

Original Scientific Paper
UDC: 37.091.12(497.6)
DOI: 10.5937/zrffp55-57984

FACTOR STRUCTURE OF THE TEACHER REFLECTION SCALE FOR PRIMARY AND SECONDARY SCHOOL TEACHERS

Nemanja D. VUKANOVIĆ¹

Margareta G. SKOPLJAK²

Tatjana V. MIHAJLOVIĆ³


University of Banja Luka

Faculty of Philosophy

Department of Pedagogy and Teaching Methodology

Banja Luka (Republic of Srpska, Bosnia and Herzegovina)

¹ nemanja.vukanovic@ff.unibl.org;  <https://orcid.org/0009-0008-3219-976X>

² margareta.skopljak@ff.unibl.org;  <https://orcid.org/0009-0000-1071-8452>

³ tatjana.mihajlovic@ff.unibl.org;  <https://orcid.org/0009-0002-6554-6824>

Received: May 25, 2025
Accepted: September 25, 2025

FACTOR STRUCTURE OF THE TEACHER REFLECTION SCALE FOR PRIMARY AND SECONDARY SCHOOL TEACHERS

Keywords:
reflective practice;
Teaching Reflection
Inventory (TRI);
factor analysis of
data;
teachers'
professional
development.

Abstract. Reflection represents a key element for professional development and the transformation of teachers' knowledge and practice. It is a complex, multidimensional process that encompasses various aspects of teachers' professional activities. The aim of our research was to determine the factor structure of the reflection scale on a sample of 423 teachers—268 primary school teachers and 155 secondary school teachers from Banja Luka. The research instrument applied was the Teaching Reflection Inventory (TRI). To determine the factor structure of the scale, several analyses were conducted, including descriptive statistics, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy, Bartlett's test of sphericity, communalities for each variable, Cattell's scree test, the initial component matrix, the rotated component matrix, and the component transformation matrix. Four factors with satisfactory internal consistency were extracted: affective ($\alpha = 0.903$), cognitive ($\alpha = 0.838$), metacognitive ($\alpha = 0.843$), and practical aspect ($\alpha = 0.743$). The obtained results indicate that the applied instrument is valid for measuring teachers' reflection and that it can serve as a tool for teachers' professional development. Given the sample size, it would be desirable to conduct a comparative analysis of the TRI instrument in multiple countries for cross-cultural validation, as well as to conduct longitudinal research to track the development of teachers' reflective practices.

Introduction

Complex social relations have led to the emergence of new roles, knowledge, and competencies for teachers, which include taking responsibility for their own professional development (Larrivee, 2006; Vujičić, 2007). Theoretical insights support the need for teachers to have a dominant role in the continuous process of professional development (Andevski et al., 2015; Marić Jurišin & Malčić, 2021), emphasizing that the essence of this ongoing learning process lies in understanding how teachers acquire and transform their knowledge into practice (Avalos, 2011). Numerous theoretical insights, as well as contemporary and relevant research (Avalos, 2011; Larrivee, 2005; Loughran, 2002; Manouchehri, 2002; Schön, 1983; Wood & Bennett, 2000), indicate that teachers play a crucial role in analyzing the quality of education (Bilač, 2015; Snoeck et al., 2010). Furthermore, reflective practice is recognized as an effective method of continuous professional development, a key factor in teacher competence, and an essential element of teaching quality (Ahmed & Al-Khalili, 2013; Hrevnack, 2011; Soisangwarn & Wongwanich, 2014). Reflective practice involves taking responsibility, making decisions for action, and achieving practical goals (Hegarty, 2011; Loughran, 2002). It enables teachers to analyze their practice, reflect on its values and the context in which it takes place, learn from personal or others' experiences, share these insights with colleagues, and propose changes where necessary (Šagud, 2011). Additionally, the concept of reflective practice contributes to a deeper understanding of teaching, implies a shift in how practice is perceived through a reflective thinking style (Ferraro, 2000), and highlights the complexity of viewing teaching from different perspectives. It emphasizes the importance of (critical) thinking about outcomes and the impact of teaching on both the individual and the environment (Larrivee, 2008). Therefore, the application of reflective practice in enhancing teaching quality offers multiple benefits, including increased efficiency and a deeper understanding of one's own teaching approach (Ferraro, 2000). It positively influences job satisfaction, reduces professional burnout, and contributes to overall teaching quality (Hrevnack, 2011). The implementation of reflective practice models in educational settings serves as inspiration for new

strategies, hypotheses, interpretations, and ideas about learning and teaching. Ultimately, it represents both the outcome of teachers' professional development and the advancement of the entire educational practice (Šagud, 2011).

Theoretical Approach to the Problem

Teacher Reflection

Reflective practice represents a holistic approach to teachers' professional development. It entails a way of learning and researching in which theory is integrated with reflection (thinking) and practice, with reflection constituting the essence of the learning process and the transformation of practice. Research focused on developing models of reflective practice is based on the theoretical outcomes of experiential learning proposed by John Dewey and Donald Schön, who contributed to the understanding of learning (Bilač, 2015). The scientific literature highlights numerous theoretical models of reflective practice applied in different educational programs. One of these models is Kolb's experiential learning model, based on theories of how people learn (Kolb et al., 2001). Donald Schön (1987) conceptualized reflection as a cycle consisting of critically examining practice, developing ideas, improving practice, and implementing these ideas in practice. Schön also distinguished between reflection-in-action and reflection-on-action. Reflection-in-action refers to individual reflection occurring during teaching, whereas reflection-on-action takes place after teaching and can be conducted in groups (Akbari et al., 2010). Kolb's model of reflective practice is grounded in theories of how people learn (Kolb et al., 2001), while Brookfield's reflective model (Brookfield, 1995) involves analyzing experiences from different perspectives, including personal perspective, theoretical and philosophical perspective, participant perspective and critical perspective (Brookfield, 1995). In contrast, Cowan's (1998) model of reflective learning expands Schön's reflection-in-action and reflection-on-action by incorporating reflection-before-action. This model underscores the importance of planning and anticipating potential problems that could be addressed in advance or mitigated proactively in practice (Cowan, 1998, cited in Marić Jurišin & Malčić, 2021).

The application of reflective practice in the teaching process necessitates the presence of a reflective teacher. A reflective teacher regularly evaluates whether mistakes were made and considers their own work and subjective perceptions of teaching when reassessing their practice (Meyer, 2005). A reflective teacher is someone who periodically reviews their work and believes it can be improved (Schön, 1983). Additionally, a reflective teacher is an investigator of their own practice, willing to change their behavior and understand practical problems in order to enhance their professional development and improve teaching quality. The teacher as a reflective practitioner examines different elements of reflection, which

include the practical element (e.g., portfolio, group discussions, video recordings, journal writing, etc.); cognitive element, which involves activities directly aimed at professional development (e.g., reading academic literature, attending seminars and workshops, and participating in various forms of professional development within their specific field); affective element, which refers to the teacher's relationship with students and students' emotional reactions toward both the teacher and the class (socio-emotional climate in the classroom); metacognitive element, which involves questioning personal values, attitudes, beliefs, and assumptions that guide teaching practices; critical element, which considers reflection in relation to the socio-political aspects of pedagogy; moral element, which encompasses the teacher's moral beliefs related to justice, empathy, and values (i.e., critically assessing their purpose and actions from a moral standpoint, as well as how they perceive and relate to others) (Akbari et al., 2010). Considering these elements of reflection, each is crucial for a comprehensive understanding of a teacher's practice and their interactions with students. The complexity of the construct of teacher reflection highlights the significance of empirical research in this field to develop strategies aimed at enhancing this vital aspect of professional teacher development (Malčić & Marić Jurišin, 2022).

Studies and analyses of reflective teaching mainly focus on theoretical research (Farrell, 2004; Gnawali, 2008; Gojkov, 2010; Hillier, 2005; Loughran, 2002; Marić Jurišin & Malčić, 2021; Pollard, 2002; Radulović, 2007) or review existing empirical research that promotes reflection, key characteristics of reflection (reflection-in-action, reflection-on-action) (Marcos et al., 2009), as well as the impact of reflection on teaching practice and professional teacher development (Bilač, 2015). The selection of the instrument used in this study, the Teaching Reflection Inventory (TRI), which encompasses all components of teacher reflection, was based on the analysis conducted by Akbari et al. (2010). After an in-depth review of the literature, these authors identified six elements of reflection (practical, cognitive, affective, metacognitive, critical, and moral), with each element containing seven behavioral indicators, covering what is considered reflective teaching practice. Initial research, as well as exploratory and confirmatory data analyses using the TRI instrument, led to its reduction to 29 items, removing the moral element and reducing the affective behavior items (Malčić & Marić Jurišin, 2022). The validated elements of teacher reflection that remained were cognitive, metacognitive, affective, practical, and critical. The validation of this instrument was conducted on a sample of 308 teachers from private and public schools in Turkey (Akbari et al., 2010). Furthermore, a second validation process of the instrument was carried out in Turkey with 173 instructor teachers working in English preparatory programs at four public universities in Ankara (Yeşilbursa, 2013). The obtained validation results were similar to those of the original study by Akbari et al. (2010). Specifically, the cognitive, metacognitive, and critical factors remained unchanged, whereas the affective and moral factors

were found to be unreliable. The author emphasized the importance of testing this scale in primary and secondary education (in addition to Turkish higher education) and in other cultural contexts (Yeşilbursa, 2013). The research we conducted did not identify any available sources regarding a second validation of this scale in our region, except for an empirical study conducted in Serbia (Malčić & Marić Jurišin, 2022). Given that a large body of research is based on a theoretical approach, it was of fundamental importance to test the psychometric properties of the Teaching Reflection Inventory (TRI) on a sample of teachers from primary schools and secondary vocational schools in the Republic of Srpska. This was the primary objective of our research. In addition to presenting the inventory itself, this study provides an overview of the factor structure, psychometric properties of the instrument, and potential recommendations based on the obtained results.

Methodological Approach to the Problem

The aim of our research is to determine the factor structure of the teacher reflection scale among primary and secondary school teachers in Banja Luka. The TRI was initially implemented in Iranian schools, institutes, and centers on a sample of 650 English language teachers. Due to incomplete data, the analysis considered responses from 300 participants from Tehran and six other Iranian provinces (Akbari et al., 2010). The scale was later revised and tested in Turkey on a sample of 157 teachers in a preparatory English language learning program at four public universities (Yeşilbursa, 2013). The most recent validation of the instrument for assessing teacher reflection was conducted by researchers from Serbia on a convenience sample of 310 primary school teachers from the Novi Sad region (Malčić & Marić Jurišin, 2022).

Sample and Research Procedure

During the 2023–2024 school year, when the study was conducted, the total number of teachers in primary schools in Banja Luka was 1,227 (Republika Srpska Institute of Statistics, 2024a), while the total number of teachers in secondary schools was 857 (Republika Srpska Institute of Statistics, 2024b). The convenience sample consisted of a total of 423 teachers—268 primary school teachers (63.36%) and 155 secondary school teachers (36.64%) from Banja Luka. Of the total respondents, 334 (79.00%) were female and 89 (21.00%) were male. The average age of teachers was $M = 43.69$ years, $Mo = 44$, and $Me = 43.00$ ($SD = 9.101$). Age data were missing for two respondents.

Regarding years of work experience in education, the findings were as follows: 62 teachers (14.7%) had up to 5 years of experience, 133 teachers (31.4%) had between 5 and 15 years, 140 teachers (33.1%) had between 15 and 25 years,

and 88 teachers (20.8%) had over 25 years of experience. In terms of educational attainment, most teachers held a bachelor's degree (317; 74.9%), followed by those with a pre-Bologna and Bologna master's degree (79; 18.7%). Additionally, 13 teachers (3.1%) had an associate degree, while an equal number of respondents (3; 0.7% each) had either a high school diploma (with a highly skilled employee qualification) or a doctoral degree. At the start of the survey, respondents were informed about the purpose of the study and the research team, and were assured of anonymity. Participants completed the instrument using survey/questionnaire and scaling techniques.

Instrument

The instrument was completed online, with seven respondents opting for the pen-and-paper format. The online version was sent to schools via email and further distributed by school pedagogues and principals. In one school, the pedagogue was responsible for administering the survey, where a group of seven teachers chose to complete it using the pen-and-paper format. Written consent for the use of the instrument was obtained from Malčić and Marić Jurišin (2022). In the first section of the instrument, respondents provided information about their employment in either primary or secondary school, gender, age, work experience, education level, self-assessment of financial status, subjects taught, frequency of seminar attendance, and criteria for seminar selection. In the second section, they completed a rating scale with 29 statements. According to Malčić and Marić Jurišin (2022), the scale was adapted from Akbari et al. (2010) and initially contained 42 items across six factors: practical, affective, cognitive, metacognitive, critical, and moral. After pilot testing and preliminary model testing by Akbari et al. (2010), the number of items was reduced to 29, removing the moral reflection element and halving the number of items in the affective factor. The same number of items was used by Malčić and Marić Jurišin (2022) in their study, where they identified 26 items and four factors (affective, metacognitive, cognitive, and practical). However, due to the low reliability of the practical reflection factor, they recommended a three-factor solution for examining the affective, cognitive, and metacognitive aspects of teacher reflection, using 23 items.

Data Analysis

After collecting the data, we calculated descriptive statistics, including measures of central tendency (mean, median, mode), measures of dispersion (standard deviation), as well as frequencies and percentages. Subsequently, we conducted factor analysis using Principal Component Analysis (PCA) to reduce the set of original variables to a smaller number of principal components (latent factors or underlying dimensions of teacher reflection). We assessed the suitability of the

data for factor analysis by calculating the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett’s Test of Sphericity. Additionally, we examined communalities, total variance explained, the scree plot (Cattell’s scree test), the rotated component matrix, and the component correlation matrix.

Results

A prerequisite for any factor analysis is to assess the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett’s test of sphericity. The adequacy of the sample is tested using the KMO test (Kaiser, 1970, 1974), while the strength of relationships among variables is assessed using Bartlett’s test of sphericity (Bartlett, 1954).

The KMO value can range from 0 to 1. The closer the KMO value is to zero, the greater the partial correlations relative to the total correlations, indicating that factor analysis is not justified. If the value is closer to one, partial correlations are small compared to the total correlations, meaning the correlation patterns are relatively compact, making factor analysis appropriate (Field, 2009). A KMO value above 0.5 is considered acceptable (Kaiser, 1974, as cited in Field, 2009), while a value between 0.8 and 0.9 is considered excellent (Hutcheson & Sofroniou, 1999, as cited in Field, 2009). In our study, the KMO statistic indicates excellent overall sampling adequacy (KMO = 0.9), implying that factor analysis is justified.

Bartlett’s test of sphericity is based on a clear null hypothesis: H_0 : The variables are orthogonal (the correlation matrix is an identity matrix). H_1 : The variables are not orthogonal (the correlation matrix differs from an identity matrix). In our study, we rejected the null hypothesis, finding that the items are sufficiently correlated and suitable for further analysis ($\chi^2 = 6284.470$; $p = .000$). We eliminated items 1, 2, 4, 23, and 24 after determining that they had low communalities and/or high loadings on multiple factors (high cross-loading).

Table 1. Communalities (Common Components)

Item	Initial	Extraction
3. After each lesson, I write about the achievements/failures of that lesson or share experiences with colleagues.	1.000	.362
5. I attend other teachers’ lessons to learn about their effective practices.	1.000	.796
6. I ask my colleagues to observe my lessons and provide suggestions for improvement.	1.000	.736
7. I read professional literature on effective teaching to improve my instruction.	1.000	.540
8. I participate in workshops, seminars, and conferences related to teaching and learning.	1.000	.431

9. I consider writing academic papers based on my classroom experiences.	1.000	.602
10. I read professional literature or browse the internet to keep up with the latest developments in my profession.	1.000	.563
11. I conduct small-scale research activities in my lessons to gain a better understanding of students' learning experiences.	1.000	.630
12. I believe classroom events are potential research topics and think about ways to investigate them.	1.000	.650
13. I talk to students to learn more about their learning styles and preferences.	1.000	.535
14. I talk to students to learn more about their family background, hobbies, interests, and abilities.	1.000	.415
15. I ask my students whether they like a particular lesson task or not.	1.000	.377
16. I reflect on my teaching style and how it impacts my lessons.	1.000	.633
17. I think about how my education and sociocultural context influence how I perceive myself as a teacher.	1.000	.690
18. I reflect on the meaning and significance of my role as a teacher.	1.000	.678
19. I try to identify which aspects of teaching bring me satisfaction.	1.000	.647
20. I think about my strengths and weaknesses as a teacher.	1.000	.649
21. I reflect on positive/negative role models I had as a student and how they influenced my teaching practice.	1.000	.646
22. I reflect on inconsistencies and contradictions that occur in my lessons.	1.000	.563
25. In my lessons, I include topics such as aging, AIDS, discrimination against women and minorities, and poverty.	1.000	.622
26. I think about the social values of teaching and how I influence my students' political views.	1.000	.661
27. I think about ways I can promote tolerance and democracy in my lessons and society in general.	1.000	.584
28. I consider whether gender, race, language, religion, national or social background can affect my students' achievements.	1.000	.651
29. I reflect on external social events that may influence my teaching.	1.000	.631

The number of factors can be determined using the Scree Plot (Field, 2009). Field (2009) states that the cutoff point is where the slope of the line significantly changes. The number of factors is determined by counting the number of points

to the left of the intersection of the X and Y axes (Field, 2009). Accordingly, our research findings indicate that four factors can be extracted (Figure 1).

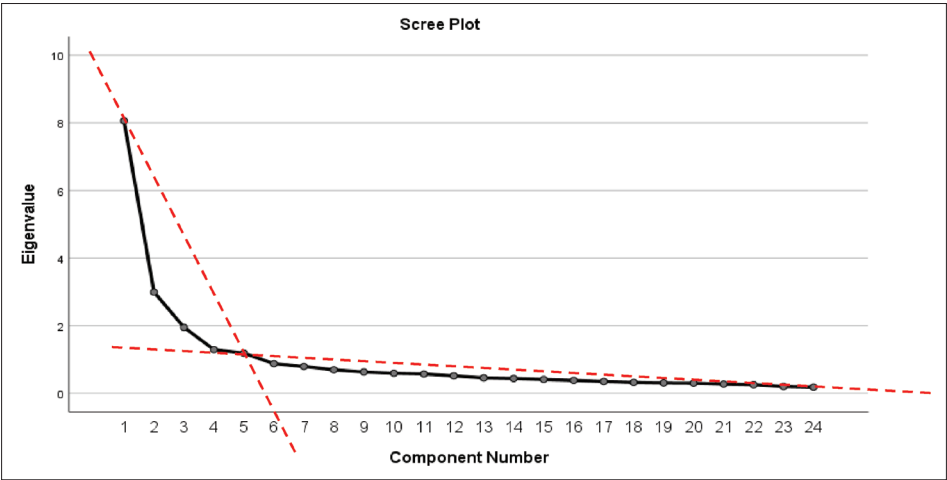


Figure 1. Number of factors determined using Scree Plot

Extracted Factors

Considering that Kaiser (1960) emphasized some ambiguity in the interpretation of scree plots, as well as a tendency to overestimate results obtained via the scree plot and Kaiser test, we opted to conduct an additional Horn’s parallel analysis. Parallel analysis (as an empirical method) is used to determine the underlying constructs that form the variance within a set of items and the number of factors that should be retained (Horn, 1965). As a result of this method, we identified a four-factor structure, presented in Table 2. These four factors explain a total of 59.552% of the variance, with retained communalities ranging from .362 to .796.

Table 2. Extracted Factors

Factors	Eigenvalue	% of explained variance	Cumulative % of variance
1	8.061	33.586	33.586
2	2.993	12.470	46.056
3	1.949	8.120	54.176
4	1.290	5.376	59.552

Factor 1: Affective Aspect of Reflection. This factor consists of ten statements (ordered by communalities from highest to lowest): 18. I reflect on the meaning and significance of my role as a teacher, 17. I think about how my education and sociocultural context influence how I perceive myself as a teacher, 21. I reflect

on positive/negative role models I had as a student and how they influenced my teaching practice, 20. I think about my strengths and weaknesses as a teacher, 16. I reflect on my teaching style and how it impacts my lessons, 19. I try to identify which aspects of teaching bring me satisfaction, 22. I reflect on inconsistencies and contradictions that occur in my lessons, 13. I talk to students to learn more about their learning styles and preferences, 14. I talk to students to learn more about their family background, hobbies, interests, and abilities, 15. I ask my students whether they like a particular lesson task or not.

Factor 2: Cognitive Aspect of Reflection. This factor includes six items (ordered by communalities from highest to lowest): 9. I consider writing academic papers based on my classroom experiences, 11. I conduct small-scale research activities in my lessons to gain a better understanding of students' learning experiences, 12. I believe classroom events are potential research topics and think about ways to investigate them, 10. I read professional literature or browse the internet to keep up with the latest developments in my profession, 7. I read professional literature on effective teaching to improve my instruction, 8. I participate in workshops, seminars, and conferences related to teaching and learning.

Factor 3: Metacognitive Aspect of Reflection. This factor consists of five statements (ordered by communalities from highest to lowest): 26. I think about the social values of teaching and how I influence my students' political views, 28. I consider whether gender, race, language, religion, national or social background can affect my students' achievements, 25. In my lessons, I include topics such as aging, AIDS, discrimination against women and minorities, and poverty, 29. I reflect on external social events that may influence my teaching, 27. I think about ways I can promote tolerance and democracy in my lessons and society in general.

Factor 4: Practical Aspect of Reflection. This factor comprises three statements (ordered by communalities from highest to lowest): 5. I attend other teachers' lessons to learn about their effective practices, 6. I ask my colleagues to observe my lessons and provide suggestions for improvement, 3. After each lesson, I write about the achievements/failures of that lesson or share experiences with colleagues.

Table 3. Rotated Component Matrix

Item	Component			
	1	2	3	4
18. I reflect on the meaning and significance of my role as a teacher.	.807			
17. I think about how my education and sociocultural context influence how I perceive myself as a teacher.	.786			
21. I reflect on positive/negative role models I had as a student and how they influenced my teaching practice.	.771			
20. I think about my strengths and weaknesses as a teacher.	.754			
16. I reflect on my teaching style and how it impacts my lessons.	.739			
19. I try to identify which aspects of teaching bring me satisfaction.	.727			
22. I reflect on inconsistencies and contradictions that occur in my lessons.	.674			
13. I talk to students to learn more about their learning styles and preferences.	.591			
14. I talk to students to learn more about their family background, hobbies, interests, and abilities.	.547			
15. I ask my students whether they like a particular lesson task or not.	.490			
9. I consider writing academic papers based on my classroom experiences.		.766		
11. I conduct small-scale research activities in my lessons to gain a better understanding of students' learning experiences.		.757		
12. I believe classroom events are potential research topics and think about ways to investigate them.		.755		
10. I read professional literature or browse the internet to keep up with the latest developments in my profession.		.708		
7. I read professional literature on effective teaching to improve my instruction.		.660		
8. I participate in workshops, seminars, and conferences related to teaching and learning.		.578		
26. I think about the social values of teaching and how I influence my students' political views.			.804	
28. I consider whether gender, race, language, religion, national or social background can affect my students' achievements.			.766	

25. In my lessons, I include topics such as aging, AIDS, discrimination against women and minorities, and poverty.			.744	
29. I reflect on external social events that may influence my teaching.			.696	
27. I think about ways I can promote tolerance and democracy in my lessons and society in general.			.674	
5. I attend other teachers' lessons to learn about their effective practices.				.873
6. I ask my colleagues to observe my lessons and provide suggestions for improvement.				.817
3. After each lesson, I write about the achievements/failures of that lesson or share experiences with colleagues.				.512

When it comes to the correlation matrix, promax rotation (a type of oblique rotation) is typically used to determine the correlation between factors (Bureau et al., 2023). However, promax rotation assumes that factors overlap, meaning that broader areas of generalization exist beyond just the primary factors, i.e., there are higher-order factors (Gorsuch, 1983). In contrast, varimax factor rotation considers factors in isolation from one another. If we apply Cohen's (1977) correlation thresholds—small correlation (0.10–0.29), medium correlation (0.30–0.49), and large correlation (≥ 0.50)—we can see from Table 4 that the correlations range from small (between the 2nd and 3rd factors, as well as the 1st and 4th factors) to medium (between the 1st and 2nd factors, the 1st and 3rd factors, and the 2nd and 4th factors).

Table 4. Component Correlation Matrix

Component	1	2	3	4
1	1.000	.416	.469	.226
2	.416	1.000	.196	.459
3	.469	.196	1.000	.164
4	.226	.459	.164	1.000

Scale Reliability

The reliability of the first factor (affective aspect of reflection) is Cronbach's $\alpha = .903$ (ten items). Removing item 14 would increase reliability by only .001. Considering both statistical and theoretical justification, we decided to retain this item.

Table 5. Item Analysis of the First Factor

Item	Scale mean if item deleted	Scale variance if item deleted	Corrected item-total correlation	Cronbach's alpha if item deleted
13	36.48	37.875	.540	.901
14	36.58	38.732	.485	.904
15	36.45	37.999	.723	.891
16	36.14	35.838	.759	.887
17	36.40	36.467	.734	.889
18	36.22	36.340	.713	.890
19	36.36	36.463	.720	.890
20	36.30	35.861	.712	.890
21	36.43	36.186	.631	.896
22	36.76	37.875	.540	.901

The item analysis of the second factor (cognitive aspect of reflection) yielded a scale reliability of Cronbach's alpha = .838 (six items). Removing any item would not increase the reliability coefficient.

Table 6. Item Analysis of the Second Factor

Item	Scale mean if item deleted	Scale variance if item deleted	Corrected item-total correlation	Cronbach's alpha if item deleted
7	16.19	18.271	.608	.814
8	16.56	17.767	.532	.828
9	17.69	16.261	.610	.815
10	16.13	17.870	.609	.813
11	17.03	17.047	.657	.803
12	16.99	16.411	.690	.796

The third factor contains five items (25, 26, 27, 28, 29) with a reliability level of .843. Removing any item would not increase the scale's reliability, so all items forming this factor were retained.

Table 7. Item Analysis of the Third Factor

Item	Scale mean if item deleted	Scale variance if item deleted	Corrected item-total correlation	Cronbach's alpha if item deleted
25	13.10	14.947	.649	.811
26	13.58	14.832	.635	.816
27	12.50	16.108	.640	.815
28	13.19	14.626	.676	.804
29	12.74	15.929	.657	.811

The fourth factor includes three items (3, 5, 6) that measure the practical aspect of reflection. The reliability of this scale is Cronbach's Alpha = .743. Removing the third item would increase reliability to Cronbach's Alpha = .875, but in that case, the third factor would consist of only two items, which would compromise its validity and stability (Cropley et al., 2011; Maini et al., 2019; Rahmatpour et al., 2020).

Table 8. Item Analysis of the Fourth Factor

Item	Scale mean if item deleted	Scale variance if item deleted	Corrected item-total correlation	Cronbach's alpha if item deleted
3	4.38	4.185	.358	.875
5	5.21	2.737	.743	.434
6	5.29	3.040	.645	.565

Analyzing the internal consistency of all four scales, we concluded that all four have a satisfactory reliability coefficient for further use. According to reliability thresholds (George & Mallery, 2003, as cited in Mohd Arof et al., 2018), the first scale has excellent reliability with an Alpha coefficient of .903, the second scale has good reliability with an Alpha coefficient of .838, the third scale also has good reliability with an Alpha coefficient of .843, and the fourth scale has an acceptable reliability coefficient of .743.

Discussion

The conducted research is based on the theoretical principles of Dewey and Schön (Akbari et al., 2010), who emphasize reflection as a key element of professional development, as well as studies (Larrivee, 2008; Loughran, 2002) that highlight the importance of reflective practice in transforming teachers' knowledge and practice. Therefore, our research contributes to the understanding of the construct of teachers' reflective practice, focusing on the validation of the Teaching Reflection Inventory (TRI).

Factor analysis confirmed the four-factor structure of the TRI instrument, explaining 59.552% of the variance. Cronbach's alpha coefficients confirm the high reliability of the scale: affective aspect $\alpha = .903$, cognitive aspect $\alpha = .838$, metacognitive aspect $\alpha = .843$, and practical aspect $\alpha = .743$. Thus, the research findings support the complex nature of teacher reflection, identifying four key aspects: affective, cognitive, metacognitive, and practical. Unlike the study by Malčić and Marić Jurišin (2022), in which a three-factor solution for assessing teacher reflection was recommended due to the low reliability of the last factor (practical aspect of reflection), our results align with earlier validation studies in Iran (Akbari et al., 2010) and Turkey (Yeşilbursa, 2013).

Examining the literature on the factor structure of teacher reflection scales, we identified several similar research findings. Lee (2005) developed and validated a measurement instrument for teacher reflection using confirmatory factor analysis, identifying three main dimensions: cognitive, methodological, and ethical. Postrojević and Vujisić Živković (2012) conducted a factor analysis of an instrument measuring teacher reflection in the Serbian context, identifying factors related to self-reflection, professional development, and critical thinking about teaching. Mansvelder-Longayroux and associates (2007) used factor analysis to assess teachers' portfolios, identifying the following components of reflection: description of experience, interpretation of experience, conceptualization, and reassessment of assumptions. Hatton and Smith (1995) conducted an extensive analysis of teacher reflection measurement instruments and identified four different levels of reflection: returning to experience, reflection-in-action, reflection-on-action, and critical reflection.

A comparative analysis of related studies indicates a consensus on the complexity of teacher reflection, with different research approaches recognizing the multidimensionality of this construct. Our research expands existing knowledge, emphasizing the importance of Dewey's and Schön's theoretical principles on reflection as a key element of professional development. Therefore, we conclude that reflection is a complex, multidimensional process encompassing various aspects of teachers' professional activity.

Conclusion

This validation study of the Teaching Reflection Inventory (TRI) on a sample of teachers from Banja Luka provided significant insights into the structure and reliability of the instrument for assessing teacher reflection. Factor analysis confirmed the four-factor structure of the instrument, explaining 59.552% of the total variance, and demonstrated satisfactory internal consistency for all subscales: affective, cognitive, metacognitive, and practical. This study confirms the multidimensional nature of teacher reflection and provides a valid instrument for its measurement. In this way, our research has expanded existing knowledge about the validity of the TRI instrument, demonstrating its applicability within the educational system and beyond the region of Banja Luka. The validated instrument can serve as a tool for teachers' professional development and for monitoring progress in reflective practice, as well as a diagnostic instrument for identifying professional development needs.

A limitation of this study is that the obtained research data cannot be generalized due to the relatively small sample size and its restriction to a single geographical region. Additionally, methodological bias characteristic of self-assessment is possible. Future research should include longitudinal studies that track the development of teachers' reflective practice over a longer period and

examine the correlation between TRI instrument results and other measures of teachers' professional development. Furthermore, a comparative analysis of the TRI instrument across multiple countries would be beneficial for cross-cultural validation and for exploring the possibility of developing a shorter version of the instrument that would be simpler to apply.

References

- Ahmed, E. W., & Al-Khalili, K. Y. (2013). The impact of using reflective teaching approach on developing teaching skills of primary science student teachers. *The Online Journal of New Horizons in Education*, 3(2), 58–64.
- Akbari, R., Behzadpoor, F., & Dadvand, B. (2010). Development of English language teaching reflection inventory. *System*, 38(2), 211–227. <https://doi.org/10.1016/j.system.2010.03.003>
- Andevski, M., Budić, S. i Gajić, O. (2015). *Profesionalno delovanje u učionici – put ka refleksivnom praktičaru*. Novi Sad – Vršac: Filozofski fakultet – Visoka škola strukovnih studija za obrazovanje vaspitača „Mihailo Palov”.
- Avalos, B. (2011). Teacher professional development in *Teaching and Teacher Education* over ten years. *Teaching and Teacher Education*, 27(1), 10–20. <https://doi.org/10.1016/j.tate.2010.08.007>
- Bartlett, M. S. (1954). A note on the multiplying factors for various χ^2 approximations. *Journal of the Royal Statistical Society. Series B (Methodological)*, 16(2), 296–298. <https://doi.org/10.1111/j.2517-6161.1954.tb00174.x>
- Bilač, S. (2015). Refleksivna praksa – čimbenik utjecaja na profesionalni razvoj, mijenjanje odgojno-obrazovne prakse i kvalitetu nastave. *Napredak: Časopis za interdisciplinarna istraživanja u odgoju i obrazovanju*, 156(4), 447–460.
- Brookfield, S. D. (1995). *Becoming a Critically Reflective Teacher*. San Francisco: Jossey Bass Publishers.
- Bureau, J.-F., Bandk, K., Deneault, A.-A., Turgeon, J., Seal, H., & Brosseau-Liard, P. (2023). The PPSQ: Assessing parental, child, and partner's playfulness in the preschool and early school years. *Frontiers in Psychology*, 14, 1–15. <https://doi.org/10.3389/fpsyg.2023.1274160>
- Cohen, J. (1977). *Statistical Power Analysis for the Behavioral Sciences* (Revised Edition). New York: Academic Press.
- Cowan, J. (1998). *On Becoming an Innovative University Teacher. Reflection in Action*. Buckingham: Society for Research into Higher Education and Open University Press.
- Cropley, D. H., Kaufman, J., & Cropley, A. (2011). Measuring creativity for innovation management. *Journal of Technology Management & Innovation*, 6(3), 13–30. <https://doi.org/10.4067/S0718-27242011000300002>
- Farrell, T. S. C. (2004). *Reflective Practice in Action: 80 Reflection Breaks for Busy Teachers*. Thousand Oaks: Corwin Press.
- Ferraro, J. M. (2000). *Reflective Practice and Professional Development*. New York: ERIC Digests.
- Field, A. (2009). *Discovering Statistics Using SPSS* (3rd ed.). Los Angeles – London – New Delhi – Singapore – Washington DC: Sage Publications Ltd.

- Gnawali, L. (2008). Teacher development through reflective practice. *Journal of Education and Research*, 1(1), 69–71. <https://doi.org/10.3126/jer.v1i0.7953>
- Gojkov, G. (2010). Teacher as a reflexive practitioner. *Godišnjak SAO za 2010*, 37–66.
- Gorsuch, L. R. (1983). *Factor Analysis* (2nd ed.). New Jersey: Lawrence Erlbaum Associates. <https://doi.org/10.4324/9780203781098>
- Hatton, N., & Smith, D. (1995). Reflection in teacher education: Towards definition and implementation. *Teaching and Teacher Education*, 11(1), 33–49. [https://doi.org/10.1016/0742-051X\(94\)00012-U](https://doi.org/10.1016/0742-051X(94)00012-U)
- Hegarty, B. (2011). *A Framework to Guide Professional Learning and Reflective Practice* (Unpublished doctoral dissertation). Faculty of Education, University of Wollongong.
- Hillier, Y. (2005). *Reflective Teaching in Further and Adult Education*. London: Continuum.
- Horn, J. L. (1965). A rationale and test for the number of factors in factor analysis. *Psychometrika*, 30(2), 179–185. <https://psycnet.apa.org/doi/10.1007/BF02289447>
- Hrevnack, J. R. (2011). Guided development of reflective thinking in the observations of classroom teachers by pre-service candidates. *Academy of Educational Leadership Journal*, 15(2), 81–93.
- Kaiser, H. F. (1960). The application of electronic computers to factor analysis. *Educational and Psychological Measurement*, 20(1), 141–151. <https://doi.org/10.1177/00131644600-2000116>
- Kaiser, H. F. (1970). A second generation little jiffy. *Psychometrika*, 35(4), 401–415. <https://doi.org/10.1007/BF02291817>
- Kaiser, H. F. (1974). An index of factorial simplicity. *Psychometrika*, 39(1), 31–36. <https://doi.org/10.1007/BF02291575>
- Kolb, D. A., Boyatzis, R. E., & Mainemelis, C. (2001). Experiential learning theory: Previous research and new directions. In: R. J. Sternberg & L.-f. Zhang (Eds.), *Perspectives on Thinking, Learning, and Cognitive Styles* (pp. 227–247). Mahwah, New Jersey: Lawrence Erlbaum Associates Publishers.
- Larrivee, B. (2005). *An Educator's Guide to Teacher Reflection*. Stamford, CT: Cengage Learning.
- Larrivee, B. (2006). *An Educator's Guide to Teacher Reflection*. Boston, MA: Houghton Mifflin.
- Larrivee, B. (2008). Development of a tool to assess teachers' level of reflective practice. *Reflective Practice*, 9(3), 341–360. <https://doi.org/10.1080/14623940802207451>
- Lee, H. J. (2005). Understanding and assessing preservice teachers' reflective thinking. *Journal of Teacher Education*, 56(3), 222–236. <https://doi.org/10.1016/j.tate.2005.05.007>
- Loughran, J. J. (2002). Effective reflective practice: In search of meaning in learning about teaching. *Journal of Teacher Education*, 53(1), 33–43. <https://doi.org/10.1177/0022487102053001004>
- Maini, R., Lohmann, J., Mounier-Jack, S., & Borghi, J. (2019). Measuring the motivation of health workers: A reflection on the methodological issues and lessons learnt (PREPRINT Version 1). *Research Square*. <https://doi.org/10.21203/rs.2.16460/v1>
- Malčić, B., & Marić Jurišin, S. (2022). Factor structure of the English Language Teaching Reflective Inventory (ELTRI) in the Serbian educational context. *Društvene i humanističke studije*, 2 (19), 635–654. <https://doi.org/10.51558/2490-3647.2022.7.2.635>
- Manouchehri, A. (2002). Developing teaching knowledge through peer discourse. *Teaching and Teacher Education*, 18(6), 715–737. [https://doi.org/10.1016/S0742-051X\(02\)00030-6](https://doi.org/10.1016/S0742-051X(02)00030-6)

- Mansvelder-Longayroux, D., Beijaard, D., & Verloop, N. (2007). The portfolio as a tool for stimulating reflection by student teachers. *Teaching and Teacher Education*, 23(1), 47–62. <https://doi.org/10.1016/j.tate.2006.04.033>
- Marić Jurišin, S. i Malčić, B. (2021). Refleksija nastavnika kao uslov unapređenja savremene školske kulture. U: *Zbornik radova: Jedanaesti međunarodni interdisciplinarni simpozijum „Susret kultura”* (str. 105–120). Novi Sad: Filozofski fakultet.
- Mena Marcos, J. J., Sánchez Miguel, E., & Tillema, H. H. (2009). Teacher reflection on action: What is said (in research) and what is done (in teaching). *Reflective Practice*, 10(2), 191–204. <https://doi.org/10.1080/14623940902786206>
- Meyer, H. (2005). *Što je dobra nastava?*. Zagreb: Erudita.
- Mohd Arof, K. Z., Ismail, S., & Saleh, A. L. (2018). Contractor's performance appraisal system in the Malaysian construction industry: Current practice, perception and understanding. *International Journal of Engineering & Technology*, 7(3.9), 46–51. <http://dx.doi.org/10.14419/ijet.v7i3.9.15272>
- Pollard, A. (Ed.). (2002). *Readings for Reflective Teaching*. London: A&C Black.
- Postrojević, A. i Vujisić Živković, N. (2012). Profesionalna refleksija nastavnika – teorijski okvir i empirijska istraživanja. *Pedagogija*, 67 (3), 411–422.
- Radulović, L. (2007). Istraživanje i razvijanje obrazovanja nastavnika za refleksivnu praksu –kritički prikaz jednog istraživanja kao građenje obrazovnog programa. *Pedagogija, LXII* (4), 136–151. <https://reff.f.bg.ac.rs/handle/123456789/644>
- Rahmatpour, P., Sharif Nia, H., Sivarajan Froelicher, E., Kaveh, O., Pahlevan Sharif, S., & Taghipour, B. (2020). Psychometric evaluation of Persian Version of Nurses' Intention to Care Scale (P-NICS) for patients with COVID-19. *International Journal of General Medicine*, 13, 515–522. <https://doi.org/10.2147/IJGM.S260579>
- Republika Srpska Institute of Statistics. (2024a). *Primary Education*. Republika Srpska Institute of Statistics. <https://www.rzs.rs.ba>
- Republika Srpska Institute of Statistics. (2024b). *Secondary Education*. Republika Srpska Institute of Statistics. <https://www.rzs.rs.ba>
- Schön, D. A. (1983). *The Reflective Practitioner: How Professionals Think in Action*. New York: Basic Books.
- Schön, D. A. (1987). *Educating the Reflective Practitioner*. San Francisco, CA: Jossey-Bass.
- Snoeck, M., Eisenschmidt, E., Forsthuver, B., Holdsworth, P., Michaelidou, A., Dahl, J., & Pachler, N. (2010). *Developing Coherent and System-Wide Induction Programmes for Beginning Teachers: A Handbook for Policy Makers*. Brussels: European commission.
- Soisangwarn, A., & Wongwanich, S. (2014). Promoting the reflective teacher through peer coaching to improve teaching skills. *Procedia—Social and Behavioral Sciences*, 116, 2504–2511. <https://doi.org/10.1016/j.sbspro.2014.01.601>
- Šagud, M. (2011). Inicijalno obrazovanje odgajatelja i profesionalni razvoj. *Pedagogijska istraživanja*, 8(2), 259–267.
- Vujičić, L. (2007). Kultura odgojno-obrazovne ustanove i stručno usavršavanje učitelja. *Magistra Iadertina*, 2(1), 91–106. <https://doi.org/10.15291/magistra.882>
- Wood, E., & Bennett, N. (2000). Changing theories, changing practice: Exploring early childhood teachers' professional learning. *Teaching and Teacher Education*, 16(5–6), 635–647. [https://doi.org/10.1016/S0742-051X\(00\)00011-1](https://doi.org/10.1016/S0742-051X(00)00011-1)
- Yeşilbursa, A. (2013). Construct validation of the English Language Teaching Reflective Inventory with a sample of Turkish university EFL instructors. *English Language Teaching*, 6(5), 28–37. <https://doi.org/10.5539/elt.v6n5p28>

Немања Д. ВУКАНОВИЋ
Маргарета Г. СКОПЉАК
Татјана В. МИХАЈЛОВИЋ

Универзитет у Бањој Луци
Филозофски факултет
Катедра за педагогију и методике
Бања Лука (Република Српска, Босна и Херцеговина)

Факторска структура скале рефлексije наставника основних и средњих школа

Резиме

Рефлексija је кључни елемент професионалног развоја и трансформације наставничког знања и праксе. Представља сложен, вишедимензионалан процес који обухвата различите аспекте професионалног дјеловања наставника. Због тога је циљ нашег истраживања био да се установи факторска структура скале рефлексije на узорку од 423 наставника из Бање Луке, од чега 268 из основних школа и 155 из средњих школа. Примijeњен је истраживачки инструмент Инвентар рефлексije у настави (ИРН). У сврху утврђивања факторске структуре скале израчунате су мјере дескриптивне статистике, КМО и Бартлеров тест, ниво комуналитета сваке промјенљиве, Кателов тест одрона, матрица компоненти, ротирајућа матрица компоненти и матрица трансформације компоненти. Издвојена су четири фактора који имају задовољавајућу унутрашњу конзистентност: афективни ($\alpha = ,903$), когнитивни ($\alpha = ,838$), метакогнитивни ($\alpha = ,843$) и практични аспект ($\alpha = ,743$). Добијени резултати указују да је примijeњени инструмент валидан за мјерење наставничке рефлексije, те да може служити као средство за професионални развој наставника. С обзиром на величину узорка, било би пожељно да се уради компаративна анализа овог инструмента у више земаља ради међукултуралне валидације, као и да се спроведу лонгитудинална истраживања која би пратила развој рефлексивне праксе наставника.

Кључне ријечи: рефлексивна пракса; Инвентар рефлексije у настави (ИРН); факторска анализа података; професионални развој наставника.



Овај чланак је објављен и дистрибуира се под лиценцом *Creative Commons ауторско-некомерцијално 4.0 међународна* (CC BY-NC 4.0 | <https://creativecommons.org/licenses/by-nc/4.0/>).

This paper is published and distributed under the terms and conditions of the *Creative Commons Attribution-NonCommercial 4.0 International* license (CC BY-NC 4.0 | <https://creativecommons.org/licenses/by-nc/4.0/>).