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Teacher self-efficacy: development, validity, and factorial invariance of a brief measure in Peruvian university professors

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Introduction: Teacher self-efficacy is understood as the set of beliefs regarding teachers' ability to exercise their role and have a positive effect on the learning of their students. Although this concept has been widely discussed in scientific literature; however, evaluating new instruments for its measurement is still necessary. This study develops and analyzes evidence of validity, factorial invariance, and reliability of a one-dimensional scale of self-efficacy for teaching among Peruvian university professors, comprised by 10 items.

Methods: A total of 529 university professors (men: 67.9%) participated, aged between 30 and 60 years. The Workload Scale and The Social Support at Work Scale were used for to evaluate convergent validity.

Results: The results revealed a satisfactory one-dimensional structure, invariant according to sex and age, and adequate internal consistency. Finally, expected associations were found with measures of workload and social support at work.

Discussion: In conclusion, the scale developed is a valid and reliable unidimensional measure to evaluate the level of perceived self-efficacy specific to teaching in Peruvian university professors.

KEYWORDS

teacher self-efficacy, factor analysis, invariance, reliability, university professors, Peru

1. Introduction

In recent years, there has been a growing interest in research on teacher self-efficacy—a variable that has been related to a series of significant results, both for the teaching practice and student learning and performance (Simes et al., 2023).

1.1. Self-efficacy and teacher self-efficacy

Self-efficacy is a person's belief in their abilities to organize and execute the courses of action required to produce specific achievements (Bandura, 1997; Fackler et al., 2021). In this sense,

teacher self-efficacy refers to teachers' beliefs about their ability to organize and execute actions required to successfully achieve specific teaching tasks in a particular context (Holzberger and Prestele, 2021). According to Bandura (1997), these beliefs are influenced by four sources from which the individual obtains information about their capacities (mastery experiences, vicarious experiences, social experiences, and physiological and affective states), with mastery experiences being the source with the most significant impact. This implies that teachers' own teaching experiences positively or negatively influence the configuration of more or less effective beliefs. In this way, self-efficacy is a learned belief system about a specific domain maintained in context, influencing how we evaluate a course of action (Bandura, 1997). Based on this, self-effective teachers believe that they can influence how well students learn, even though they may be difficult, unmotivated, or from challenging backgrounds (Lazarides et al., 2020).

Regarding the impact of teacher self-efficacy, previous evidence suggests that this variable shows positive links with teachers' behavior patterns, their practices related to classroom quality, and the factors underlying their psychological well-being, including personal achievements, job satisfaction, and commitment; meanwhile, negative associations were found with burnout factors (Zee and Koomen, 2016), including work overload (Skaalvik and Skaalvik, 2017). Furthermore, perceived social support among teachers has been linked to improving and maintaining their work-related self-efficacy (Bandura, 1997; Chung and Chen, 2018). Regarding the impact on student performance, teacher self-efficacy has been found to be associated with academic adjustment, motivation toward learning, and academic performance of students in school settings (Fackler and Malmberg, 2016; Zee and Koomen, 2016). At the university level, although the amount of previous research is significantly lower than that reported in the school context, teacher self-efficacy has been found to be positively related to commitment, job satisfaction (Han et al., 2021), and with the adaptation to virtual media (Minaya Herrera et al., 2022); meanwhile, it is negatively related to perceived stress (Yin et al., 2020) and workload (Minaya Herrera et al., 2022). In addition, it is positively associated with the quality of teaching perceived by students and their emotional experiences (Daumiller et al., 2021) and more active participation in the classroom (Fong et al., 2019).

1.2. Measuring teachers' self-efficacy

The direct associations of teacher self-efficacy with positive student learning outcomes and teachers' psychological well-being highlight the importance of this construct for psychology and education (Avanzi et al., 2013). Therefore, having valid and reliable tools for its measurement and approach is necessary; however, observations have been raised about the clarity in identifying the domains that constitute teacher self-efficacy and the precision and specificity of its measurement (Ma et al., 2023). In a meta-analytic study, Klassen et al. (2011) found that almost half of the 218 studies analyzed used measures that differed from Bandura's conceptualizations of teacher self-efficacy, as well as his recommendations for item construction (Bandura, 2006). For example, a conceptual problem frequently found in measures of teacher self-efficacy is that in some cases, the items do not reflect beliefs about one's current ability to perform a course of action (prospective ability), but are instead based on actions or past performance of teachers (Klassen et al., 2011).

One of the first instruments used to measure teacher self-efficacy is Gibson and Dembo's Teacher Efficacy Scale (TES) (1984), which, according to several authors (Tschannen-Moran and Woolfolk Hoy, 2001; Klassen et al., 2011), presents conceptual limitations, primarily that its items are based on teachers' beliefs about their control of student results but not on beliefs about teachers' abilities to teach students effectively.

Currently, the most widely used measurement instrument is the Teachers' Sense of Efficacy Scale (TSES; Tschannen-Moran and Woolfolk Hoy, 2001), the original construction of which comprises three dimensions: perceived efficacy in instructional practices, perceived efficacy in classroom management, and perceived efficacy in student adjustment. However, the dimensionality of the TSES should be studied in greater depth. For example, Koniewski (2018) emphasizes the importance of analyzing the factorial structure of the scale with each application, as it may require modifications when administered to different samples. Moreover, Ma et al. (2019), after an analysis of the methodological and psychometric problems of the TSES, indicate that its domains are inconsistent and fragile, identifying errors in the analysis as the use of orthogonal rotation when the subdomains were correlated.

In Peru, Dominguez-Lara et al. (2019) evaluated the internal structure of the TSES and factorial invariance in public school teachers of Regular Basic Education, finding that the three-factor model does not receive empirical support; meanwhile, the one-dimensional model presents a better fit, both in men and women. This finding is consistent with the results of previous studies, wherein high correlations were found between the subscales, which could suggest the overlapping of the three original factors and the presence of a higher-order construct (Tschannen-Moran and Woolfolk Hoy, 2001; Koniewski, 2018; Ma et al., 2019).

The dimensionality of other multidimensional scales that measure teacher self-efficacy has also been observed in recent studies that use advanced techniques for the evaluation of the instruments' factorial structures. For instance, Park et al. (2016) found that Teacher Efficacy for Inclusive Practices (TEIP) is essentially one-dimensional, based on the development of a two-factor model adjusted to the data. Furthermore, Pisanti et al. (2022), in a study of the psychometric properties of the Teacher Self-Efficacy Scale (Schwarzer et al., 1999) developed for Italian teachers found evidence in favor of the one-factor model, which is invariant according to gender, experience teacher, and level of education.

As can be seen, most current instruments of teacher self-efficacy are based on the specific domains of the tasks that teachers assume in the classroom, albeit there needs to be more consistency in the evidence of the psychometric dimensionality of such measures. This hinders its practical and theoretical utility as highly specific criteria can limit its predictive power for contexts that go beyond the specific capacities and situations being measured (Avanzi et al., 2013), considering that people tend to evaluate their self-efficacy toward specific tasks simultaneously with the evaluation of their general ability (Bandura, 2012). Although Bandura (2006) defends a multidimensional assessment of teacher self-efficacy, proposing a measurement scale that considers up to seven dimensions (namely, efficacy in influencing decision-making, efficacy in influencing school resources, educational efficacy, disciplinary efficacy, efficacy in getting

parents involved, efficacy in getting community involvement, and efficacy in creating a positive school climate); unfortunately, however, no evidence of the reliability and validity of this measure is reported (Avanzi et al., 2013).

In the university context, one of the few reported scales is the Faculty Teaching Efficacy Questionnaire (FTE), developed by Chang et al. (2011), which has six factors (namely, efficacy for course design, use of technology, instructional strategy, class management, interpersonal relationships, and learning assessment); however, there is no precise information on the psychometric evidence that supports the dimensionality proposed by the authors.

Indeed, the university teaching environment has characteristics that differentiate it from teaching at basic education levels (primary and secondary), making it necessary to design particular measurement instruments for this context. In the first place, university teachers, unlike their peers at the primary and secondary levels, are not required to receive formal training in education; thus, they have yet to be trained to perform functions related to instruction. Second, as promoting student autonomy should be a primary goal of the university educational process, parents' role is reduced. Additionally, it is expected that a university professor not only dedicates themselves to teaching but also assumes functions related to the production of knowledge and research, acknowledging research training as a transversal component in all current university curricula (Criollo et al., 2017). In this regard, Bailey (1999) found that self-efficacy for research and self-efficacy for teaching in university teachers are two independent constructs such that a teacher can be effective in teaching processes but not in their own activities of the investigation. In the present study, we focus solely on teachers' teaching role.

In the Peruvian university scenario and, in general, in developing countries, the study of teacher self-efficacy becomes fundamental owing to fewer resources and concerns pertaining to the quality of university education, which increase the expectations that society has about teachers' performance to respond to international standards and, with this, guarantee the training of professionals with skills articulated according to the needs of each country.

1.3. This study

One of the most widely used instruments for measuring self-efficacy in the Peruvian context is the Scale of Perceived Self-efficacy Specific to Academic Situations (*Escala de Autoeficacia Percibida Específica de Situaciones Académicas* [EAPESA]; Palenzuela, 1983), in its version adapted to the Peruvian university environment (Dominguez-Lara, 2014). This instrument has been widely used because it is a brief and one-dimensional tool to measure academic self-efficacy, and its psychometric properties in different contexts have been showed to be adequate by previous studies (García-Fernández et al., 2010; Dominguez-Lara, 2014; Dominguez-Lara et al., 2023). Therefore, considering that research on the measurement of teacher self-efficacy in the Peruvian university context is limited, the purpose of this study is to develop and validate the Specific Perceived Self-efficacy Scale for Teaching (*Escala de Autoeficacia Percibida Específica para la Docencia* [EAPED]) in Peruvian university professors, based on the adaptation of the EAPESA items, incorporating a general domain, recent advances in the measurement of teacher self-efficacy and current methodological recommendations for exploring the factorial structure of the instruments.

Moreover, the following specific objectives have been established: (1) Obtaining evidence of the validity based on the content of the measurement instrument developed; (2) Evaluating the one-dimensional internal structure of the EAPED; (3) Examining whether the internal structure of the EAPED is invariant concerning gender and age; and (4) Obtaining evidence of validity based on the relationship with other variables, examining the relationship of EAPED scores with measures of workload and social support at work.

2. Methods

2.1. Design

This study corresponds to a cross-sectional instrumental investigation (Ato et al., 2013), as a measurement instrument was developed and validated considering its main psychometric properties.

2.2. Participants

This study had the participation of 529 university professors who taught in public (21.2%) and private (78.8%) universities: men and women (67.9% men), whose ages ranged from 30 to 60 years; 74.3% of the professors had a master's degree; 19.5% a doctorate, and 6.2% a bachelor's degree. Additionally, 74.9% were full-time staff. The selection of the professors was conducted using an intentional non-probabilistic sampling.

2.3. Instrument design

2.3.1. Specific perceived self-efficacy scale for teaching

For the development of the instrument and the writing of the items, the review of one-dimensional scales that measure self-efficacy and have demonstrated satisfactory psychometric properties was taken as a reference, particularly the version adapted to the Peruvian university context of the EAPESA (Dominguez-Lara, 2014). The EAPESA is a unidimensional measure of beliefs related to academic self-efficacy, comprising 10 items with 4 response options (from *Never* to *Always*). Additionally, for EAPED's design, Bandura's (2006) recommendations for the construction of items were followed, concerning mainly the use of verbs such as "to be able" or "to be capable of" to capture the perceived capacity of and usability for the first person. Based on this, considering the roles and challenges of the university professor in the Peruvian context, the EAPED was designed, comprising 10 items on a Likert-type scale with 4 response options (1 = *Never*, 2 = *Rarely*, 3 = *Sometimes*, 4 = *Always*).

2.3.2. Workload scale

This is a unidimensional measure of workload; the version validated for the Peruvian context by Calderón De la Cruz et al. (2018) presents six items on a Likert-type scale with five response options

(i.e., *Never*, *Rarely*, *Sometimes*, *Frequently*, and *Very frequently*). This study's data presented good reliability indicators (α = 0.850; ω = 0.854).

2.3.3. Social support at work scale

This scale is included in the UNIPSICO test battery; the version validated in Peruvian workers by Calderón-De La Cruz et al. (2019) comprises six items with Likert-type options: 0 = *Never*, 1 = *Rarely: a few times a year*, 2 = *Sometimes: a few times a year*, 3 = *Frequently: a few times a week*, and 4 = *Very frequently: every day*. This study's data presented good reliability indicators (α = 0.886; ω = 0.887).

2.4. Procedure

The research was approved by the Ethics Committee of Graduate School of the Universidad Peruana Unión (Reference: 2023-CE-EPG-0054). To collect information, a virtual questionnaire was designed through the Google Forms platform. The link was distributed through social networks, such as Facebook and WhatsApp. In the first section of the questionnaire, informed consent was presented, in which the objective of the study and the anonymous and voluntary nature of participation in this study were disclosed.

2.5. Data analysis

Initially, the database was coded to perform the initial descriptive analysis and thus obtain the measures of central tendency with the mean (M), variability with standard deviation (SD), and shape with skewness (g1) and kurtosis (g2). Regarding the latter, values of g1 < 3 and g2 < 10, both with absolute values, are considered as data with no significant deviations from normality (Kline, 2016). We later obtained the matrix of polychoric correlations taking into account the ordinal nature of the items. As for the psychometric aspects, the content-based validity evidence was analyzed through the Aiken V coefficient (Ventura-León, 2019). For the analysis of the internal structure, confirmatory factor analysis (CFA) was applied, considering the ordinal nature of the items by calculating the matrix of polychoric correlations. The estimator used was the weighted least squares means and variance adjusted (WLSMV), a recommended procedure for ordinal variables (Beauducel and Herzberg, 2006; Gana and Broc, 2019). The global evaluation of the fit of the model was obtained with the comparative fit index (CFI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR). CFI values >0.90 are interpreted as favorable evidence of fit to the model (Bentler, 1990), similarly RMSEA <0.080 (MacCallum et al., 1996) and SRMR <0.080 (Browne and Cudeck, 1992). The recommendations of Wu and Estabrook (2016) and Svetina et al. (2020) were used for the measurement invariance analysis and the analysis of invariance for ordinal variables, respectively. Thus, three restrictive models were evaluated hierarchically between the groups according to gender and age group, these being the configural, threshold, and threshold and loading invariance, all of them tested using WLSMV estimator for ordinal data. Additionally, for measurement invariance testing, a set of criteria were evaluated, comprising a change in CFI < 0.010, RMSEA <0.015, or SRMR <0.005 (Chen, 2007). Then, for the reliability analysis, the internal consistency method was considered with the omega coefficient (ω), considering values greater than 0.70. Finally, the association between the EAPED scores and the workload and social support scales at work were performed using Pearson's correlation coefficient (*r*), assessing its magnitude as significant if it is greater than 0.20 (Ferguson, 2009).

The statistical analysis was conducted using the "R" program version 4.2.2, specifically with the "lavaan" library in its version 0.6–13 (Rosseel, 2012).

3. Results

Given that the EAPED items were written, considering the adaptation of the EAPESA items, through the judgment of seven experts and by calculating Aiken's V, evidence of validity was obtained based on the content of the items of the EAPED. All items were found to be clear, representative, and relevant (V > 0.70).

Meanwhile, before the structural analysis, the descriptive results and the polychoric correlation matrix of the items were obtained, as shown in Table 1. Initially, the asymmetry (g1) and kurtosis (g2) values were observed, which were within the suggested values; that is, being less than 3 and 10 in their absolute values, respectively (Kline, 2016). The intercorrelations are between the values of 0.78 and 0.96.

Regarding the results of the CFA, the one-dimensional structure of the instrument was evaluated, finding an adequate fit: $\chi^2(35) = 114.6$, $p < 0.001$, CFI = 0.998, RMSEA = 0.066, and SRMR = 0.023. The resulting factor loadings were between 0.90 and 0.9, displayed in Table 2. The result of internal consistency in this one-dimensional configuration was ω = 0.985.

In the measurement invariance analysis, initially, the adjustment for the two groups determined by sex was evaluated. Subsequently, these were joined to estimate and assess the first level of invariance. The configurational invariance resulted in an acceptable fit ($\chi^2[70] = 182.2$, $p < 0.001$, CFI = 0.997, RMSEA = 0.078, SRMR = 0.027), continuing with the invariance levels proposed for equal threshold and equal loading and threshold, noting that the criteria for changes in the CFI, RMSEA, and SRMR were met (Chen, 2007). Similarly, the invariance analyses of the measurement according to the age group was also conducted. Adequate values in the differences of the adjustment indices were obtained, and equivalence up to the suggested level of equal loading and thresholds for ordinal variables was confirmed. Table 3 presents these results.

Finally, as evidence of validity based on the relationship with other variables, convergent validity was evaluated, obtaining significant correlations between teacher self-efficacy scores and the workload measure ($r = -0.23$, $p < 0.001$). as well as between teacher self-efficacy scores and the measure of social support at work ($r = 0.21$, $p < 0.001$).

4. Discussion

According to the findings in various studies and contexts, teacher self-efficacy seems to be one of the variables with the most significant predictive power of positive teacher behavior (Tschannen-Moran and Woolfolk Hoy, 2001), student motivation and academic achievement (Tschannen-Moran and Woolfolk Hoy, 2001; Mojavezi and Poodineh, 2012), and the anticipation of a teacher's later successes (Bandura, 1997).

TABLE 1 Descriptive and polychoric correlations of the scale items.

Variables	*M*	*SD*	g1	g2	1	2	3	4	5	6	7	8	9	10
Item 1	3.7	0.5	−1.8	3.8	–									
Item 2	3.7	0.5	−1.7	3.1	0.90	–								
Item 3	3.7	0.5	−1.9	4.3	0.87	0.87	–							
Item 4	3.6	0.5	−1.3	1.5	0.82	0.82	0.86	–						
Item 5	3.7	0.5	−1.6	2.7	0.81	0.79	0.83	0.85	–					
Item 6	3.7	0.5	−1.7	2.9	0.86	0.88	0.89	0.86	0.86	–				
Item 7	3.7	0.5	−1.5	2.1	0.80	0.85	0.82	0.86	0.87	0.94	–			
Item 8	3.6	0.6	−1.5	2.2	0.78	0.83	0.84	0.86	0.86	0.89	0.89	-		
Item 9	3.7	0.5	−1.9	3.9	0.87	0.88	0.89	0.85	0.89	0.95	0.91	0.90	–	
Item 10	3.7	0.5	−1.7	2.9	0.84	0.83	0.86	0.86	0.85	0.96	0.90	0.88	0.94	–

M, Mean; SD, Standard Deviation.

TABLE 2 Factor loadings of the standardized solution of the confirmatory factor analysis for the final model.

Item	Factor loading
01. I consider myself sufficiently qualified to successfully face any task in my role as a teacher.	0.90
02. I think I can plan and design the teaching–learning process of the courses I teach.	0.91
03. I feel confident to address situations that test my ability as a teacher.	0.92
04. I am convinced that I can obtain good results in the evaluation that the students make of my performance.	0.91
05. Even with demanding students, I am confident in my ability to motivate them for their learning.	0.91
06. I believe that I am a qualified and competent teacher.	0.98
07. I think I have adequate ability to get good grades in my evaluation as a teacher.	0.94
08. I think I can do my teaching job quite easily and even get credit for it.	0.93
09. I feel confident in my skills to carry out teaching successfully.	0.97
10. I believe that I am prepared and qualified to achieve many successes as a teacher.	0.96

The results show the importance of having valid and reliable tools for its measurement and approach, either to build a baseline on the behavior of this construct in Peruvian university professors, which supports institutional decision-making, or to fill the gaps in local research in this field. In this context, this study aims to develop and validate EAPED in Peruvian university professors, based on the adaptation of the EAPESA items.

After obtaining favorable evidence of the representativeness, relevance and clarity of the items created from the EAPED, through expert judgment criteria, the analysis of the psychometric properties revealed acceptable results. First, regarding the validity based on the internal structure, the CFA allowed us to obtain evidence in favor of the unifactorial model, with acceptable factor loads and adequate reliability. In other words, the EAPED items constitute appropriate and consistent indicators to measure self-efficacy for teaching as the only latent trait; thus, teachers participating in this study perceived their performance in teaching from an integrating perspective. This result is consistent with previous findings that corroborate the one-dimensionality of the EAPESA (Dominguez-Lara, 2014), an instrument from which the EAPED items were constructed. Additionally, although these results cannot be directly contrasted with the findings of previous studies as it is a new instrument, it is possible to affirm that they are consistent with those of previous studies that find evidence supporting the one-dimensionality of instruments designed to measure teacher self-efficacy in a multidimensional way (Park et al., 2016; Koniewski, 2018; Dominguez-Lara et al., 2019; Ma et al., 2019; Pisanti et al., 2022).

Regarding measurement invariance, the results indicate that the EAPED is invariant between sexes and between age groups; that is, the structural properties of the EAPED are equivalent for men and women and for different age groups. These results make it possible to conduct comparative studies on sex or age groups. Although the EAPED is a new instrument, previous studies had already corroborated the factorial invariance according to sex (Dominguez-Lara et al., 2019; Pisanti et al., 2022) and according to years of teaching experience (Pisanti et al., 2022) of other measures of teacher self-efficacy.

Regarding the evidence of concurrent validity, the results show that the EAPED scores correlate significantly and in a negative sense with the measure of workload, which is consistent with previous evidence that reports negative associations between teacher self-efficacy with the teachers' perceived stress (Yin et al., 2020) and burnout factors (Zee and Koomen, 2016), including work overload (Skaalvik and Skaalvik, 2017). Further, it is consistent with previous findings that show that professional self-efficacy is negatively associated with the workload of university professors (Minaya Herrera et al., 2022). Similarly, significant and positive correlations were found between the EAPED scores and the measure of social support at work. This result is consistent with previous studies that report perceived social support in groups of teachers as a predictor of teacher self-efficacy (Chung and Chen, 2018).

This study was not exempt from the limitations reported below and from which recommendations for future research can be derived. First, the type of sampling used limits the generalization of the results; thus, future studies are recommended to explore the psychometric properties of the EAPED in representative samples of Peruvian university professors. Second, as the data were collected in a single moment, the reliability of the EAPED could only be explored from the perspective of

TABLE 3 Measurement invariance of the final model regarding gender and age group.

Model invariance	χ^2(df)	CFI	RMSEA	SRMR	ΔCFI	ΔRMSEA	ΔSRMR
Gender							
Configural	182.2(70)	0.997	0.078	0.027			
Equal thresholds	175.5(80)	0.998	0.067	0.027	0.001	0.011	0.000
Equal loadings and thresholds	181.3(89)	0.998	0.063	0.027	0.000	0.004	0.000
Age group							
Configural	165.1(70)	0.998	0.072	0.028			
Equal thresholds	171.0(80)	0.998	0.066	0.028	0.000	0.006	0.000
Equal loadings and thresholds	172.7(89)	0.998	0.060	0.028	0.000	0.006	0.000

df, Degree of freedom; CFI, Comparative fit index; RMSEA, Root mean square error of approximation; SRMR, Standardized root mean square residual.

internal consistency, pending the evaluation of the temporal stability of the measure through the test–retest process; additionally, the information on the reliability of the instrument may be expanded through the execution of other methods, such as that of the two halves. Third, the exclusive use of self-report measures for data collection may have generated biases associated with the social desirability of the participating teachers; thus, future studies must consider the control of social desirability and the use of external criteria as sources of validity, such as the interview with the supervisors or the opinion of the students who oversee the teachers. Fourth, although convergent validity was explored considering other measures of variables conceptually associated with teacher self-efficacy (workload and social support at work), it would be relevant to evaluate this validity evidence taking into account other instruments that measure the same construct (teacher self-efficacy). Unfortunately, this procedure was not carried out in this study, since few measurement instruments have solid psychometric properties to be considered valid external criteria in the Peruvian context. Lastly, having corroborated the factorial invariance of the EAPED concerning gender and age, it is also recommended that future studies evaluate the existence of differences in teacher self-efficacy scores between men and women, and according to age ranges, in addition to the execution of predictive or explanatory studies that allow studying the relationship between teacher self-efficacy, measured with the EAPED, and the results in the work performance of university professors.

Despite the limitations mentioned above, the study results have certain implications, as they provide a new measure of perceived self-efficacy toward teaching. Therefore, it can be affirmed that the EAPED scale shows favorable psychometric properties for measuring self-efficacy for teaching in Peruvian university professors, presenting some advantages compared with previously developed instruments. Among them is its factorial simplicity that is consistent with recent empirical evidence (Schwarzer et al., 1999; Park et al., 2016; Koniewski, 2018; Ma et al., 2019; Pisanti et al., 2022). Additionally, it is an instrument that is easy and quick to apply owing to its brevity, compared with other measurement tools (Gibson and Dembo, 1984; Tschannen-Moran and Woolfolk Hoy, 2001; Chang et al., 2011; Ma et al., 2023). Finally, it uses a language that can be used for samples of university professors who are dedicated to teaching in different areas of knowledge, which broadens its functionality.

In conclusion, the EAPED scale is a valid and reliable unidimensional measure to evaluate the level of perceived self-efficacy specific to teaching in Peruvian university professors. This study's main contribution is providing a useful measurement tool that allows evaluating one of the variables of importance in the educational context.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by Ethics Committee of Graduate School of the Universidad Peruana Unión (Reference: 2023-CE-EPG-0054). The patients/participants provided their written informed consent to participate in this study.

Author contributions

SL-H and RC-E contributed to conception and design of the study. SL-H drafted the initial manuscript. OM-B wrote parts of the introduction and revised the manuscript at different timepoints. RC-E and RC-B wrotes diferent parts in the whole manuscrit and performed the statistical analysis and the interpretation of the results. IC-O and JR-S were responsible for material preparation, data collection and draft of the manuscript. All authors contributed to the article and approved the submitted version.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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