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Validating the Filipino teacher's sense of efficacy scale using exploratory factor analysis

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Abstract

Teaching efficacy is a self-efficacy construct that describes the teachers' belief to accomplish instructional outcomes and responsibilities. The authors translated the Teachers' Sense of Efficacy Scale (TSES) originally created by Tschannen-Moran and Hoy (2001). The Filipino TSES was tested among 240 public school teachers from the Division of Catanduanes, Philippines. Exploratory factor analysis was conducted and has found out that there is a single factor construct extracted from the tool in contrast to the 3-factor construct of the original TSES. Implications to practice was discussed in the paper.

Keywords: teaching efficacy, Filipino, self-efficacy, assessment, exploratory factor analysis, factors

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1. Introduction

Teaching efficacy (TE) is a concept derived from the construct of self-efficacy by Bandura (Bandura, 1977, 2006; Pajares, 1997) from his social cognitive theory, which posits that teaching and learning outcomes are influenced by persons' beliefs about their capability to attain such goals. He believes that self-efficacy creates self-expectancy on possible outcomes of actions, leading to the development of a personal view on coping. Self-efficacy has two components: personal efficacy and outcome expectations. In order to situate self-efficacy within the educational context, the term 'teaching efficacy' was first coined by Armor et al. (Armor, 1976) and Berman et al (Berman, 1977). Teaching efficacy (TE) is a construct that focuses on teachers' motivation—on a belief that they can accomplish a goal (Thomson et al., 2020). Bandura (Bandura, 1993) claims that behavior towards motivation is strongly connected with TE. However, the impact of TE towards a person's belief is domain oriented and would rather differently react depending on the situation at hand (Yough, 2019). TE researches have established that positive relationship in instructional leadership towards learners needs and goals (Tassell et al., 2019) focuses on appropriate teaching practices through effective planning and conduct (Cobanoglu et al., 2019), better coping mechanism towards burnout, and higher job satisfaction (Molero Jurado et al., 2019). TE as a construct of belief towards one's motivation is supported by many studies to affect possible outcomes towards classroom instruction and career choices of a teacher.

1.1 Teaching Efficacy

Teaching efficacy (Bandura & Cervone, 1970; Bandura et al., 1994) posits that teachers' performance is influenced by their belief about one's capability to reach desired goal. In the context of teaching, the goals may refer to instructional targets that their learners must achieve. Bandura identified factors that affect teaching efficacy. The first factor is mastery experiences, which refers to all the learnings on outcomes of the actions taken by the teacher. This may be sourced out from the pedagogies applied in class. Seeing the results of learner performance, teachers are prompted to internally reflect on their practices. The next factor are vicarious experiences, which are sourced from social models, e.g. observing outcomes from actions of peers (Bautista, 2011). In a way, vicarious experiences present teachers with a model for behavioral outcomes similar to the experiences of in-service teachers while observing their cooperating teachers in practice (Kabilan, 2013). Another factor is social persuasion, which refers to the ability of validation from others to influence teachers' belief to execute the desired action. The last factor is physiological states, which relates to the teacher's judgements on the emotional and physical state they experienced and their capability to accomplish the task.

Teaching efficacy had been observed to influence behavior and performance of teachers. Pre-service teachers' TE is influenced by teacher preparation they have undergone (Yough, 2019). Interventions in improving teaching practice among preservice teachers have shown improvement in TE. Sex is also a factor that influences the amount of TE (Sales, 2019). TE affects the quality of teaching and material presented to the class, commitment to the craft, and learners' achievement (Menon & Sadler, 2017; Thomson et al., 2020). Job burnout is less likely to occur when high TE is present (O'Brennan et al., 2017). Personal accomplishments are correlated to the level of TE as well (Molero Jurado et al., 2019).

Nurturing TE is possible. A positive working environment and organizational leadership have been observed to improve TE scores(Wilson et al., 2020). This further explains that sources of job satisfaction should be given importance by educational planners in order to harness the outcomes of a strong TE (Molero Jurado et al., 2019). It also as important for educational planners to understand the needs and background of the teacher before assigning them to classes as these also affect the TE they would manifest (Menon & Sadler, 2017). Engaging in professional development through post-graduate, seminar trainings and modelling have also been observed to

improve teacher's belief (Bautista, 2011; Wilson et al., 2020).

1.2 Teacher's Sense of Efficacy Scale

The Teacher's Sense of Efficacy Scale (TSES) was developed in order to examine teaching efficacy Tschannen-Moran and Hoy (2001). This scale consists of three factors, namely student engagement, instructional practices, and classroom management. The scale has a short form with 12 items and a long form with 24 items. Translations and modification of the TSES have been published, reporting different implications about the constructs of the scale. Ma et al. (2020) finding out that the original construct of the Chinese TSES presents a different construct among in-service and preservice teachers which discriminates the ability to unify the idea of TE in the tool thus recommended to use the single factor modified Chinese TSES version. Montiero and Forlin (Monteiro et al., 2019), however, disagree on the use of the Chinese TSES as an ultimate measure of TE but rather suggest to couple it with qualitative data in order to understand the psychometric constructs of the scale. Meanwhile, a modified Malaysian 3 factor model of the TSES was found to have a good factor structure (Khairani & Makara, 2020). Spanish (Burgueno et al., 2019) and French (Valls, Bonvin, & Benoit, 2020) counterparts prefer a shorter form of the TSES construct over the long and short form of the original scale due to its reliable construct. Overall, these studies suggest that psychometric properties of the scale would vary based on teachers' experiences, and that in their adoption across cultural boundaries, the scale must be adjusted for appropriateness to the unique context of teachers being studied.

TE is a construct that has been repeatedly examined and new developments on the scale constructs continue to emerge. This is due to sustained efforts to design TSES in context, lending itself to interpretations as varied as the cultures in different contexts of study. However, TE is a construct that has been used in many studies in different countries and is accepted to be a construct (Tschannen-Moran & Hoy, 2001; Ma et al., 2020; Burgueno et al., 2019) that explains teachers' instructional leadership, professional growth, personal preferences, and commitment towards teaching. Thus, it is equally as important to give importance in improving TE in order to achieve favorable outcomes.

In this study, the authors opt to validate a translated Filipino version of the TSES in order to probe whether the translation would provide a similar construct to the other international translations of the scale.

2. Methodology

2.1 Participants of the Study

The study was participated by public elementary and secondary teachers from the Division of Catanduanes, Philippines. The sampling technique opted was convenience sampling as due to the limitation brought by the COVID-19 lockdown. A request to distribute the tool online through Google© Forms was made through the Division Office of the Department of Education in Catanduanes. The Division Office consequently sent the link through an advisory with regards to the participation on the validation of the tool. Collected data from the participants were the demographic profile which includes the sex, degree graduated, level taught, teaching experience (Dicke et al., 2014; Poulou, 2016; Poulou et al., 2019; Suprayogi et al., 2017), and subject taught. The data was then collected from the form and transferred to IBM© SPSS© software for statistical analysis.

2.2 Instrumentation and Validation

The TSES was translated in Filipino by the co-authors who are language specialists in Filipino. After the initial translation, the Filipino TSES was then shown to other Filipino language specialist for further critiquing of the translation. A back-translation was done by bilingual language specialist teachers and by other non-language teachers from the Division of Catanduanes (Carroll et al., 2001; Tsui & Kennedy, 2009). The tool structure adapted was the short form due to its adherence to the concept of TE (Burgueño et al., 2019; Klassen et al., 2009;

Ma & Trevethan, 2020; Ma et al., 2020; Monteiro & Forlin, 2020; Monteiro et al., 2019; Ruan et al., 2015; Scherer et al., 2016; Valls et al., 2020). Adjustments done to the tool is the change in the dimensions of the Likert by reducing the original 9 points to 7 points (Krosnick & Presser, 2010; Lozano et al., 2008; Pasek & Krosnick, 2010).

2.3 Statistics

The researchers collected the demographic profile of the participants of the validation. Shapiro-Wilk and Levene's Test was conducted to check statistical assumptions to be considered. Test of correlation and difference was further analyzed. An exploratory factor analysis using principal component analysis was conducted to establish the construct of the Filipino TSES using varimax rotation and items with eigenvalues of greater than one (1) was accepted. KMO, Bartlett's, Communalities, and Reliability testing using Cronbach's Alpha was calculated and analyzed. (Balasundaram, 2009; Jung, 2013).

3. Results and Discussion

3.1 Demographic Profile

Table 1

Demographic Profile of Teachers

Category	*f*	%
Sex		
Male	57	23.8
Female	183	76.3
Degree		
BEED	53	22.1
BSED	149	62.1
Teaching Units	38	15.8
Level Taught		
Secondary	186	77.5
Elementary	54	22.5
Experience		
Early Career (0-5 years)	105	43.8
Mid-Career (6-20 years)	105	43.8
Late Career (21 and beyond)	30	12.5
Subject Taught		
English	20	8.3
Filipino	29	12.1
Science	31	12.9
Mathematics	33	13.8
Social Studies	29	12.1
MAPEH	14	5.8
Values	3	1.3
TLE/TVL/Technical	34	14.2
Generalist (Elementary)	47	19.6
TOTAL	240	100

Table 1 presents the profile of the 240 participants in the validation of the tool. It is shown that majority of the teachers are females, took Bachelor of Secondary Education, teaching in secondary level, and are generalist teacher as they are teaching in elementary. Moreover, most of the teachers participating are in their early and mid- career.

3.2 Correlation Testing

Results of the mean TE of teachers per item showed that most of the items are rated *5-Marami* (5-A lot) which is above the middle most score (4) of the tool scale that shows that most of the teachers have high amount of TE (Table 2). Spearman ρ was opted to test the level of correlation between the teaching experience and the

level TE among the participants (Table 3) after assumption of normality was rejected by the results of the Shapiro-Wilk. It shows that that there is a significant correlation between TE and the length of teaching experience among the participants ranging from very weak to weak strength. This result is similar to previous studies showing that amount of experience earned by teachers affects their TE as it also manifested in their practice and in their emotional management that affects their performance of their tasks (Dicke et al., 2014; Poulou, 2016).

Table 2

TE per Item

	1	2	3	4	5	6	7	8	9	10	11	12	TE AVE
$\bar{X}$	5.06	5.33	5.45	5.57	5.28	5.43	5.30	5.34	5.30	5.38	5.01	5.15	5.30
SD	.95	.86	.85	.90	.84	.95	.92	.85	.86	.92	.92	.89	.69

Table 3

Spearman test

1	2	3	4	5	6	7	8	9	10	11	12	TE AVE
.179*	.208*	.262*	.223*	.301*	.186*	.290*	.215*	.268*	.108*	.221*	.253*	.285*

*Significant at p<0.01

3.3 Difference Testing

Mann-Whitney U was employed to show if there were significant differences in terms of sex and level taught by the teacher after not satisfying the assumptions for parametric t-test. The results for sex (U=4891.5,p=.479) and level taught (U=4936.5,p=.849) showed that there is no significant difference in terms of the average TE based on the tested variables

Further analysis using Kruskal-Wallis H was done with degree, experience, and taught subject. Degree (H(2)=1.274,p=0.529) and subject taught (H(7)=8.833, p=0.265) showed no difference among their average TE. However, teaching experience showed significant difference (H(2)=21.684, p<0.001) with late careers (*M*=5.78) having better average TE compared to mid-career (*M*=5.37) and early career teachers (*M*=5.12).

3.4 Validation of the Filipino TSES

Table 4

Communalities

	1	2	3	4	5	6	7	8	9	10	11	12
Initial	1	1	1	1	1	1	1	1	1	1	1	1
Extraction	.510	.621	.634	.553	.652	.621	.603	.692	.661	.659	.496	.613

The KMO testing $(KMO = 0.934)$ and Bartlett's test $(\chi^2 = 2034.392, df = 66, p < 0.001)$ presented that the assumption of sampling adequacy and sphericity based on the size of the respondents has been achieved. Moreover, the calculated Cronbach's $\alpha = 0.941$ is within the limits suggested (Bland & Altman, 1997; DeVellis Robert, 2003; Gliem & Gliem, 2003; Nunnally, 1994). Table 4 presents the results of the communalities per item. Using parameters set by MacCallum et al (MacCallum et al., 2001; MacCallum et al., 1999), and Mundfrom, Shaw and Ke Mundfrom et al. (2005), the results show that wide communality pattern.

Presenting the results of the component matrix which determines the acceptance of items in the tool, it shows that all of the items are within the acceptable values to be included in the tool hence creating a single factor construct for the Filipino TSES (Jung, 2013). Considering the p/f ratio, the size of the respondents has able to satisfy the requirements of the factor analysis with a wide communality pattern under an excellent level criterion (0.98) (MacCallum et al., 2001; MacCallum et al., 1999; Mundfrom et al., 2005) (Table 6).

Table 5

Factor Loadings

Component	Initial Eigenvalues			Extraction of Sum of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.315	60.957	60.957	7.315	60.957	60.957
2	.857	7.141	68.098			
3	.678	5.649	73.747			
4	.649	5.411	79.158			
5	.498	4.150	83.308			
6	.395	3.293	86.601			
7	.358	2.979	89.581			
8	.348	2.897	92.478			
9	.258	2.148	94.626			
10	.235	1.958	96.584			
11	.233	1.938	98.522			
12	.177	1.478	100.000			

Table 6

Component Matrix

Component	1	2	3	4	5	6	7	8	9	10	11	12
1	.714	.788	.796	.744	.807	.788	.776	.832	.813	.812	.704	.783

4. Conclusion and Recommendations

The results showed that the TE of the respondents are above the middlemost score describing their level of efficacy as a lot with the average TE mean of 5.30 (SD=0.69) which shows that 97% chance that most of the respondents would most likely have scored better above the middlemost score indicating that majority of the teachers believes they can perform well with their efficacy above the middle standard. This trend is similarly observed with the individual items of the Filipino TSES. This trend is also similarly observed from Tschannen-Moran's TSES original construct with 98% chance of her respondents would score above the middlemost score and also with other TSES translations done (Duffin et al., 2012; Monteiro & Forlin, 2020; Tsui & Kennedy, 2009; Valls et al., 2020).

The test for correlation and difference showed a significant positive relationship of length of teaching experience towards teaching efficacy. This finding closely resembles the results of previous researches and further emphasizes the need for a teacher to practice their craft in order to improve their performance towards their assigned tasks (Fives & Buehl, 2009; Heneman III et al., 2006). These further stresses Bandura et al. (1994) postulation towards vicarious experiences as a direct source of self-efficacy as the years of practice makes teachers polish their pedagogies and educational philosophy. It further suggests the importance of pre-service teaching should learn to collaborate with teachers with greater length of experience as their higher TE aids in better mentoring and reflecting on the practice of teaching which in turn help in developing the teacher identity and personal maturity of pre-service and early career teachers as well (Brown et al., 2014; Duffin et al., 2012; Heneman III et al., 2006; Şenler, 2011).

Validating the factor construct of the Filipino TSES had that it satisfied the preliminary assumptions required in the conduct of EFA and had shown a single factor was extracted out of the process with a wide range of communality and excellent criterion. Single factor constructs were previously observed from other translations both in the short forms and long forms of the original TSES (Fives & Buehl, 2009; Ma et al., 2020). However, single factor TSES was better employed as a construct applicable to pre-service teachers and was emphasized that the TSES should a factor structure that adapts towards the teaching experience (Scherer et al., 2016). Ma et al. (2020) on the other hand, provides an alternate discussion as they believe that what causes for the original 3 factors to merge into a single factor is the subconscious integration of all the three factors

(Classroom Management, Managing Student Behavior, and Providing Instruction) into a single behavioral task being considered by the teacher while Tsui and Kennedy (2009) presented that upon doing a second order factor analysis a single factor is also extracted which indicates the merging of the factors. Furthermore, Scherer et al. (2016) tested the TSES among 32 countries has shown that the best construct to describe the tool in an international perspective is by adapting the single factor construct which appears to be the same of the results of the study. This implies that the teacher sees that all of the identified items in the TSES correlating with each other as a single correlating practice that affects the teachers' identity and philosophy towards the role of providing quality instruction and perform as model of guidance to learners.

The authors suggest to conduct a confirmatory factor analysis and exploratory structural equation model analysis to further deepen the analysis of the factor construct of the Filipino TSES. Involving in the validation of the tool should also include all members of the academe from pre-school to graduate level including pre-service teachers in the Philippines.

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