model was carried out using a chi square difference test for nested models. All analyses were run using IBM SPSS Statistics v.25 for Macintosh, as well as IBM SPSS AMOS v.22 for Windows.

Results

Exploratory Factorial Analysis

EFA confirmed a structure with 4 factors for the analysed instrument and the selected sample. The factors together explained 67.01% of the total variance. Factor 1 was composed by 8 items with loadings from .417 to .612; factor 2 comprised 8 items with loadings between .462 and .764; factor 3 included 4 items with loadings from .461 to .688; and factor 4 was constituted by 4 items with loading ranging from .499 to .556. Loadings below .40 were not considered. A summary of the factors from the EFA is shown in Table 3.

Table 3. Exploratory Factorial Analysis of the Items of the Teachers' Sense of Efficacy Scale

Item number	Factor				Dimension
	1	2	3	4	
1	**.612**		.544		
2	**.601**				
4	**.563**				
6	**.417**				ESE
9	**.560**				
12	**.484**	.429			
14	**.579**				
22	**.501**				
7		**.566**			
10		**.462**			
11		**.764**			
17		**.644**	.544		EIS
18		**.633**			
20		**.547**	.417		
23		**.573**			
24		**.664**			
5	.406		**.461**		
8			**.522**		ECM
13			**.688**		
16			**.648**		
3				**.499**	
15				**.556**	ESM
19				**.454**	
21				**.447**	

Note. ESE = efficacy in student engagement; EIS = efficacy in instructional strategies; ECM = efficacy in classroom management; ESM = efficacy in student misbehavior.

Traditional TSES Model (T-TSES)

The first CFA analysis showed poor model fit for the three-factor structure, as all indexes were found to be below the widely accepted thresholds (AGFI, NFI, TLI, and CFI < .9), whereas RMSEA was close to the suggested limit (RMSEA = .081). These scores could not be improved after adjusting for error covariances. The analysis of item loadings revealed extremely low scores for item 7 ("How well can you respond to difficult questions from your students?"; λ = .44), belonging to the EIS factor, and item 3 ("How much can you do to control disruptive behaviour in the classroom?"; λ = .38) belonging to the ECM factor. After their elimination, AGFI and NFI were still unsatisfactory, whereas TLI and CFI were slightly above the limit (.906 and .907, respectively), as well as RMSEA showed a sufficient score (.078). Further analysis of item loadings highlighted that all items were loading sufficiently (from .60 to .77), except for item 23 from EIS ("How well can you implement alternative strategies in your classroom?"; λ = .47). Removing the item implied an increased model fit for the three-factor structure (χ^2 = 385.146; df = 166; χ^2/df = 2.320, AGFI = .920, NFI = .937, TLI = .953, CFI = .963, and RMSEA = .050). The final model was composed by 21 items distributed as follows: efficacy in student engagement, eight items; efficacy in instructional strategies, six items; and efficacy in classroom management, seven items (Figure 1).

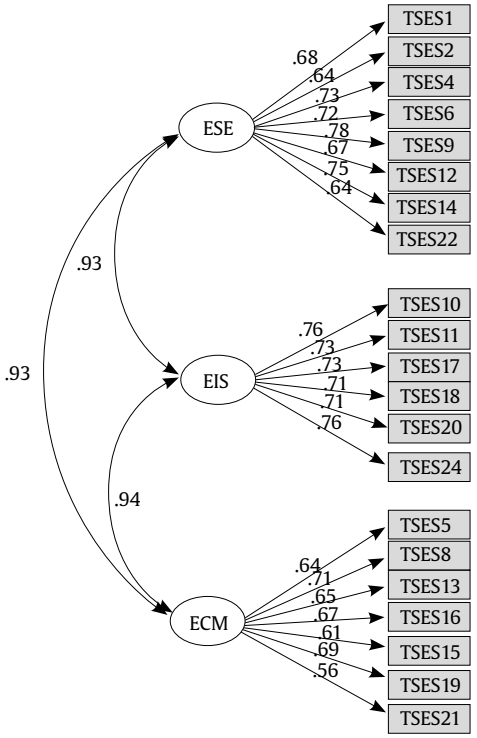

Figure 1. Measurement Model of the Traditional Three-Factor Structure of the Teachers' Sense of Efficacy Scale.
Note. ESE = efficacy in students' engagement; EIS = efficacy in instructional strategies; ECM = efficacy in classroom management.

Cronbach's alpha and McDonald's omega showed high reliability for the three factors of the final model (alpha: ESE = .875, EIS = .864, ECM = .876; omega: ESE = .889, EIS = .857, ECM = .874).

Alternative TSES Model (A-TSES)

Based on findings and suggestions from recent research, as well as considering the outcomes relative to the traditional model testing

obtained in this study, the original 24-item model of TSES was evaluated after splitting the ECM factor into two, efficacy in classroom management and efficacy in student misbehaviour (ESM; items 3, 15, 19, and 21). Similar to the above-mentioned analysis of the traditional model, outcomes from the alternative one showed low scores in some of the fit indexes (AGFI = .880, NFI = .896). After verification of modification indices, residual covariances, and factor loadings, item 3 ("How much can you do to control disruptive behaviour in the classroom?"; λ = .41) from ESM, item 7 ("How well can you respond to difficult questions from your students?"; λ = .44) and item 23 ("How well can you implement alternative strategies in your classroom?"; λ = .40) from EIS were sequentially removed and the model was tested after each removal. CFA for the model after elimination of the above-mentioned items showed good values of the goodness of fit indexes (χ^2 = 369.798, *df* = 164, χ^2/df = 2.255, AGFI = .922, NFI = .939, TLI = .955, CFI = .965, and RMSEA = .049). The final model was composed by efficacy in students' engagement: eight items; efficacy in instructional strategies: six items; efficacy in classroom management: four items; and efficacy in student misbehaviour: three items (Figure 2).

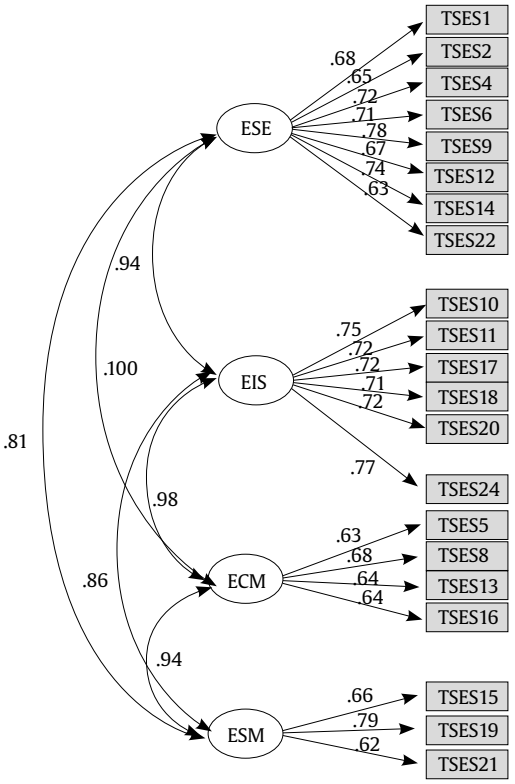

Figure 2. Measurement Model of the Alternative Four-Factor Structure of the Teachers' Sense of Efficacy Scale.
Note. ESE = efficacy in students' engagement; EIS = efficacy in instructional strategies; ECM = efficacy in classroom management; ESM = efficacy in student misbehavior.

Item loadings of the alternative model ranged from .63 to .80. Cronbach's alpha and McDonald's omega scores for each of the four factors were good (alpha: ESE = .881, EIS = .884, ECM = .861, ESM = .838; omega: ESE = .888, EIS = .858, ECM = .800, ESM = .847).

Competing Models Evaluation

The two models presented are considered as nested due to the fact that, while they both use the same pool and number of items, the alternative one proposes an additional latent variable, which implies additional covariances and correlations (Werner & Schermelleh-Engel, 2010). Statistically significant chi square differences, evaluated against chi square distribution tables with degrees of freedom equal to the difference between the models' degrees of freedom, indicate that the larger model (with more parameters) fits the data better than the smaller. On the other hand, non-significant chi square differences signal that both models fit equally well: in these circumstances, it is suggested to select the simpler model over the more complex one (Steiger, 1985). In our case, the chi square difference test showed that A-TSES represents the best fit for the dataset and sample of our study (χ^2diff = 15.348, *df* = 2, $p < .001$).

Discussion

The aim of this study was to test and contrast two structural models for the TSES questionnaire, one being the original three-factor form proposed by Tschannen-Moran et al. (1998), the other being a four-factor structure based on the latest research findings in the field of SE and education. In both models, items 3, 7, and 23 were discarded as they were affecting negatively the soundness of both structures. Item 3 ("How much can you do to control disruptive behaviour in the classroom?") was originally assigned to ECM (T-TSES) and ESM (A-TSES). However, the question may have been interpreted by teachers in a different way compared to other items in the same factors; in fact, it seems to imply teachers' perception of their efficacy in "directing", or "having a control over" (Oxford Living Dictionaries - English, 2017; Royal Spanish Academy, 2017), a certain behaviour rather than in responding to it after its occurrence, which appears to be the focal point of most of the questions composing those factor/s. Regarding items 7 ("How well can you respond to difficult questions from your students?") and 23 ("How well can you implement alternative strategies in your classroom?"), they underline a modern, student-centred approach of teaching, such as pupils' active learning strategies. The Organization for Economic Cooperation and Development (OECD) reports that Mexican teachers are among those mostly using teacher-directed instructions, providing students with less freedom and autonomy to actively participate in the classroom (OECD, 2016). This data is consistent with the findings of Camacho Zambrano (2016), who found out that Mexican teachers strongly adhere to a traditional teaching model based on the mere reproduction of knowledge in a constrained teaching setting, at the same time as they show little expertise and application of the current trends of educational practices. This could be a consequence of the structure and contents of Mexican higher education and continuing education programs for teachers mainly employing traditional practices (Nava-Gómez & Reynoso-Jaime, 2015; OCDE, 2010). Therefore, the discrepancy between the content of the eliminated items and the specific educational setting of our sample may explain their low saturation in both proposed models.

Both models comprised 21 items, and both fitted our dataset. While the tendency is commonly to be conservative when a traditional, well known, and deeply tested model equals a more innovative approach (Blunch, 2015), in our case the chi square difference test showed that A-TSES represents an even better fit than T-TSES. Splitting the ECM factor into two, and thus emphasizing the importance of efficacy in students' misbehaviour as a stand-alone construct connected to TSE in a different way than regular classroom management, seems to make sense in the light of the findings of studies in the field of education carried out in the last five years. We need to consider the changes that education has faced over the years, especially in the dynamics of the teaching-learning processes. In fact, nowadays teachers report to have to deal with students' challenging behaviours at least once a day (Butler & Monda-Amaya, 2016; Scott, 2017). As Butler and Monda-Amaya (2016) suggest, these challenging behaviours have a huge impact both on students and on teachers. Pupils' negative conducts

can escalate to a point at which teachers' perceived efficacy is fully depressed, leading some of them to even quit their job (Scott, 2017; Sharafi et al.. 2016). Flower et al. (2017) mention that currently many students with behavioural issues are served in general education classrooms, this marking a positive change towards integration compared to older approaches (having separated special classrooms in extreme cases), at the same time as it implies more challenges for teachers in order to provide all pupils with equal opportunities to learn and grow (Scott, 2017). As a matter of fact, both in-service and pre-service teachers declare to have high concerns on how to efficiently manage situations generated by disruptive conducts during classes (Glock & Kleen, 2017). For this reason, authors suggest that assessing behaviour management skills is critical to any successful educational context (Flower et al., 2014). Our findings are in line with the above-mentioned studies and seem to support the stream of research on TEHSM (Tsouloupas, Carson, & Matthews et al., 2014). Also, they are backed up by several empirical studies in different educational settings, either recommending the specific assessment of efficacy in pupils' misconducts as a separated domain from efficacy in classroom management (Di Santo et al., 2017; Malmberg et al., 2014; Sass et al., 2016) or hinting at the need to increase the structural robustness of TSES (Nie et al., 2012; Zee, Koomen et al., 2016; Wyatt, 2014).

Conclusions

The traditional structure of TSES is confirmed to have a good soundness, despite the need to remove three items, which could have depended on the specific demographic characteristics of the sample selected for this study. Previous literature in the field of education supports T-TSES has a solid instrument for measuring TSE (Holzberger et al., 2013; Klassen et al., 2011; Skaalvik & Skaalvik, 2007).

However, the changes that educational systems have suffered in recent years have highlighted the need for an adjustment of the original tool to better reflect the current state of teaching-learning processes in the classroom (Fives & Buehl, 2010; Nie et al. 2012; Tsouloupas et al., 2014). The alternative questionnaire tested in the present study, the A-TSES, represents a valid and modern structural model for TSES, which describes the interaction between teachers' perceived efficiency and classroom dynamics respecting the theoretical foundation of the questionnaire at the same time as it responds to the needs originated from the contemporary state of educational settings worldwide (Butler & Monda-Amaya, 2016; Scott, 2017).

Limitations

Some considerations need to be addressed about this study. It has been suggested that SE may be affected by cultural and contextual characteristics. For instance, authors such as Schunk and Pajares (2009) state that TSE is context specific. Culture and society are considered to play an essential role in constructing human psychology, including perceived efficacy (Bruner, 1996; Lin & Gorell, 2001). Moreover, it must be taken into account that teaching practices and conditions may vary not only across countries, but also within (Ho & Hau, 2004). The call of Klassen et al. (2009) for more rigorous research on TSE operating in different teaching and learning experiences has resulted in numerous cross-cultural studies supporting this argument. Therefore, TSE has been studied in different educational and cultural settings, in order to understand better the relation of SE with educational level, subjects taught, school features, socio-economic matters, or school leadership (Lee et al., 2013; Paletta et al., 2017; Raudenbush et al., 1992; Walan & Chang Rundgren, 2014). The belief that culture and education influence TSE has led to many studies being conducted to test the external validity and generalizability of the TSES, as well as to measure the universality of this construct. While most of those studies pointed out that TSES is universally reliable, cultural invariance could not always be confirmed (Klassen et al., 2009; Tsigilis et al., 2010). Based on the above-mentioned, the fact that our study was carried out in a specific educational system, the Mexican one, may represent a limitation. In the light of the possible impact of cultural differences on teachers' construction of their SE, the structural validity of A-TSES should be evaluated across countries and educational systems. Additionally, other external factors may affect self-efficacy based on the context in which the educational action occurs. For instance, environmental and social conditions, such as family economy, school resources, type of school, administrators' policies, or the degree of conflict in the community in which a school is located, may influence directly or indirectly (through increased stress, or pressure) teachers' perception of their efficacy in the classroom. This may call for future research strategies to either exclude or control statistically such variables, hence reducing their potential effects on TSE.

Nonetheless, it is important to address that the large sample selected for our research was characterized by a heterogeneous background in terms of geographical area (participants were teachers from most of the Mexican states), educational level (from pre-school to higher education), and subject taught (from maths, physics, or biology, to English, literature, or physical education). Authors raised concerns on the use of non-subject-specific tools (such as TSES) with assorted samples, for they may introduce noise into their statistical model (Morris et al., 2016); thus, the robustness shown by A-TSES in such a varied sample may indicate that this is a valuable instrument to assess TSE regardless of teachers' topic taught or the educational level at which they operate.

A further limitation in our study is represented by the sampling procedure. While a large sample was obtained, the methodology followed was non-probabilistic and based on convenience, which is considered to be less robust than others, hence partially reducing the generalizability of results. In future research in this field, randomized samples based on stratification and proportional affixation may allow to increase the range of the results at the same time as it would help controlling for other external noise variables.

Finally, our proposed instrument only consists of a structural renewal of the existing one, whereas no attention is paid to inherent modification of contents or the need of adding/removing items. On one hand, relying on an existing model based on strong theoretical foundations constitutes an advantage if we focus on the immediate practical application of the A-TSES. On the other hand, our study can be added to the stream of recent research widely demanding for revising the existing theory on TSE in the light of the changes occurred within educational settings worldwide. A future application of this research is therefore the use of A-TSES in studies implementing a mixed quantitative-qualitative methodology, which would allow to delve into teachers' thoughts, concerns, sources of SE, and factors affecting their sense of efficacy in the classroom, with special focus on students' misbehaviours This approach could reveal the necessity to include more questions in the newly created ESM factor, as well as to consider the addition of new items in the already existing factors, in response to teachers' considerations about the current state of education.

Conflict of Interest

The authors of this article declare no conflict of interest.

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