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Development and Validation of the Questionnaire of Self-efficacy Sources for Primary School Teachers

Peter Gavora*

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Abstract:
Introduction: Self-efficacy is a person's subjective belief about their level of ability. According to Albert Bandura (1997), the author of this concept, self-efficacy is a very powerful mental tool influencing a person's performance. This study focused on assessing the sources that strengthen teacher self-efficacy. Research instruments for measuring these sources have had validity problems and have therefore produced inconclusive results.
Methods: This study evaluated the properties of the SSE-CZ, a sources of self-efficacy questionnaire developed for Czech primary school teachers.
Results: The SSE-CZ was administered to 984 teachers to check its psychometric properties. Using both exploratory and confirmatory factor analyses, results revealed a four-factor solution with a good model fit.
Discussion: The four-factor solution corresponds to Bandura´s efficacy sources of mastery experience, vicarious experience, emotional state and social persuasion.
Conclusions: Though the current study was primarily focused on a research tool validation, it resulted in empirical evidence of the Bandura´s theory of the strengths of efficacy sources in enhancing primary-school teachers' self-efficacy.

Key words: sources of self-efficacy, teacher self-efficacy, cultural context, questionnaire development, primary school teachers.

* Peter Gavora, Faculty of Arts, Comenius University, Bratislava, Slovakia; gavora.p@gmail.com; ORCID: 0000-0002-8352-033X

Introduction

This study addresses the methodological as well as cultural challenges inherent in the exploration of teacher efficacy sources by providing a new questionnaire to assess efficacy sources of Czech primary school teachers. There are two main reasons why we developed a new efficacy sources questionnaire instead of using an existing one. The primary reason was that the existing questionnaires, mentioned bellow, were developed in diverse countries, such as Brazil, Greece, Finland, Japan or North America, and they do not fit other educational environment. If translated, it would be difficult, if not impossible, to provide realistic equivalents of these questionnaires. To avoid the equivalence problem, methodology experts recommend to use translation and back-translation of questionnaire items, whereby the original questionnaire form is translated into a new language and then it is converted to the original language to test the quality of the first translation. This requires semantic modification of items, omission of some items or inclusion of new items. This process is sometimes more problematic than constructing a new questionnaire. The other important reason for developing a new questionnaire was that the existing efficacy sources questionnaires have methodology problems, described bellow, inherent in their construction. We used appropriate validation procedures to assess the construct validity of the new questionnaire, thus lending it credibility.

1 Self-efficacy and its sources

Self-efficacy is an important factor in explaining intentional human behaviour (van Dinther et al., 2011; Gallagher, 2012; Schunk & DiBenedetto, 2023). This concept was originally developed by Bandura (1997) within his social cognitive theory and was defined as the "beliefs in one's capacity to organize and execute the courses of action required to produce given attainments" (p. 3). In essence, Bandura postulated that peoples' beliefs about their ability to perform an action significantly influence whether or not they will persist when obstacles occur and accomplish the task. In a similar way, teacher self-efficacy is the belief about teachers' abilities to promote student engagement and learning, despite difficulty (Tschannen-Moran & Woolfolk Hoy, 2001). In the past few decades, self-efficacy has been widely explored to determine its relationship to teacher behaviour in the classroom and, consequently, to pupils' academic and behavioural outcomes (Caprara et al., 2006; Klassen et al., 2011; Klassen & Tze, 2014; Holzberger et al., 2013; Ma et al., 2025; Miao et al., 2025; Zee & Kooman, 2016).

Bandura (1997) not only defined personal self-efficacy but also suggested how individuals can improve it or cause it to deteriorate. He proposed that they affect their efficacy by interpreting information from four primary sources. Applied to the educational sphere, (1) mastery teaching experiences are situations in which teachers demonstrate their own teaching success, thus proving that they are

competent teachers; (2) vicarious experiences are teachers learning from observations of successes of other teachers; (3) social persuasion occurs when colleagues and superiors suggest that a teacher can teach successfully; (4) the physiological and emotional states of a teacher influence efficacy judgement. Positive states provide excitement and enthusiasm as cues about anticipated teaching success. Negative states can lead to damaging judgments of a teacher's abilities and skills.

Scholars found both theoretical and practical importance in exploring how and to what extent efficacy sources influence teachers' instructional capabilities. However, the results of these studies are inconclusive, stemming from their number, relationship, and relative power (Bautista, 2011; Brickman & Olsson, 2021; Bruce & Ross, 2008; Morris & Usher, 2011; Mulholland & Wallace, 2001; Weng Hoi et al., 2017; Yada et al., 2019;). This weakness can be attributed to the diverse operationalisation of efficacy sources, the degree of their specificity, measurement approaches (Morris et al., 2017) as well as the professional characteristics of the teacher samples used. Studies also showed the role of cultural context in determining the strengths of efficacy sources. Teachers working in varied school systems have dissimilar teaching conditions, resources and constraints (Franks et al., 2025). They also may receive unequal feedback from colleagues, administrators, and parents (Tschannen-Moran et al., 1998). The concept of efficacy sources is culturally based and can be comprehensively understood if explored in different countries (Klassen et al., 2009; Lin et al., 2002; Yada et al., 2019).

In the Czech Republic, several teacher self-efficacy scales have been developed or adapted. For instance, Straková et al. (2020) introduced a questionnaire assessing teacher beliefs in their ability to motivate students, foster student self-belief, and maintain classroom discipline. Smetáčková et al. (2017) constructed a self-efficacy scale for primary school teachers, while Fico (2023) adapted the Norwegian Teacher Self-Efficacy Scale (NTSES) specifically for the lower secondary level. More recently, Pivarč (2026) employed the Teacher Efficacy for Inclusive Practices (TEIP) questionnaire across preschool, primary, and secondary contexts. Additionally, Gavora et al. (2024) utilized the Czech version of the OSTES alongside an instrument designed to measure the underlying sources of primary school teachers' self-efficacy.

2 Nature and quality of existing measures

Rating scales to assess teacher efficacy sources were developed and administered in a number of countries, such as Brazil (Furtado Nina et al., 2016), Greece (Polou, 2007), Finland and Japan (Savolainen et al., 2012; Yada & Savolainen, 2017), Taiwan (Lin & Tsai, 2013) or the United States (Kiefer & Henson, 2000; Usher & Pajares, 2009). Only a few of them were developed to assess the efficacy sources

of primary school preservice and in-service teachers (Morris, 2010; Poulou, 2007; Weng Hoi et al., 2017). The methodological quality of these instruments varies. Morris et al. (2019) expressed concern about shortcomings they found in 82 studies they reviewed. Some instruments focused on one or two but not on all efficacy sources as conceptualised by Bandura, while others combined several efficacy sources, thus preventing identification of the effect of each of them on teacher self-efficacy (e.g., in Poulou, 2007). Some studies used both positively and negatively framed instrument items, which presumably confused respondents, causing poor validity and low reliability of the scale (e.g., Kieffer & Henson, 2000). The message of the reviews of Morris et al. (2019), Täschner et al. (2024) and Duan et al. (2024) is that there is a need to develop theoretically well-based and valid measures in order to produce findings that enable a better understanding of how efficacy sources contribute to the improvement or deterioration of teacher self-efficacy.

This study contributes to the understanding of the empirical complexity of efficacy sources by presenting an instrument to measure teacher efficacy sources of primary school teachers. The instrument is constructed to assess all rather than some efficacy sources. It consists of items that appraise the current teacher experiences or states rather than their past experiences, and its items are positively worded.

3 The current study

3.1 Aims

The aim of the study is (1) to develop a questionnaire measuring the efficacy sources of Czech primary school teachers, (2) to explore its psychometric qualities, and (3) additionally, to identify the extent to which the Czech primary school teachers rate the four efficacy sources, theoretically proposed by Bandura (1997).

3.2 Participants

Participants were 984 grade 1 to grade 5 teachers in the Czech Republic. The sample represents the statistical distribution of public primary school teachers in both urban and rural areas. Most of the teachers (96.4%) were female. Among the participants, 88.5% had a master's degree, 2.7% had a bachelor's degree, 2.2% had completed upper secondary school, 1.1% had a PhD degree, and 2.6% were pre-service teachers. The majority of teachers (59.2%) had more than 20 years of practice, 19% of teachers had 10 to 20 years of practice, 9.7% of teachers had 5 to 10 years of practice and 12.2% of teachers had less than five years of practice. They taught in schools with the mean of 12 teachers per school (max. 55; min. 1; SD=7.55).

3.3 Measure

The Sources of Self-Efficacy Questionnaire, labelled as SSE-Cz, was constructed in several steps. An in-depth literature review was conducted in the research area of efficacy sources. Published questionnaires related to teachers' efficacy sources in a variety of national school systems were inspected for comparison. Finally, based on Bandura's (1997) theoretical tenets, a pool of 42 items was created that cover the four sources of self-efficacy. They were framed as follows:

- Mastery experience covered items rating a teacher's successes rather than failures, e.g., "I succeed teaching even a complicated topic." Items relate to teacher experiences, such as creating a classroom atmosphere, giving interesting presentations, motivating pupils, or cooperating with parents.
- Vicarious experience included items that compared one's teaching with that of important persons. Their characteristics ranged from neutral ("colleagues") to high attributes like "excellent", "master", "successful" or "experienced" teachers, e.g., "I observe classes of excellent teachers to be inspired by new ideas." As recommended by Bandura (1997), items about teacher indirect experience through video were included.
- Social persuasion comprised items of a teacher's appreciation by colleagues and superiors, e.g., "The principal praises the way I teach." The items expressed a specific manner of persuasion (praise, appreciation, acknowledgment) rather than a neutral statement like "receiving feedback from colleagues." Items included teacher appreciation by pupils' parents.
- Emotional state contained items that assessed favourable emotions in teaching, e.g., "I enjoy spending a day teaching children." The items rated the extent of a teacher's enjoyment, satisfaction, or pleasant moments in school.

Mastery experience items used a six-point scale ranging from "not at all likely" to "a great deal." Vicarious experience, social persuasion, and emotional state were rated on a six-point scale from "never" to "very frequently." A score for each dimension is obtained by averaging responses across all items. The higher the score, the larger the impact of the particular efficacy source.

Teachers filled in an electronic version of the questionnaire. They were invited to participate voluntarily with no reward or incentive. They were informed that their responses would be anonymous and that all provided information would be treated as confidential. They were also informed that the questionnaire would not be analysed at the individual level and that aggregated data would not allow the identification of any specific person. Participants had the right to decline participation or to withdraw from the study at any time. Informed consent was indicated by the completion of the questionnaire.

4 Results

4.1 The factor structure of SSE-Cz

To examine the factor structure of the SSE-Cz, an exploratory analysis (EFA) was conducted in IBM SPSS 28. Solutions were evaluated on the basis of multiple criteria: Bartlett's test, KMO test, McDonald's omega coefficients of reliability greater than .70, and simple structure with mutually exclusive items to factors. Both the Bartlett's test (p=0.000) and KMO results (0.947) appeared to be adequate, so we proceeded to the analysis. Principal axis method of extraction with items loading set at 0.40. Oblimin rotation was used with default Delta value at 0 so that correlation between factors was allowed but not maximized. The scree plot indicated 4 or 5 factors. The first round of the EFA suggested seven factors, which was not a clear solution. Therefore, we gradually reduced the number of factors in order to obtain more viable results. Four factors showed the most meaningful solution. The factor items fitted well with the theoretically set efficacy sources. In this solution, the mastery experience had 15 items with loadings ranging from 0.446 to 0.758, vicarious experience had nine items with loadings ranging from 0.494 to 0.847, emotional state had nine items with loadings ranging from 0.578 to 0.904, and social persuasion included six items with loadings ranging from 0.431 to 0.927. The four factors explained 52.5% of the overall variance. Because the mastery experience factor had proportionally too many items, seven items were excluded that had the lowest loading, thus resulting in nine items in this factor. The emotional factor explained the largest amount of the variance (16%), followed by mastery experience (14.9%), vicarious experience (11.3%) and social persuasion (10.3%). The result of the EFA is presented in Table 1.

Table 1

The Pattern matrix of the exploratory factor analysis of SSE-Cz

		Emotional states	*Vicarious experiences*	*Social persuasion*	*Mastery experiences*
S32	Working with children brings me enjoyment.	**0.904**	0.019	0.003	-0.066
S38	I feel comfortable in class.	**0.881**	0.030	-0.005	-0.050
S35	Teaching gives me satisfaction.	**0.864**	0.014	0.027	0.017
S42	The time spent at school gives me satisfying experiences.	**0.860**	0.047	-0.004	-0.024
S24	I feel relaxed while teaching.	**0.797**	0.030	0.092	-0.038
S21	Working with children gives me energy.	**0.779**	0.042	0.035	0.067
S14	Teaching gives me pleasant moments.	**0.762**	0.038	0.010	0.017
S17	I look forward to spending the day with the children.	**0.680**	-0.035	0.030	0.176
S27	Teaching energizes me.	**0.578**	-0.012	0.037	0.212

S29	I am inspired by the experience of quality teachers.	-0.022	**0.847**	-0.044	-0.068
S31	Seeing the work of an experienced teacher, I get excited about their ideas.	0.048	**0.791**	0.057	-0.085
S12	I look for presentations or videos of excellent teachers for comparison.	-0.029	**0.701**	-0.097	0.096
S39	I observe classes of excellent teachers to be inspired by new ideas.	0.184	**0.685**	-0.001	-0.013
S40	I look for colleagues who are a great class leader in order to learn from them.	-0.023	**0.680**	-0.002	-0.038
S15	Teaching of my colleagues motivates me to improve professionally.	0.152	**0.622**	-0.044	0.026
S36	I go to model teacher classes to compare their approach with mine.	-0.061	**0.571**	0.091	0.026
S22	Seeing my colleagues teach well strengthens my professional commitment.	0.096	**0.545**	0.021	0.010
S26	I compare my teaching skills with those of my colleagues.	-0.031	**0.494**	0.149	0.034
S20	The principal praises the way I teach.	0.035	-0.026	**0.927**	-0.017
S33	Colleagues say that I am a valid member of the teaching staff.	0.007	0.023	**0.881**	0.010
S25	The principal appreciates my expertise.	0.105	-0.028	**0.870**	-0.099
S13	The school administrators appreciate my work for the school.	0.025	-0.074	**0.840**	-0.030
S18	The principal highly acknowledges my professional erudition.	0.020	0.072	**0.546**	0.102
S30	Colleagues turn to me for professional advice.	-0.034	0.271	**0.506**	0.185
S34	Colleagues appreciate my expertise.	-0.001	0.185	**0.431**	0.197
S10	I do well in class.	-0.040	-0.032	0.025	**0.758**
S9	I can create a favourable atmosphere in the classroom.	0.044	-0.007	-0.029	**0.725**
S5	I can attract pupils with an interesting presentation of the topic.	0.074	-0.033	-0.045	**0.717**
S3	In on-line learning, I manage to keep pupils motivated.	0.023	0.097	-0.040	**0.665**
S6	I am satisfied with how I manage the class.	-0.089	-0.022	0.078	**0.638**
S2	In on-line learning. I can teach pupils effectively.	0.124	0.010	-0.036	**0.610**
S4	I am a good teacher.	-0.055	0.005	0.036	**0.571**
S1	I can teach well even a difficult topic.	0.176	-0.041	-0.015	**0.540**
S11	I can cooperate with parents during on-line learning.	0.021	0.042	0.056	**0.478**

Note: Items wording translated from Czech.

4.2 Invariance measurement of the SSE-Cz

To further validate the SSE-Cz, an invariant measurement was performed with two groups of participants. Measurement invariance implies that using the same questionnaire in different groups of participants measures the same construct in the same way. We chose teachers' years of practice as a group selection criterion. Group A was composed of teachers with up to 20 years of practice (n=402, or 40.9% of the full sample), and Group B included teachers with 20+ years of practice (n=582, or 59.1% of the full sample). Invariant measurement was performed in IBM SPSS AMOS 26.

To follow the recommendation of Byrne (2012), separate confirmatory factory analyses (CFAs) were conducted first with the two groups to confirm that the invariance measurement analysis is feasible. The fit indexes were reasonably good. For Group A, the fit indexes were $\chi 2/df=2.496$, $p<.000$, RMR=0.065, CFI 0.912 and RMSEA=0.061. For Group B, the fit indexes were $\chi 2/df=3.001$, $p<0.000$, RMR=0.077, CFI=0.906 and RMSEA=0.067. Hence, we can conclude that the four factors model showed a satisfactory fit both for Group A and Group B teachers. Thus, the invariant measurement can be performed.

The analysis was conducted creating nested models with configural invariance, metric invariance, scalar invariance and residual invariance (Byrne, 2012). The models are ordered from unconstrained (configural) to most constrained (residual). Assessment of measurement invariance was based on the model fit indexes and the changes in CFI and RMSEA values from less constrained to more constrained model. While there are numerous goodness-of-fit indexes to interpret measurement invariance, according to Byrne (2012), the most relevant are $\chi 2/df$, p of $\chi 2/df$, CFI, RMSEA, and the comparative changes in models with increasing constrains. Cheung and Rensvold (2002) recommend changes in RMSEA<0.015 and CFI<0.01 as cut off values. As a non-significant χ^2-statistic is unlikely given the large sample size (Vandenberg & Lance, 2002), it will not be used as a decisive indicator of model fit.

Following the recommendation of Byrne (2012), first, the configural invariance model (Model 1) was examined. The results showed adequate fit indexes $\chi 2/df=2.893$, $p=0.000$, CFI=0.914, RMSEA=0.044, indicating that the factorial structure of SSE-Cz remained invariant in the two compared groups. Model 2 proposed equivalence in the matrix of factor loadings (metric invariance) in both groups of participants. The model showed $\chi 2/df=2.846$, $p=0.000$, CFI=0.914, RMSEA=0.043, ΔCFI=0.000 and ΔRMSEA=0.001, indicating very similar fit indexes to the ones obtained in Model 1. Model 3 assessed the correspondence between intercepts. Again, the fit indexes showed equivalent values to the ones of Model 2 ($\chi 2/df=2.824$, $p=0.000$, CFI=0.914, RMSEA=0.043), ΔCFI=0.000 and ΔRMSEA=0.000. Therefore, the invariance of intercepts between the two groups

was supported. In Model 4, the variances and covariances of the error were restricted to be equal between the groups (residual invariance). The fit indexes showed adequate fit values ($\chi 2/df=2.804$, $p=0.000$, CFI=0.912, RMSEA=0.043, ΔCFI=0.002, ΔRMSEA=0.000). Because CFI and RMSEA did not exceed the recommended incremental value, the invariance of the residuals was fully supported. In sum, the gradual changes in CFI and RMSEA in the models met the criteria of invariant measurement. Thus, we can conclude that SSE-Cz proved reasonably good invariance measurement characteristics.

To sum up the validation results, the SSE-Cz consists of 34 items, with 9 items in emotional state (McDonald's omega 0.954), 9 items in mastery experience (McDonald's omega 0.864), 9 items in vicarious experience (McDonald's omega 0.888),) and 7 items in social persuasion (McDonald's omega 0.918). The omegas confirm a good to excellent internal consistency of the measurement.

4.3 Correlational analysis

Data from the SSE-Cz were correlated to identify the relationships of their dimensions. Table 2 shows that all coefficients in the matrix are positive and significant. Correlations among the efficacy sources range from 0.275 to 0.490, which confirms that the sources are inter-related, but the coefficients are low to moderate, which shows that they differentiate fairly. High intercorrelation would have indicated that the constructs were weakly operationalised and would have suggested some overlap. Mastery experience shows somewhat larger correlations with emotional state than with vicarious experience and social persuasion. This indicates that teachers who had successful in-class experiences did not need as much vicarious experience and social persuasion as they would have if they had had unsuccessful experiences. Probably, successful teachers do not need to learn from their peers how to manage instruction and do not require praise from them. Correlations among vicarious experience, emotional state and social persuasion are moderate (0.414 to 0.477).

Table 2

Pearson's correlations among dimensions of SSE-Cz

Dimensions	*ME*	*VE*	*ES*
Mastery experiences (ME)	-		
Vicarious experiences (VE)	0.275***	-	
Emotional state (ES)	0.490***	0.477***	-
Social persuasion (SP)	0.373***	0.457***	0.414***

Note*:* ***p<.001

4.4 Descriptive data on the SSE-Cz dimensions

Descriptive data are presented in Table 3. Arithmetic means, standard deviations, skewness and kurtosis were calculated of the four dimensions of the SSE-Cz. The highest rating was identified on mastery experience (M=5.02, SD=0.52), followed by emotional states (M=4.92, SD=0.85). Social persuasion was rated somewhat lower (M=4.00, SD=1.07). The lowest rating was observed on vicarious experience (M=3.91, SD=0.86). Significant values of the Kolmogorov-Smirnov test signify that the distribution is non-parametric. The findings suggest that teachers place the highest importance on internal factors (emotional state and mastery experience) when developing their self-efficacy. External factors, such as social persuasion and vicarious experience, are seen as less influential but still contribute to a certain extent. This may imply that interventions to boost teachers' self-efficacy could focus more on enhancing emotional resilience and providing opportunities for mastery experiences.

Table 3

Descriptive data on the SSE-Cz dimensions

	Mastery experience	*Emotional states*	*Vicarious experience*	*Social persuasion*
N	984	984	984	984
M	5.02	4.92	3.91	4.00
SD	0.52	0.85	0.86	1.07
St. error of the mean	0.017	0.027	0.027	0.034
Min	2.25	1.89	1.22	1.00
Max	6.00	6.00	6.00	6.00
Skewness	-0.58	-0.68	-0.19	-0.19
Kurtosis	1.11	-0.03	-0.32	-0.59
K-S test	0.081	1.00	0.046	0.059
p-value of K-S test	< 0.001	< 0.001	< 0.001	< 0.001

Note: K-S = Kolmogorov-Smirnov test of normality

5 Discussion

Drawing upon Bandura's (1997) concept of self-efficacy and his proposal of what contributes to its enhancement, the present study focused on the development and validation of SSE-CZ, an instrument to assess Czech primary school teachers' efficacy sources. Improving upon some of the limitations of the published versions of similar instruments, care was taken on item conceptualisation in the instrument. In contrast to Palmer (2011) and Garvis and Pendergast (2011), we avoided conceptualizing mastery experience as teachers' appraisal of pedagogical content knowledge or a general description of teaching and managing pupils' behaviour. Rather, we concentrated on teachers' interpretations of instructional segments and

strategies, i.e., creating classroom atmosphere, giving interesting presentations, motivating pupils, or cooperating with parents.

A series of analyses provided strong evidence for the construct validity of SSE-Cz. Four distinct and reliable factors were identified that share substantial common variance and correspond to the four efficacy sources suggested by Bandura: mastery experience, vicarious experience, social persuasion and emotional state. The SSE-Cz factor structure was generalizable and invariant to subgroups of primary school teachers with contrasting years of teaching experience. These results support the contention that primary school teachers benefit from a complex process of selecting and weighing information from four different sources, which contribute to enhancing their self-efficacy.

These findings provide stronger support for the four efficacy sources than some other studies. Research instruments, developed in the past, for measuring sources of self-efficacy have had validity problems and have therefore produced inconclusive results. Some of them provided weakly supported results, e.g., Morris (2010), or the factor analysis accounted for only a small variance, like in the study with pre-service teachers by Clark and Newburry (2019), or authors did not provide details about the validity of the instrument used (Furtado Nina et al., 2016). Some authors did not prove the existence of the four efficacy factors because they either intentionally omitted some sources in their studies or concentrated on a single one. For instance, only vicarious experience was assessed by teachers and school management in Sweden and Canada (Jungert et al., 2019), or scholars combined two sources, e.g., mastery experience with social persuasion (Poulou, 2007). Other studies expanded upon Badura's conceptualisation by suggesting additional efficacy sources. For instance, Palmer (2006) suggested a more subtle division of efficacy sources specific to teaching contexts, i.e., cognitive pedagogical mastery, cognitive content mastery, and simulated modelling. Palmer argued that the sources of cognitive pedagogical content are the forms of mastery experiences, and that simulated modelling should be considered as a form of vicarious experience. Challenged by Palmer's (2006) theory, in the current study we considered the possibility of finding more than four efficacy sources in our data, but the data did not support this option.

Looking at the four efficacy sources that influence teacher self-efficacy, two of them are what Earley (1994) and Klassen (2004) characterized as self-oriented (mastery experience and emotional state), and one is an other-oriented source (vicarious experience). Self-oriented efficacy sources are typical for a more individualistic culture that predominates in the Czech population, when compared with more collectivist cultures in non-western countries (Yada et al., 2019).

Conclusions

Though the current study was primarily focused on a research tool validation, it resulted in empirical evidence of the Bandura's theory of the strengths of efficacy sources in enhancing primary-school teachers' self-efficacy. The results also support the importance of educational and cultural contexts in understanding efficacy sources that influence teacher development. The research instruments that have been developed and used in different cultures produced dissimilar findings. However, this must not be viewed as negative results only. The differences can stimulate comparison of existing instruments, which, then may direct the researchers to concentrate effort and time on improving the instruments or developing more valid and reliable instruments. In addition to methodology benefits, better instruments have more efficiency in designing and applying teacher professional development programmes at both the pre-service and in-service levels.

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