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# VALIDATION OF THE SERBIAN VERSION OF THE TEACHERS' SENSE OF EFFICACY SCALE (TSES)*

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*Abstract*. Given that teacher self-efficacy has been recognized as a significant predictor of desirable outcomes at the student as well as at the teacher level, it is necessary to address the lack of a robust measure of this construct in Serbia. The present study examined the reliability, factor structure, and criterion validity of the 12-item Teachers' Sense of Efficacy Scale (TSES) among a sample of 452 Serbian teachers. Internal consistency estimates for scores on the TSES varied from .77 to .88. The results of confirmatory factor analysis showed that a three-factor model of the TSES yielded the best fit to data. Criterion validity of the TSES was supported by relationships of all its subscales with teacher job satisfaction. Primary school classroom teachers reported significantly higher self-efficacy for student engagement compared to secondary and high school teachers. No significant differences were found with gender and years of teaching experience. Our results confirm that the TSES is a reliable and valid instrument, and thus potentially useful for research within the Serbian cultural context. Both areas for future research and practical implications are discussed.
*Keywords*: teacher self-efficacy, TSES, Serbia, confirmatory factor analysis.

## INTRODUCTION

From a sociocognitive perspective developed by Bandura (1997, 2012), teacher self-efficacy can be defined as "teacher's individual beliefs in their capabilities to perform specific teaching tasks at a specified level of quality in a specified situation" (Dellinger, Bobbett, Olivier & Ellett, 2008, p. 752). The main reason for the researchers' interest in the construct of teacher self-efficacy lies in its relation with many significant outcomes for both the teachers and their students (Tschannen-Moran, Woolfolk Hoy & Hoy, 1998). In their review of

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studies conducted over the past 40 years, Zee and Koomen (2016) have stated that teacher self-efficacy is positively related to the quality of teaching and the academic achievement of students. Additionally, self-efficient teachers find it easier to cope with stress, they are less emotionally exhausted, and more satisfied with their work.

Problems with measuring teacher self-efficacy were highlighted in previous research (Klassen, Tze, Betts & Gordon, 2011; Wyatt, 2014). Klassen et al. (2011) found that almost half of the teacher self-efficacy studies conducted in the period between 1998 and 2009 used instruments that could be considered "conceptually suspect and results from these studies may result in misleading conclusions" (p. 36). However, with the development of the Teachers' Sense of Efficacy Scale (TSES; Tschannen-Moran & Woolfolk Hoy, 2001), researchers reached a considerable consensus on the conceptualization and measurement of the construct. Taking into account the complex nature of the teacher's role and following the implications of Bandura's theory, Tschannen-Moran and Woolfolk Hoy (2001) created and validated two forms of TSES: short (12 items) and long form (24 items). Both forms of the instrument explore three interrelated latent factors that reflect three domains of teaching: efficacy to promote student engagement, efficacy for classroom management, and efficacy in using instructional strategies.

Previous research has shown that the TSES has several significant advantages over other instruments in this field (Klassen *et al*., 2011). First of all, the scale is well-grounded in social cognitive theory. As Bandura (1997) points out, teacher self-efficacy measures should be focused on beliefs of what a person can achieve in different circumstances, rather than on assessing current capabilities. Secondly, previous research has shown that the scale has a stable factor structure, reliability, and convergent validity, as it is related to other measures of teacher self-efficacy (Woolfolk Hoy & Spero, 2005).

Over the last 15 years, the TSES has been by far the most widely used instrument in the field, as is evident from its application in different countries and cultures (Klassen *et al*., 2009; Ruan *et al*., 2015; Tsigilis, Koustelios, & Grammatikopoulos, 2010). The majority of studies that tested the construct validity of the TSES using confirmatory factor analysis (CFA) showed that the scale structure is best described by the three-factor model, proposed in the initial study. Using multigroup CFA in their research, Klassen et al. (2009) found the TSES short form to be a valid measure in five countries – Canada, Cyprus, Korea, Singapore and the United States. A cross-cultural validation study which has been conducted in Asia (Ruan *et al*., 2015) successfully reproduced the three-factor structure of the short form of the instrument. Although both versions of the instruments have good validity and reliability, the TSES short form has been used more frequently than the long form.

Although the stable factor structure of the instrument was confirmed across different countries, there are findings that point to the existence of certain drawbacks of the TSES. One of the highlighted conceptual issues re-

lates to a small number of assumed dimensions of the construct (Skaalvik & Skaalvik, 2007). At the level of individual items, particular words can have different meanings in different cultures. Ruan et al. (2015) have found that the item "How well can you establish a classroom management system with each group of students?" does not fit the school systems in Asian countries. The problem of high correlation between the individual dimensions of the teachers' self-efficacy due to the existence of cross-loadings has been identified in some studies (Nie, Lau, & Liau, 2012; Scherer, Jansen, Nilsen, Areepattamannil & Marsh, 2016). Accordingly, available evidence indicates that the teachers' self-efficacy beliefs may overlap with each other, and that dimensions of the construct are not strictly distinct. Bearing in mind the above, it is important to update and revise the psychometric properties of the TSES.

Some studies suggest that the construct of teacher self-efficacy in different national cultures has a similar meaning. Vieluf, Kunter and van de Vijver (2013) demonstrated the metric invariance of the one-factor teacher self-efficacy scale in 23 countries included in the Teaching and Learning International Survey (TALIS). On the other hand, it is important to consider cultural influences in teacher-self efficacy research. In accordance with the above, exploring the measuring properties of the most widely used measures of teacher self-efficacy on a sample of Serbian teachers would enable a deeper understanding of the relevance of the concept within the Serbian educational context.

## *The present study*

To date, no empirical studies have been conducted to explore the psychometric properties of the TSES in Serbia. Since the teacher self-efficacy could be associated with positive educational outcomes, there is an evident need to address the lack of a valid and reliable instrument that may be used within the Serbian educational context. Our first research aim therefore was to evaluate the factor structure of the Serbian version of the TSES short form. We hypothesized that the original structure of the scale, which assumes the existence of 3 interconnected latent factors, will be confirmed on the sample of Serbian teachers. Secondly, the reliability and criterion validity of the TSES were also investigated based on data obtained from the sample of Serbian teachers. In accordance with current knowledge, we expected that the TSES would have good internal consistency and a positive relationship with the criterion variable (teacher job satisfaction). Our third research aim addressed the relationship between the three dimensions of teacher self-efficacy and their demographic characteristics. Accordingly, we expected that there are differences in dimensions of self-efficacy in relation to teachers' gender, age, years of teaching experience, and school level. Finally, the current research may contribute to the further internationalization of this field of research, to which recently papers refer (Klassen *et al*., 2011).

## METHOD

*Participants and procedure.* The sample consisted of 452 teachers from primary, secondary and high schools in Serbia. Among the teachers from whom the data were collected, 94 (20.8%) were primary school classroom teachers, 153 (33.8%) were subject teachers from secondary schools and 205 (45.4%) teachers were teaching at the high school level. The average age of teachers was 43.14 years (SD=9.09), ranging from 23 to 64 years. The average length of the teachers' service was 15.69 years (SD=9.49), whereas the length of service ranged between 1 and 39 years. Regarding the gender structure, 74.1% of respondents were females, while male teachers accounted for 25.9% of the sample.

Although no random sampling procedure was implemented, the demographic characteristics of the participants were diversified enough and comparable with the whole population of Serbian teachers (See statistics in Women and Men in the Republic of Serbia, 2014). Teacher participants completed the questionnaires anonymously at the time that was suitable. We emphasized that the responses were voluntary so the teachers could stop completing the questionnaires at any time.

### *Instruments*

*TSES.* The study used the TSES short form (Tschannen-Moran & Woolfolk Hoy, 2001) translated into Serbian using the back-translation procedure with the permission of one of the authors of the original scale (Megan Tschannen-Moran). The instrument contains a total of 12 items evenly distributed in three subscales that evaluate the assumed dimensions of the construct: efficacy to promote student engagement (SE), efficacy for classroom management (CM), and efficacy in using instructional strategies (IS). Examples of items for each subscale in respective order are: "How much can you do to help your students value learning?", "How much can you do to control disruptive behaviour in the classroom?", "To what extent can you provide an alternative explanation or example when students are confused?". The respondents provided their answers using the 9-point Likert type response scale, ranging from 1 (none at all) to 9 (a great deal). The Serbian translation is provided in the Appendix 1.

Despite the need for minor alterations to the statements in order to take into account the specificities of the syntax of the cultural context, the Serbian translation reflects the content of the original version of the scale. After the translation process was completed, 10 bilingual Serbian teachers participated in the preliminary research. Half of them took the English version first and the other half took the Serbian version and the other version in the retest 3 weeks later. The means of the three factors of the two versions were compared and low differences were found between them (Cohen's *d* ranged from – .14 to .21), indicating the equivalence between the English and Serbian ver-

sion of the TSES. Intraclass correlation coefficients (ICC) between two versions of the TSES were calculated based on absolute agreement and two-way mixed-effects model (Koo & Li, 2016). ICC coefficients for all of the TSES domain-specific subscales were above the recommended value of .70 and significant at $p<.01$: efficacy to promote student engagement ICC=.74, efficacy for classroom management ICC=.81, and efficacy in using instructional strategies ICC=.78.

*Job satisfaction.* Teacher job satisfaction was examined using a single item by asking teachers to indicate to what extent they are satisfied with their current job. The respondents provided their answers using the 7-point Likert type response scale, with response options ranging from 1 (strongly disagree) to 7 (strongly agree). The single-item scale of job satisfaction is often used in this type of research (Avanzi *et al*., 2013; Klassen *et al*., 2009) due to its practical advantages. It should also be noted that there is a high correlation between single-item and multi-item measures of job satisfaction, which speaks in favour of this measure (Dolbier, Webster, McCalister, Mallon, & Steinhardt, 2005).

## *Data analysis*

The structural validity of the TSES was evaluated based on confirmatory factor analysis (CFA) which was conducted using the Lavaan software package written for the R (Rosseel, 2012). Parameter estimation was carried out using the robust maximum likelihood estimator, since the criterion of multivariate data normality was not met. CFA results were evaluated using $\chi^2$ statistics and other well-established indices: the comparative fit index (CFI, optimal values $\geq.95$, acceptable values $\geq.90$), the root mean square error of approximation (RMSEA, optimal values $\leq.06$, acceptable values $\leq.08$), and the standardized root mean square residual (SRMR, optimal values $\leq.05$, acceptable values $\leq.08$) (Brown, 2015; Hu & Bentler, 1999). Bayesian information criterion (BIC) and Akaike information criterion (AIC) were employed in order to compare different models.

The internal consistency of the Serbian version of the TSES was assessed using Cronbach's alpha and omega coefficients. McDonald's omega is considered appropriate if an instrument is known to be multidimensional (Dunn, Baguley, & Brunsden, 2014). Criterion validity of the TSES was estimated using multiple regression with teacher job satisfaction as the criterion variable, while the predictors were scores on the TSES subscales. Finally, the analysis of variance (ANOVA) has been used to investigate the relation between the teachers' demographic characteristics and the dimensions of teacher self-efficacy.

## RESULTS

### *Descriptive statistics and internal consistency*

Subscale distributions were neither skewed nor kurtotic, besides the subscale related to the classroom management (skew= – 1.19, kurtosis=2.30). As it is shown in the Table 1, means of the subscale scores were found in the interval from 6.80 to 7.55. As it could be seen, internal consistency estimates for scores on the Serbian version of the TSES are satisfactory.

*Table 1: Descriptive statistics for the TSES in a Serbian sample*

| | Serbian Teachers | | | | U.S. Sample[a] | | | |
|---|---|---|---|---|---|---|---|---|
| | *N*=452 | | | | *N*=410 | | | |
| TSES | *M* | *SD* | α | ω | *M* | *SD* | α | Cohen's *d* |
| SE | 6.80 | 1.13 | .78 | .78 | 7.20 | 1.20 | 0.81 | - 0.17 |
| CM | 7.25 | 1.20 | .88 | .88 | 6.70 | 1.20 | 0.86 | 0.22 |
| IS | 7.55 | 0.94 | .77 | .78 | 7.30 | 1.20 | 0.86 | 0.23 |

*Note*. TSES – Teachers' Sense of Efficacy Scale; SE – efficacy to promote student engagement; CM – efficacy for classroom management; IS – efficacy in using instructional strategies.
[a]The descriptive statistics of U.S. sample cited from Tschannen-Moran and Woolfolk Hoy (2001).

For the sake of comparison, the descriptive statistics of the U.S. sample from the original validation study conducted by Tschannen-Moran and Woolfolk Hoy (2001) are also presented. The U.S. sample included 410 teachers covering various sociodemographic subgroups. The last column in Table 1 presents the mean differences indicated by effect size between two groups. Cohen's scale (Cohen, 1988) for the interpretation of the score includes: small effects range from 0.20 to 0.49, medium from 0.50 to 0.79, and large is greater than 0.80. The results in Table 1 show that there are low differences between the Serbian and the U.S. samples. The internal consistency of IS and SE subscales were somewhat lower compared to the estimates obtained for the U.S. sample.

### *Factor structure and factor loadings*

Table 2 lists the fit indices for all specified models. Since the fit of one-factor model did not meet the desired standards, this model will not be further discussed in this paper. As it can be seen, the original three-factor model did not provide acceptable fit to the data, because RMSEA value was greater than .08. However, the modification indices have suggested the inclusion of the residual correlation between items 1 ("How much can you do to control disruptive behavior in the classroom?") and 3 ("How much can you do to calm

a student who is disruptive or noisy?"). Given that their belonging to the same subscale (CM), we decided to allow the residuals of this two similar items to correlate.

*Table 2: Fit indices derived from the confirmatory factor analysis for the TSES*

| Model | $\chi^2$ | *p* | *df* | CFI | RMSEA (90% CI) | SRMR | AIC | BIC |
|---|---|---|---|---|---|---|---|---|
| One-factor | 384.462 | <.001 | 54 | .827 | .135 (.123-.148) | .069 | 16454.638 | 16602.731 |
| Original three-factor | 191.371 | <.001 | 51 | .927 | .090 (.077-.104) | .045 | 16198.153 | 16358.586 |
| Modified three-factor[a] | 142.134 | <.001 | 50 | .953 | .074 (.059-.088) | .040 | 16132.634 | 16297.181 |

*Note*. TSES – Teachers' Sense of Efficacy Scale; RMSEA – root mean square error of approximation; SRMR – standardized root mean square residual; AIC – Akaike information criterion; BIC – Bayesian information criterion.
[a]The model includes one pair of correlated errors.

As can be seen in Table 2, allowing errors of these two items to correlate resulted in all of the fit indices being in the acceptable range, and the three-factor model was accepted. Relying on the commonly used cut-off of .30 for the size of the loading in order to be considered salient in defining the construct (Fabrigar, MacCallum, Wegener, & Strahan, 1999), all items were found to have excellent loadings across their target subscales (Table 3). Standardized loadings values ranged between .64 and .86.

After that, given the high correlations between factors of the construct, bifactor and higher-order models were tested. The bifactor model did not converge and contained negative error variances. Based on this result, it was concluded that this model is misspecified and was not further interpreted. In the case of the second-order model, the number of parameters and degrees of freedom to estimate was the same as in the correlated three-factor model, and a hierarchical confirmatory factor analysis resulted in fit indices that were identical to those obtained for the modified three-factor model.

*Table 3: Standardized solution of the confirmatory factor analysis*

| Item | Factor loadings | Error |
|---|---|---|
| SE | | |
| How much can you do to motivate students who show low interest in school work? | 0.64 | 0.59 |
| How much can you do to help your students value learning? | 0.71 | 0.50 |
| How much can you do to get students to believe they can do well in school work? | 0.75 | 0.44 |
| How much can you assist families in helping their children do well in school? | 0.66 | 0.57 |
| CM | | |
| How much can you do to control disruptive behaviour in the classroom? | 0.72 | 0.48 |
| How much can you do to calm a student who is disruptive or noisy? | 0.72 | 0.48 |
| How much can you do to get students to follow classroom rules? | 0.86 | 0.25 |
| How well can you establish a classroom management system with each group of students? | 0.85 | 0.28 |
| IS | | |
| To what extent can you craft good questions for your students? | 0.68 | 0.54 |
| To what extent can you use a variety of assessment strategies? | 0.72 | 0.48 |
| To what extent can you provide an alternative explanation or example when students are confused? | 0.65 | 0.58 |
| How well can you implement alternative teaching strategies in your classroom? | 0.70 | 0.51 |

*Note.* SE – efficacy to promote student engagement; CM – efficacy for classroom management; IS – efficacy in using instructional strategies. All coefficients are significant at the level of $p<.001$

As can be seen in Table 4, all latent factors are in a positive mutual correlation. Although correlations between the TSES subscales are relatively high, they do not exceed the value of .85, which indicates that they represent distinctive constructs (Brown, 2015). Dimensions that were correlated the most are efficacy to promote student engagement and efficacy in using instructional strategies ($r$=.83).

*Table 4: Intercorrelations between dimensions of teacher self-efficacy and teacher job satisfaction*

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 1. SE | – | | | |
| 2. CM | .76 | – | | |
| 3. IS | .83 | .75 | – | |
| 4. Job satisfaction | .46 | .38 | .40 | – |

*Note*. SE – efficacy to promote student engagement; CM – efficacy for classroom management; IS – efficacy in using instructional strategies. All correlations are significant at the level of $p$<.001

## *Criterion validity*

As can be seen in Table 4, all subscales of the Serbian version of the TSES achieve a positive correlation with teacher job satisfaction, ranging from $r$=.38 (CM) to $r$=.46 (SE). We also conducted a hierarchical multiple regression analysis to investigate the predictive validity of the scale, when controlling for teacher demographic characteristics (Table 5). Consistent with previous research (Klassen & Chiu, 2010), we entered teacher demographic variables at the first step of the regression equation: teachers' gender, years of teaching experience, and the grade level. Given the high correlations between the teacher's age and years of experience ($r$=.88, $p$<.001), we did not use the variable teacher's age in this type of analysis. At the second step we entered all the three subscales of the TSES. According to the results obtained, teacher demographic characteristics explained 2.8%, and the dimensions of teacher self-efficacy 22% of additional variance in teacher job satisfaction. The results showed that both blocks of predictors achieved a substantial contribution: the first block: $F$(3, 448)=4.26, $p$<.01, both blocks $F$(6, 445)=24.91, $p$<.001.

*Table 5: Summary of hierarchical regression predicting teacher job satisfaction*

| | Model 1 | Model 2 |
|---|---|---|
| Gender | -.06 | -.08 |
| Teaching experience | -.10* | -.07 |
| Grade level | -.15** | -.07 |
| SE | | .29*** |
| CM | | .13* |
| IS | | .13* |
| $R^2$=.028** | | |
| Step 2 change in $R^2$= .22*** | | |
| Total $R^2$=.25 *** | | |

*Note*. SE – efficacy to promote student engagement; CM – efficacy for classroom management; IS – efficacy in using instructional strategies.* $p$<.05, ** $p$<.01, *** $p$<.001.

The standardized beta weights indicated that in the first step teachers' gender and grade level were negative predictors of their job satisfaction. It means that the male teachers and teachers who worked at lower grade levels reported higher job satisfaction. However, at the second step, the effects of these variables were not statistically significant. The results also showed that the TSES subscales had unique contribution to the prediction of teacher job satisfaction. Efficacy for student engagement found to be the best predictor of teacher job satisfaction (β=.29, $p$<.01). Classroom management self-efficacy (β=.13, $p$<.05) and instructional efficacy (β=.13, $p$<.05) reached identical partial contributions. The analysis conducted on the Serbian sample supported the adequate criterion validity of the scale.

## *Group differences in teacher self-efficacy*

Using the paired sample *t*-test, it was investigated as to whether there are significant differences in teachers' perceptions of three dimensions of self-efficacy. The probability of Type I error was reduced using the Bonferroni correction (.05/3 tests run), which resulted in an adjusted level of significance of .016. The obtained results showed that the teachers perceived CM as a more present dimension than SE ($t$=9.34 (451), $p$<.001). However, teachers assessed the dimension of IS as much more salient than CM ($t$ =6.37 (451), $p$< .001). Thus the surveyed teachers reported feeling the most efficacious about their own capabilities to deliver quality instruction.

*Table 6: Analysis of variance of the TSES by the demographic variables of Serbian teachers*

| Demografic Variables | SE | | | | CM | | | IS | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *N* | *M* | *SD* | *F* | *M* | *SD* | *F* | *M* | *SD* | *F* |
| Gender | | | | | | | | | | |
| Male | 117 | 26.59 | 5.41 | 2.96 | 28.97 | 5.38 | .009 | 30.08 | 4.01 | .17 |
| Female | 335 | 27.43 | 4.16 | | 29.02 | 4.60 | | 30.24 | 3.68 | |
| Teaching experience | | | | | | | | | | |
| < 1 year | 13 | 25.84 | 3.87 | 1.56 | 27.00 | 4.97 | 1.39 | 29.69 | 3.15 | .37 |
| 1–5 years | 57 | 27.91 | 4.39 | | 28.32 | 4.52 | | 30.23 | 3.27 | |
| 6–10 years | 92 | 27.75 | 4.51 | | 29.38 | 4.90 | | 30.53 | 3.96 | |
| 11+ years | 290 | 26.97 | 4.57 | | 29.12 | 4.82 | | 30.11 | 3.83 | |
| Grade level | | | | | | | | | | |
| Classroom teacher/ primary school | 94 | 28.83 | 4.02 | 9.07*** | 29.78 | 4.16 | 1.65 | 30.80 | 3.43 | 1.81 |
| Subject teacher/secondary school | 153 | 27.23 | 4.66 | | 28.67 | 5.07 | | 30.23 | 3.64 | |
| High school teacher | 205 | 26.46 | 4.47 | | 28.91 | 4.88 | | 29.91 | 3.98 | |

*Note.* *N* – number of participants; *F* – F value; TSES – Teachers' Sense of Efficacy Scale; SE – efficacy to promote student engagement; CM – efficacy for classroom management; IS – efficacy in using instructional strategies.
*** $p<.001$

The differences in ratings of the different dimensions of teachers' self-efficacy in relation to their demographic characteristics were determined using the ANOVA. The obtained results are shown in Table 6. The teachers' gender, teaching experience, and grade in which they were working were investigated. Consistent with Wolters and Daugherty (2007), teachers were classified into four groups: < 1 year, 1–5 years, 6–10 years, and 11+ years of experience. This classification is based on the notion that teachers who are in the early stages of professional development change their beliefs more dramatically. Given the high correlations between teacher age and the length of teaching experience ($r$=.88, $p$ <.001), age were excluded from further analysis.

As it can be seen in Table 5, a significant effect of student grade has been found on teachers' self-efficacy in the domain of student engagement. Specifically, primary school classroom teachers were found to value this dimension of self-efficacy much higher than secondary school and high school teachers. Other inspected demographic characteristics of teachers were not significantly related to the dimensions of perceived self-efficacy.

## DISCUSSION

The main aim of this study was to explore the internal consistency, factor structure, and criterion validity of the Serbian translation of the TSES short form. Internal consistencies of each of the TSES specific domains subscales were good and similar to those reported in the previous studies (Klassen *et al*., 2009; Ruan *et al*., 2015). Klassen et al. (2009) reported reliabilities ranging from .71 to .94 for the TSES short form subscales in five countries, while Ruan et al. (2015) in their cross-cultural validation study found that all subscales have reliability coefficients higher than .80. In this study, alpha and omega estimates ranged from .77 to .88. These results suggest that Serbian researchers can reliably calculate and interpret the scores across three subscales (SE, IS and CM) of the TSES.

The obtained results confirmed the three-factor structure of the scale that comprises the dimensions extracted in the initial study (Tschannen-Moran & Woolfolk Hoy, 2001): efficacy for student engagement, efficacy for classroom management, and efficacy for instructional strategies. Acceptable fits indices were displayed by the original scale model with 12 items. These findings confirm the generalizability of the three-factor structure and thus also the construct validity of the scale.

The results of this study are similar to those obtained in validation studies in other countries, where correlations were allowed between residuals of individual items (Klassen *et al*., 2009) or where some of the scale items were omitted (Ruan *et al*., 2015; Tsigilis *et al*., 2010). We used modification indices, which indicated that error terms related to one pair of similar items resulted in substantial misfit. In this study, the correlated errors was specified between items 1 ("How much can you do to control disruptive behavior in the class-

room?") and 3 ("How much can you do to calm a student who is disruptive or noisy?") which belong to the CM subscale. Considering the content similarity among these items and their belonging to the same subscale, the errors were interpretable. The excessive similarity between them, which the model does not assume, can be the result of translating the original scale or their proximity in the questionnaire itself. When it cames to factor loadings in this study, there were large coefficients obtained across all subscales.

The three-factor solution confirms that teachers in Serbia differentiate the aspects of their work in the same way as teachers from Western (Klassen *et al*., 2009) and Asian countries (Ruan *et al*., 2015). Previous research suggests that teacher self-efficacy is similarly manifested in different cultural environments, regardless of the characteristics of national education system (Vieluf *et al*., 2013). However, the differences obtained by fit indices could be attributed to different response styles, specificities of the social and cultural context, and school conditions. For example, Ruan et al. (2015) found that the item "How well can you establish a classroom management system with each group of students?" did not fit well in Asian educational contexts. Similarly, Klassen and his colleagues (Klassen, Usher, & Bong, 2010) emphasized that the specific cultural orientation influences the ways of expressing teachers' motivational beliefs.

Given that coefficients of interfactor correlations in this study did not exceed the critical value of .85 (Brown, 2015), this indicates that the subscales represent different facets of teacher self-efficacy, but does not exclude finding solutions that are more parsimonious. In line with previous studies (Klassen *et al*., 2009; Ruan *et al*., 2015; Scherer *et al*., 2016), the highest correlation was obtained between the dimensions of efficacy to promote student engagement and efficacy in using instructional strategies. Where appropriate, it could be possible to accept the models in which the teacher self-efficacy is treated as a hierarchical construct, since the first-order factors are strongly correlated (Colliee, Shapka & Perry, 2012). Additionally, the higher order factor model could be considered as a more parsimonious solution. On the other hand, differentiation of various factors of teacher self-efficacy could offer more specific information about how the construct affects relevant educational outcomes, since the same teachers may have different beliefs about their competencies in different domains and circumstances (Bandura, 1997).

The analysis conducted on the Serbian sample supported the adequate criterion validity of the scale. By using hierarchical regression, we were able to demonstrate that all three dimensions of the TSES were significant predictors of the teacher job satisfaction, when controlling for demographic variables. The current study provided evidence that the TSES performed well in predicting a relevant outcome variable. Findings also revealed self-efficacy for student engagement as the strongest predictor of teacher job satisfaction. Earlier studies consistently show that teachers with highly expressed self-efficacy are more satisfied with their job (Avanzi *et al*., 2013; Caprara, Barbaranelli, Steca

& Malone, 2006; Klassen *et al*., 2009; Skaalvik & Skaalvik, 2010). The results obtained in this study are in accordance with earlier findings that indicate that the relation between teacher self-efficacy and job satisfaction is similar in different cultural environments (Vieluf *et al*., 2013). Social cognitive theory (Bandura, 1997) provides an explanation for the relationship between teacher self-efficacy and level of job satisfaction. If teachers do not believe that they are able to successfully confront the every day challenges they will easily become dissatisfied with their own work. Contrary, teachers who positively perceive their own professional competence will experience more positive emotions that determine their job satisfaction.

Regarding the levels of dimensions of teacher self-efficacy, it was found that teachers in Serbia mostly believe in their own capabilities to deliver successful instructions. Studying teachers in Cyprus, a country whose educational system is centralized as is in Serbia, Klassen et al. (2009) came to similar findings. The least present self-efficacy in Serbian teachers is in the domain of student engagement. In general, the average values obtained in all three subscales (SE, CM, IS) are approximately equal to those obtained in previous validation studies (Tschannen-Moran & Woolfolk Hoy, 2001).

This study has not found significant gender related differences in the estimation of dimensions of teacher self-efficacy. This lack of significant associations is in line with findings of previous studies (Lauermann & König, 2016; Tschannen-Moran & Woolfolk Hoy, 2007). However, it is important to note that there are findings (Klassen & Chiu, 2010) which indicate that female teachers display lower levels of self-efficacy for classroom management. Given the contradicting evidence, we believe that the clarifying the role of teacher gender in shaping self-efficacy beliefs needs further research.

When it comes to the relation between teaching experience and self-efficacy, previous studies have come to contradicting conclusions. The current study has not found significant differences in ratings of dimensions of self-efficacy as a function of the length of teaching experience. The same conclusion was reported by Tschannen-Moran and Woolfolk Hoy (2007), who noted that there are no theoretical reasons that would indicate a relation between teacher demographic characteristics and their self-efficacy beliefs. We assume that the characteristics of teachers' working conditions, such as principal leadership and the opportunity to obtain mastery experiences have a crucial role in the development of teachers' self-efficacy beliefs. Despite the evidences suggesting that teacher self-efficacy reaches its peak with 23 years of work experience and then decreases (Klassen & Chiu, 2010), this developmental trajectory may be dependent on the characteristics of the context in which the teachers work.

Results indicating that classroom teachers exhibit higher levels of self-efficacy for student engagement are in line with previous studies (Klassen & Chiu, 2010). This finding can be explained by the students' developmental characteristics. Previous studies indicate a decrease in the various dimensions

of student school engagement between grades 7 and 11, such as school participation, sense of belonging to school, and self-regulated learning (Wang & Eccles, 2012). In addition, it should be noted that subject teachers in secondary and high school spend less time with their students and find it more difficult to develop close and warm relations with all students (Ryan, Kuusinen & Bedoya-Skoog, 2015).

### *Limitations and future directions*

This research has certain limitations that should be taken into account when interpreting the obtained results. Although the Serbian sample was large enough to obtain the reliable results, it is necessary to examine whether the scores on the Serbian version of the 12-item TSES are invariant with the scores obtained on samples in the other countries. Secondly, further research on the validity of the Serbian version of the TSES should include exploring its relations with relevant outcomes, such as professional burnout of teachers, student motivation and academic achievement. This is a particularly important issue, given the insights that national cultural values can moderate the relation between teacher self-efficacy and relevant educational outcomes (Vieluf *et al*., 2013).

## CONCLUSION

In conclusion, this study provides initial support for the use of the TSES short form on the sample of Serbian teachers. This could greatly facilitate the possibility of comparing the results obtained within the Serbian educational context with findings of foreign studies. In addition to theoretical implications, the obtained results also have practical implications. The availability of a multidimensional instrument for assessing teacher self-efficacy is an important prerequisite for designing relevant professional development of teachers. Based on such measures, it is possible to identify domains where teachers are less confident about their competences. Opening such opportunities is very important for Serbia, which aims to improve the quality of its educational system.

## *References*

Avanzi, L., Miglioretti, M., Velasco, V., Balducci, C., Vecchio, L., Fraccaroli, F. & Skaalvik, E. M. (2013). Cross-validation of the Norwegian teacher's self-efficacy scale (NTSES). *Teaching and Teacher Education*, *31*(1), 69–78. https://doi.org/10.1016/j.tate.2013.01.002

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York, NJ: Freeman Lawrence.

Bandura, A. (2012). On the functional properties of perceived self-efficacy revisited. *Journal of Management*, *38*(1), 9–44. https://doi.org/10.1177/0149206311410606

Brown, T. (2015). *Confirmatory factor analysis for applied research*. New York, NJ: The Guilford press.

Caprara, G. V., Barbaranelli, C., Steca, P. & Malone, P. S. (2006). Teachers' self-efficacy beliefs as determinants of job satisfaction and students' academic achievement: A study at the school level. *Journal of School Psychology*, *44*(6), 473–490. https://doi.org/10.1016/j.jsp.2006.09.001

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd Edition). Hillsdale, NJ: Erlbaum.

Colliee, R. J., Shapka, J. D. & Perry, N. E. (2012). School climate and social-emotional learning: Predicting teacher stress, job satisfaction, and teaching efficacy. *Journal of Educational Psychology*, *104*(4), 1189–1204. https://doi.org/10.1037/a0029356

Dellinger, A. B., Bobbett, J. J., Olivier, D. F. & Ellett, C. D. (2008). Measuring teachers' self-efficacy beliefs: Development and use of the TEBS-Self. *Teaching and Teacher Education*, *24*(3), 751–766. https://doi.org/10.1016/j.tate.2007.02.010

Dolbier, C. L., Webster, J. A., McCalister, K. T., Mallon, M. W. & Steinhardt, M. A. (2005). Reliability and validity of a singel-item measure of job satisfaction. *American Journal of Health Promotion*, *19*(3), 194–198. https://doi.org/10.4278/0890-1171-19.3.194

Dunn, T. J., Baguley, T. & Brunsden, V. (2014). From alpha to omega: A practical solution to the pervasive problem of internal consistency estimation. *British Journal of Psychology*, *105*(3), 399–412. https://doi.org/10.1111/bjop.12046

Fabrigar, L., MacCallum, R., Wegener, D. & Strahan, E. (1999). Evaluating the use of exploratory factor analysis in psychological research. *Psychological Methods*, *4*(3), 272–299. https://doi.org/10.1037/1082-989X.4.3.272

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, *6*(1), 1–55. https://doi.org/10.1080/10705519909540118

Klassen, R. M., Bong, M., Usher, E. L., Chong, W. H., Huan, V. S., Wong, I. Y. F. & Georgiou, T. (2009). Exploring the validity of a teachers' self-efficacy scale in five countries. *Contemporary Educational Psychology*, *34*(1), 67–76. https://doi.org/10.1016/j.cedpsych.2008.08.001

Klassen, R. M. & Chiu, M. M. (2010). Effects on teachers' self-efficacy and job satisfaction: Teacher gender, years of experience, and job stress. *Journal of Educational Psychology*, *102*(3), 741–756. https://doi.org/10.1037/a0019237

Klassen, R. M., Tze, V. M. C., Betts, S. M. & Gordon, K. A. (2011). Teacher efficacy research 1998-2009: Signs of progress or unfulfilled promise? *Educational Psychology Review*, *23*(1), 21–43. https://doi.org/10.1007/s10648-010-9141-8

Klassen, R. M., Usher, E. L. & Bong, M. (2010). Teachers' collective efficacy, job satisfaction, and job stress in cross-cultural context. *Journal of Experimental Education*, *78*(4), 464–486. https://doi.org/10.1080/00220970903292975

Koo, T. K. & Li, M. Y. (2016). A guideline of selecting and reporting intraclass correlation coefficients for reliability research. *Journal of Chiropractic Medicine*, *15*(2), 155–163. https://doi.org/10.1016/j.jcm.2016.02.012

Lauermann, F. & König, J. (2016). Teachers' professional competence and wellbeing: Understanding the links between general pedagogical knowledge, self-efficacy and burnout. *Learning and Instruction*, *45*, 9–19. https://doi.org/10.1016/j.learninstruc.2016.06.006

Nie, Y., Lau, S. & Liau, A. K. (2012). The teacher efficacy scale: A reliability and validity study. *The Asia-Pacific Education Researcher*, *21*, 414–421.

Rosseel, Y. (2012). lavaan: An R package for structural equation modeling. *Journal of Statistical Software*, *48*(2), 1–36.

Ruan, J., Nie, Y., Hong, J., Monobe, G., Zheng, G., Kambara, H. & You, S. (2015). Cross-cultural validation of teachers' sense of efficacy scale in three Asian countries: Test of measurment invariance. *Journal of Psychoeducational Assessment*, *33*(8), 769–779. https://doi.org/10.1177/0734282915574021

Ryan, A. M., Kuusinen, C. M. & Bedoya-Skoog, A. (2015). Managing peer relations: A dimension of teacher self-efficacy that varies between elementary and middle school teachers and is associated with observed classroom quality. *Contemporary Educational Psychology*, *41*, 147–156. https://doi.org/10.1016/j.cedpsych.2015.01.002

Scherer, R., Jansen, M., Nilsen, T., Areepattamannil, S. & Marsh, H. W. (2016). The quest for comparability: Studying the invariance of the teachers' sense of self-efficacy (TSES) measure across countries. *PLoS ONE*, *11*(3), 1–29. https://doi.org/10.1371/journal.pone.0150829

Skaalvik, E. M. & Skaalvik, S. (2007). Dimensions of teacher self-efficacy and relations with strain factors, perceived collective teacher efficacy, and teacher burnout. *Journal of Educational Psychology*, *99*(3), 611–625. https://doi.org/10.1037/0022-0663.99.3.611

Skaalvik, E. M. & Skaalvik, S. (2010). Teacher self-efficacy and teacher burnout: A study of relations. *Teaching and Teacher Education*, *26*(4), 1059–1069. https://doi.org/10.1016/j.tate.2009.11.001

Statistical Office of the Republic of Serbia. (2014). *Women and Men in the Republic of Serbia*. Retrieved from http://pod2.stat.gov.rs/ObjavljenePublikacije/G2014/pdfE/G20146008.pdf

Tschannen-Moran, M. & Woolfolk Hoy, A. (2001). Teacher efficacy: Capturing an elusive construct. *Teaching and Teacher Education*, *17*(7), 783–805. https://doi.org/10.1016/S0742-051X(01)00036-1

Tschannen-Moran, M. & Woolfolk Hoy, A. (2007). The differential antecedents of self-efficacy beliefs of novice and experienced teachers. *Teaching and Teacher Education*, *23*(6), 944–956. https://doi.org/10.1016/j.tate.2006.05.003

Tschannen-Moran, M., Woolfolk Hoy, A. & Hoy, W. K. (1998). Teacher efficacy: Its meaning and measure. *Review of Educational Research*, *68*(2), 202–248. https://doi.org/10.3102/00346543068002202

Tsigilis, N., Koustelios, A. & Grammatikopoulos, V. (2010). Psychometric properties of the teachers' sense of efficacy scale within the Greek educational context. *Journal of Psychoeducational Assessment*, *28*(2), 153–162. https://doi.org/10.1177/0734282909342532

Vieluf, S., Kunter, M., & Van de Vijver, F. J. R. (2013). Teacher self-efficacy in cross-national perspective. *Teaching and Teacher Education*, *35*, 92–103. https://doi.org/10.1016/j.tate.2013.05.006

Wang, M. T. & Eccles, J. S. (2012). Adolescent behavioral, emotional, and cognitive engagement trajectories in school and their differential relations to educational success. *Journal of Research on Adolescence*, *22*(1), 31–39. https://doi.org/10.1111/j.1532-7795.2011.00753.x

Wolters, C. A. & Daugherty, S. G. (2007). Goal structures and teachers' sense of efficacy: Their relation and association to teaching experience and academic level. *Journal of Educational Psychology*, *99*(1), 181–193. https://doi.org/10.1037/0022-0663.99.1.181

Woolfolk, Hoy A. & Spero, R. B. (2005). Changes in teacher efficacy during the early years of teaching: A comparison of four measures. *Teaching and Teacher Education*, *21*(4), 343–356. https://doi.org/10.1016/j.tate.2005.01.007

Wyatt, M. (2014). Towards a re-conceptualization of teachers' self-efficacy beliefs: Tackling enduring problems with the quantitative research and moving on. *International Journal of Research & Method in Education*, *37*(2), 166–189. https://doi.org/10.1080/1743727X.2012.742050

Zee, M. & Koomen, H. M. Y. (2016). Teacher self-efficacy and its effects on classroom processes, student academic adjustment, and teacher well-being: A synthesis of 40 years of research. *Review of Educational Research*, *86*(4), 981–1015. https://doi.org/10.3102/0034654315626801

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## *Appendix 1*
## *Српски превод кратке форме скале TSES*

Овај упитник је креиран да нам помогне да боље разумемо изазове са којима се наставници суочавају. Молимо Вас да на наредних 12 питања одговорите означавањем једног од девет бројева, у распону од 1 (нимало) до 9 (у највећој мери). Приликом давања одговора имајте на уму тренутне способности у свакој од наведених ситуација. Ваши одговори су потпуно поверљиви.

| | | **нимало** | | **веома мало** | | **донекле** | | **у већој мери** | | **у највећој мери** |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. | Колико можете да утичете на контролу непримереног понашања у учионици? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 2. | Колико можете да утичете на мотивацију ученика који показују мало интересовања за оно што се ради у школи? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 3. | Колико можете да урадите како бисте смирили ученика који је бучан и омета час? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 4. | Колико можете да помогнете ученицима да цене учење? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 5. | У којој мери можете да осмислите добра питања из градива за своје ученике? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 6. | Колико можете да утичете на то да деца поштују правила у учионици? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 7. | Колико можете да утичете на то да ученици верују да могу бити успешни у школи? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 8. | Колико успешно можете да успоставите правила понашања на часу са сваким одељењем? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 9. | У којој мери можете да користите различите стратегије оцењивања? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 10. | У којој мери можете да пружите алтернативно објашњење или пример када су ученици збуњени? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 11. | Колико можете да сарађујете са родитељима како би помогли њиховој деци да буду успешна у школи? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 12. | Колико добро можете да примените алтернативне стратегије подучавања у вашој учионици? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

# ВАЛИДАЦИЈА СРПСКЕ ВЕРЗИЈЕ СКАЛЕ САМОЕФИКАСНОСТИ НАСТАВНИКА (TSES)

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*Апстракт*

С обзиром на то да је самоефикасност наставника препозната као значајан предиктор пожељених наставних исхода, потребно је пажњу усмерити на недостатак робустне мере овог конструкта у Србији. У овом истраживању испитивана је поузданост, факторска структура и критеријумска валидност Скале самоефикасности наставника (Teachers' Sense of Efficacy Scale, TSES) која има дванаест ајтема на узорку од 452 наставника из Србије. Коефицијенти интерне конзистентности скорова на TSES били су у распону од ,77 до ,88. Резултати конфирматорне факторске анализе показали су да трофакторски модел Скале има најбољи фит. Критеријумска валидност TSES подржана је релацијама свих њених супскала са задовољством послом наставника. Наставници разредне наставе су показали значајно виши ниво самоефикасности у ангажовању ученика у односу на предметне наставнике у основној и средњој школи. Нису установљене значајне разлике у односу на пол и године радног искуства наставника. Добијени резултати потврђују да је TSES поуздан и валидан инструмент, као и да може бити користан за истраживања у културном контексту у Србији. Дискутовано је о смерницама за будућа истраживања и о практичним импликацијама.
*Кључне речи*: самоефикасност наставника, TSES, Србија, конфирматорна факторска анализа.

# ВАЛИДАЦИЯ СЕРБСКОЙ ВЕРСИИ ШКАЛЫ САМОЭФФЕКТИВНОСТИ УЧИТЕЛЯ (TSES)

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*Аннотация*

Учитывая факт, что самоэффективность учителя считается важным предиктором желательных результатов обучения, необходимо направить внимание на недостаток робустного измерения данного конструкта в Сербии. В предлагаемом исследовании рассмотрены надежность, факторная структура и валидность критериумов Шкалы самоэффективности учителя (Teachers' Sense of Efficacy Scale, TSES), которая состоит из двенадцати айтемов на корпусе 452 учителя из Сербии. Коэффициенты внутренней консистентности скоров на TSES располагались в промежутке от ,77 до ,88. Результаты конфирматорного факторного анализа показали, что трехфакторная модель Шкалы отличается лучшим фитом. Валидность критериумов TSES поддрживается реляциями всех ее субшкал с удовольствием от учительской работы. Учителя младших классов проявили значительно более высокий уровень самоэффективности в привлечении к работе учащихся, чем учителя-предметники в старших классах восьмилетней школы и те, которые работают в средней школе. Не выявлены значительные оличия, связанные с полом и годинами трудового стажа учителей. Полученные результаты подтверждают, что TSES надежный и валидный инструмент, и что его можно использовать в исследованиях в культурном контексте в Сербии. В статье рассмотрены и возможные направления будущих исследований, а также импликации для практики.
*Ключевые слова*: самоэффективность учителя, TSES, Сербия, конфирматорный факторный анализ.