

## **ADAPTATION AND VALIDATION OF THE TEACHER PROFESSIONAL DEVELOPMENT QUESTIONNAIRE (PDQT) IN THE SERBIAN EDUCATIONAL CONTEXT**

**Stanislava D. Marić Jurišin\***

University of Novi Sad, Faculty of Philosophy

**Borka D. Malčić\***

University of Novi Sad, Faculty of Philosophy

**Tamara N. Dragojević\***

University of Novi Sad, Faculty of Philosophy

**Simona N. Bekić\***

University of Novi Sad, Faculty of Philosophy

---

### **ABSTRACT**

The improvement of the educational system requires the continuous professional development of teachers. In order to ensure the relevance and effectiveness of professional development programs, a study was conducted with the aim of performing a factor analysis of an instrument designed to assess teachers' professional development on a sample of 884 primary and secondary school teachers. The theoretical framework is grounded in the constructivist paradigm and the concept of lifelong learning, both of which emphasize reflection, collaboration, and ongoing professional growth. The findings indicate that the original eight-dimensional structure of the instrument was not confirmed; instead, it was reduced to five dimensions: learning environment, lesson planning, teaching research and evaluation, educational technology, and collaboration. The analysis further confirmed statistically significant correlations among the dimensions, while the internal consistency of the instrument proved to be exceptionally high. Based on these results, professional development programs can be designed to better align with the needs of teachers within the Serbian educational system and contribute to the enhancement of their teaching practice.

### **Key words**

*educational system, factor analysis, professional development, professional training, teachers.*

---

\* stashamaric@ff.uns.ac.rs, <https://orcid.org/0000-0002-4184-3309>

\* borka.malcic@ff.uns.ac.rs, <https://orcid.org/0000-0002-1862-962X>

\* tamara.dragojevic@ff.uns.ac.rs, <https://orcid.org/0009-0003-9363-8969>

\* simona.bekic@ff.uns.ac.rs, <https://orcid.org/0000-0002-0974-8846>

## Introduction

Teacher professional development represents the continuous enhancement of teaching competencies, achieved through both spontaneous and planned experiences, with the aim of improving the quality of education (Avis, Fisher, Thompson, 2018). This process is characterized by teachers, individually or in collaboration with colleagues, acting as agents of change by constantly re-examining, renewing, and strengthening their commitment to the ethical dimensions of the teaching profession (Day, 1999). Moreover, numerous studies (Kennedy, 2016; Osman & Warner, 2020) highlight the crucial role of professional development in fostering teacher motivation. Therefore, well-designed professional development programs are essential for advancing the educational system.

In the Republic of Serbia, teacher professional development is regulated by the Bylaw on Continuous Professional Development and Advancement in Titles of Teachers, Educators, and Professional Associates (*Official Gazette of RS*, No. 34/2021), as well as by the Standards of Competences for the Teaching Profession, Educators, and Professional Associates (2011). These documents define teachers' obligations with respect to continuous professional development, the system of credit accumulation, levels of career advancement, and the evaluation of teaching competencies. Contemporary educational policy in Serbia encourages teacher development through accredited forms of in-service training, self-monitoring of practice, and the application of reflective and research-based approaches. Considering the specific features of the national context, there is a clear need for instruments that are aligned with Serbian standards and are culturally and linguistically adapted to teaching practice.

*Theoretical Framework.* Teacher professional development is grounded in various theoretical approaches, among which constructivism and the concept of lifelong learning are particularly emphasized. From a constructivist perspective, learning is achieved through reflection and experience, positioning teachers as active participants in the educational process. Through research, dialogue, and collaboration with colleagues and students, teachers continuously develop and enhance their pedagogical skills (AbdulRab, 2023; Day, 1999). Constructivism is based on a “bottom-up” approach, beginning with initial education during university studies and extending into continuous, lifelong professional growth in practice (Rout & Behera, 2014). This model fosters collaboration, reflection, and experimentation, enabling teachers to build professional knowledge in a supportive environment, analyze teaching practices, explore new meanings, and broaden their understanding (Fung, 2000).

In contemporary society, rapid technological advancement and the expansion of knowledge impose the necessity of continuous teacher learning. Teachers can no longer rely solely on formal education and structured professional development programs; rather, ongoing professional growth has become indispensable throughout

their entire careers (Avis et al., 2018). In this regard, teacher professional development should not be viewed merely as an individual endeavor, but as part of a broader institutional and societal framework that evolves in line with contemporary educational demands. It is a multidimensional and dynamic process that integrates reflective practice, collaboration, and continuous alignment with professional standards in education (Marić Jurišin & Malčić, 2022). Guided by the constructivist perspective and the lifelong learning paradigm, the adaptation of the PDQT questionnaire was driven by the need to encompass the key aspects of teacher professional development within the Serbian educational system. This process involved reshaping certain dimensions of the questionnaire to better correspond with pedagogical practice and the professional standards of the Republic of Serbia. Although existing models of professional development are often multidimensional, most were initially conceptualized within Western educational systems and subsequently adapted for diverse cultural and educational contexts. For instance, the original PDQT instrument encompassed eight dimensions (Librera, Eyck, Doolan, Brady, Aviss-Spedding, 2004), while later validations of this model confirmed its multidimensional nature (Ayyoobi, Pourshafei, Asgari, 2016).

Building on the findings of previous studies (Chitanana, 2012; Molina & López, 2019), it was anticipated that certain dimensions might conceptually overlap, which justified the need to examine the factor structure of the PDQT questionnaire within the Serbian educational context.

*Objectives and hypothesis of the research.* The aim of this study was to examine the factor structure of the Professional Development Questionnaire for Teachers (PDQT) within the Serbian educational context. The original instrument, developed by Ayyoobi and colleagues (2016), was modified to align with Serbian educational policies, teaching practices, and frameworks for teacher professional development. Based on theoretical considerations and previous research on instrument validation, the study tested the following hypotheses: (1) H1: The original eight-factor structure of the PDQT will be confirmed in the Serbian educational context; (2) H2: There will be statistically significant correlations between the identified factors, supporting the theoretical relationships between different aspects of teacher professional development; (3) H3: The adapted PDQT will demonstrate high internal consistency (Cronbach's  $\alpha > .90$ ), ensuring the reliability of the instrument.

## **Method**

As the questionnaire was distributed online via social media and by directly reaching out to schools in Serbia through their official email addresses, this study utilized a convenience sampling method. Data collection took place during June and July 2024 using a Google Forms survey. Participants were required to provide basic sociodemographic information requested in the questionnaire and complete the Serbian-translated version of the PDQT questionnaire, which was adapted using the

back-translation method. The online survey was designed to be time-efficient, ensuring that respondents could complete it within approximately 15 minutes. To maintain transparency and accessibility, all participants were given the option to contact the researchers via email for any inquiries regarding the questionnaire or the study. The collected responses were stored in an electronic database and subsequently analyzed using JASP v .19. The study included 884 primary and secondary school teachers from Serbia, representing .5% of the total teaching population (Statistical Office of the Republic of Serbia, 2023). A stratified sampling method was applied to ensure balanced representation of demographic and professional characteristics. 752 women (85.1%) and 132 men (14.9%) participated in the research, reflecting this profession's gender demographics. Respondents in the age group 41–50 made up the largest part of this sample, (N = 321, 35.3%). The largest number of respondents have between 16 and 25 years of work experience behind them, followed by respondents with over 25 years of work experience. The largest number of respondents have completed master's studies (50%), and believe that their economic status is average for the Serbian context (66.6%). The sample includes the most teachers from the second cycle of primary education – from fifth to eighth grade (42.4%), as well as those teaching in urban school settings (64.3%).

*Table 1. Sample of the Study*

Variable	Level	Counts	Total	Percent
Gender	Male	132	884	14.9
	Female	751	884	85.1
Age group	24–30	55	884	6.2
	31–40	183	884	20.7
	41–50	320	884	36.2
	51–60	264	883	29.9
	61+	61	884	6.9
Years of work experience	1–5	91	884	10.3
	6–15	219	884	24.8
	16–25	304	884	34.4
	25+	269	884	30.5
Education level	Bachelor studies	405	884	45.9
	Master studies	442	884	50.1
	Specialist studies	26	884	2.9
	Doctoral studies	10	884	1.1
Economic status	Same as the majority	588	884	66.6
	Worse than the majority	234	884	26.5
	Better than the majority	61	884	6.9
School setting	Urban	568	884	64.3
	Rural	315	884	35.7

Variable	Level	Counts	Total	Percent
School type and level	Primary school – first cycle	246	884	27.9
	Primary school – second cycle	375	884	42.5
	Secondary vocational school	164	884	18.6
	Secondary grammar school	77	884	8.7
	Secondary art school	21	884	2.4

*Instrument.* For the purposes of this study, the *Professional Development Questionnaire of Teachers – PDQT* (Ayyoobi et al., 2016), was used. The original version of the questionnaire consisted of 47 items distributed across eight dimensions of teacher professional development: subject knowledge, learning environment, collaboration, educational technology, research orientation, educational planning, evaluation, and human resource development. In the process of adapting the instrument to the Serbian educational context, all items were reformulated in the first person singular, enabling the instrument to capture teachers’ self-assessment of their own behaviors, beliefs, and professional attitudes within the teaching process. In addition to linguistic and cultural adjustments, a revision of the factor structure was carried out based on the obtained empirical data.

## Results

This section outlines the prerequisites for conducting further analyses. To determine the appropriateness of factor analysis, the Kaiser-Meyer-Olkin (KMO) test of sampling adequacy and Bartlett’s test of sphericity were conducted. The KMO measure was .951, indicating excellent sample adequacy. Additionally, Bartlett’s test of sphericity was statistically significant ( $\chi^2 = 21.586.866$ ,  $df = 1.081$ ,  $p < .001$ ), confirming the presence of correlations among items, thereby justifying exploratory factor analysis (EFA).

*Table 2. Kaiser-Meyer-Olkin (KMO) sample adequacy and Bartlett sphericity test*

Kaiser-Meyer-Olkin Sampling Adequacy Measure	.951	
Bartlett’s Sphericity Test	Approximate Chi-square	21586.866
	Df	1081.00
	Sig.	< .001

*Construct Validity.* An exploratory factor analysis (EFA) was conducted to examine the latent structure of the PDQT instrument. Initially, the instrument encompassed eight dimensions; however, the analysis indicated that a five-factor model was optimal, suggesting conceptual overlap among certain dimensions compared to the original instrument. The component matrix obtained through factor analysis provided insights into the item loadings and their association with specific dimensions. The final five-factor model comprised: learning environment, lesson planning, teaching research and evaluation, educational technology, and collaboration.

*Table 3. Component Matrix from Factor Analysis*

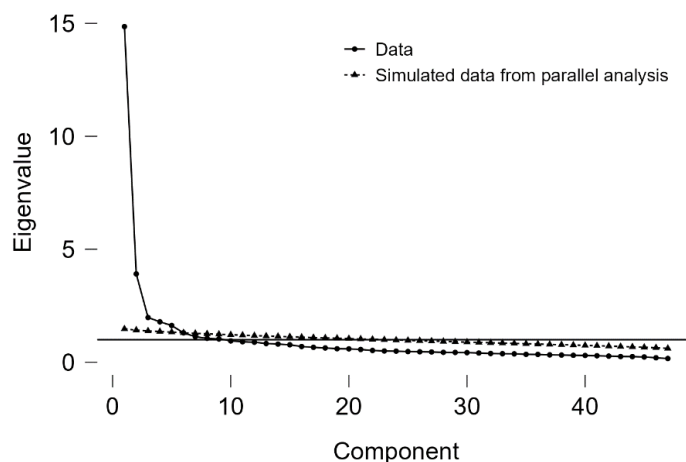
	1	2	3	4	5	Unique ness
3. I seek to develop my students' critical and creative thinking skills.	.885					.393
4. I help my students develop the skills necessary for solving problem situations.	.843					.406
15. I encourage my students to develop awareness of their own knowledge, skills, and attitudes.	.754					.417
2. I strive to develop enthusiasm in my students for the subject I teach by connecting content with everyday life.	.721					.493
8. In my teaching, I provide examples to help my students master concepts, skills, analysis, and synthesis of content.	.709					.465
11. In my teaching, I use principles and strategies that encourage positive student collaboration.	.683					.408
14. I develop a positive socio-emotional climate in my classroom.	.663					.470
1. Through the application of knowledge, I help my students better understand the subjects I teach.	.649					.586
13. I encourage my students to collaborate with one another.	.644					.473

	1	2	3	4	5	Unique ness
9. I adapt learning strategies to the students I teach.	.630					.474
12. I ensure conditions in my teaching that lead to effective student learning.	.619					.433
7. I connect teaching content with my students' prior knowledge and experience.	.580					.527
6. I design teaching content to be understandable for my students.	.578					.541
5. I regularly evaluate my teaching materials to ensure the applicability of acquired knowledge.	.437					.501
37. My lesson planning aligns with my students' prior knowledge.		.788				.461
44. In my teaching, I take into account individual differences among my students.		.764				.406
36. I use different lesson plans to improve my students' level of knowledge.		.706				.484
33. I design lesson plans based on my students' needs.		.694				.544
45. I am aware of my students' cognitive, social, and emotional differences.		.673				.428
46. I apply differentiation and individualization in working with my students.		.630				.481
34. I use my teaching experience to improve my students' learning.		.614				.416
35. I strive to integrate my knowledge, skills, and content from different scientific disciplines to provide an interdisciplinary approach to learning.		.547				.475
47. I attempt to connect my students' knowledge across different subjects.		.531				.462

	1	2	3	4	5	Unique ness
42. I use achievement test results to improve my teaching methods.		.444				.583
30. I publish the results of my research to inform colleagues about my findings.			.798			.358
29. I collaborate with professors and researchers who specialize in the discipline I teach.			.785			.402
28. I follow calls from various organizations for participation in educational projects.			.762			.381
31. I am interested in participating in research on the school work environment.			.624			.501
38. I evaluate my scientific results throughout the school year.			.461			.355
39. I use the results of my evaluation as a basis for making changes in the teaching process.			.451			.341
40. I employ various evaluation approaches to enhance my students' educational achievements.			.428			.315
26. I use educational content that requires the use of computers and/or other educational technologies.				.774		.455
24. To increase my teaching effectiveness, I apply different educational technologies.				.743		.352
25. By applying educational technology, I facilitate my students' learning.				.741		.371
23. To connect with parents and colleagues, I use electronic tools such as Viber groups, email, Google Classroom, and various educational platforms.				.616		.578

	1	2	3	4	5	Unique ness
21. To enhance my teaching, I use appropriate teaching materials.				.492		.504
22. I incorporate ideas from other experts to integrate different scientific disciplines into the teaching process.				.491		.547
19. To enrich my students' learning and improve the educational environment, I incorporate parents' and families' experiences into teaching.					.676	.534
18. I ask parents/guardians to take on the role of educators at home.					.672	.630
41. In collaboration with the school principal, I present evaluation results to parents.					.585	.401
16. To improve my students' knowledge, the school administration where I work collaborates with teachers.					.553	.692
17. Recognizing the role of the family, I maintain continuous relationships with my students' parents/guardians.					.513	.606
10. I foster a positive classroom climate because it influences learning effectiveness.						.786
20. I consult with colleagues on teaching-related issues.						.668
43. I set clear and high expectations regarding students' learning.						.807

The factor analysis indicated an optimal model with five dimensions, suggesting conceptual overlap among certain aspects of teacher professional development. The optimal number of factors was determined based on the eigenvalue criterion and a visual inspection of the scree plot (Figure 1), where a clear “elbow” point was observed, supporting the acceptance of the five-dimensional model.



*Graphic 1. Scree plot of the 47 items of the Serbian version of the PDQT questionnaire (n = 884)*

Although this reduction is statistically justified, it is important to consider its theoretical grounding. From the perspective of didactic literature, subject knowledge and lesson evaluation are often viewed as integral components of lesson planning (Vilotijević & Vilotijević, 2016). In practice, teachers perceive planning as an integrative process in which content, methods, and assessment are interwoven, while subject expertise is not regarded as a separate domain but rather as a means of designing and improving lesson plans.

Furthermore, several items demonstrated high uniqueness values, indicating their limited integration into the identified dimensions. For instance, item 10: *“I foster a positive classroom climate because it influences learning effectiveness”*, highlights the importance of classroom climate but is not directly connected with other items focused on specific teaching strategies. Similarly, item 20: *“I consult with colleagues on teaching-related issues”*, emphasizes the role of professional exchange, which may transcend individual domains such as technology or lesson planning. Item 43: *“I set clear and high expectations regarding student learning”*, reflects teachers’ expectations, which may represent an independent dimension of professional development. While these findings do not undermine the overall reliability of the instrument, they point to the need for further revision and refinement of certain items in future research.

*Table 4. Frequentist Individual Item Reliability Statistics of 47 items from the Serbian PDQT instrument (n = 884)*

Items	If item dropped	
	Cronbach's $\alpha$	Item-rest correlation
1. Through the application of knowledge, I help my students better understand the subjects I teach.	.940	.472
2. I strive to develop enthusiasm in my students for the subject I teach by connecting content with everyday life.	.940	.522
3. I seek to develop my students' critical and creative thinking skills.	.940	.493
4. I help my students develop the skills necessary for solving problem situations.	.939	.569
5. I regularly evaluate my teaching materials to ensure the applicability of acquired knowledge.	.939	.616
6. I design teaching content to be understandable for my students.	.940	.484
7. I connect teaching content with my students' prior knowledge and experience.	.940	.518
8. In my teaching, I provide examples to help my students master concepts, skills, analysis, and synthesis of content.	.939	.549
9. I adapt learning strategies to the students I teach.	.939	.602
10. I foster a positive classroom climate because it influences learning effectiveness.	.940	.351
11. In my teaching, I use principles and strategies that encourage positive student collaboration.	.939	.643
12. I ensure conditions in my teaching that lead to effective student learning.	.939	.649
13. I encourage my students to collaborate with one another.	.939	.584
14. I develop a positive socio-emotional climate in my classroom.	.939	.561
15. I encourage my students to develop awareness of their own knowledge, skills, and attitudes.	.939	.576
16. To improve my students' knowledge, the school administration where I work collaborates with teachers.	.941	.294

Items	If item dropped	
	Cronbach's $\alpha$	Item-rest correlation
17. Recognizing the role of the family, I maintain continuous relationships with my students' parents/guardians.	.940	.454
18. I ask parents/guardians to take on the role of educators at home.	.943	.157
19. To enrich my students' learning and improve the educational environment, I incorporate parents' and families' experiences into teaching.	.940	.408
20. I consult with colleagues on teaching-related issues.	.940	.403
21. To enhance my teaching, I use appropriate teaching materials.	.939	.554
22. I incorporate ideas from other experts to integrate different scientific disciplines into the teaching process.	.939	.548
23. To connect with parents and colleagues, I use electronic tools such as Viber groups, email, Google Classroom, and various educational platforms.	.940	.359
24. To increase my teaching effectiveness, I apply different educational technologies.	.939	.563
25. By applying educational technology, I facilitate my students' learning.	.939	.541
26. I use educational content that requires the use of computers and/or other educational technologies.	.940	.419
27. I engage in research related to the subject I teach.	.940	.455
28. I follow calls from various organizations for participation in educational projects.	.939	.524
29. I collaborate with professors and researchers who specialize in the discipline I teach.	.940	.481
30. I publish the results of my research to inform colleagues about my findings.	.940	.471
31. I am interested in participating in research on the school work environment.	.940	.494
32. I am aware of the importance of my students' learning outside of school and strive to incorporate those experiences into the classroom.	.939	.610
33. I design lesson plans based on my students' needs.	.939	.505
34. I use my teaching experience to improve my students' learning.	.939	.576

Items	If item dropped	
	Cronbach's $\alpha$	Item-rest correlation
35. I strive to integrate my knowledge, skills, and content from different scientific disciplines to provide an interdisciplinary approach to learning.	.939	.580
36. I use different lesson plans to improve my students' level of knowledge.	.939	.575
37. My lesson planning aligns with my students' prior knowledge.	.939	.551
38. I evaluate my scientific results throughout the school year.	.939	.600
39. I use the results of my evaluation as a basis for making changes in the teaching process.	.938	.623
40. I employ various evaluation approaches to enhance my students' educational achievements.	.938	.660
41. In collaboration with the school principal, I present evaluation results to parents.	.939	.535
42. I use achievement test results to improve my teaching methods.	.939	.545
43. I set clear and high expectations regarding students' learning.	.940	.394
44. In my teaching, I take into account individual differences among my students.	.939	.569
45. I am aware of my students' cognitive, social, and emotional differences.	.940	.494
46. I apply differentiation and individualization in working with my students.	.939	.575
47. I attempt to connect my students' knowledge across different subjects.	.939	.532

*Construct Reliability.* To assess the internal consistency of the adapted instrument, Cronbach's  $\alpha$  coefficients were calculated for all dimensions. The obtained values indicated a high level of reliability, confirming that all identified dimensions measure consistent aspects of teacher professional development. This result demonstrates that the instrument is both stable and reliable within the context of the Serbian educational system.

*Table 5. Cronbach's alpha for each factor*

Estimate	Cronbach's $\alpha$
Point estimate	.941
95% CI lower bound	.935
95% CI upper bound	.946

*Component correlation.* The correlation analysis indicated statistically significant associations among all dimensions of teacher professional development, confirming their mutual integration. A particularly strong correlation was observed between the learning environment and lesson planning ( $r = .653$ ), suggesting a close conceptual connection between these two dimensions. In teaching practice, lesson planning cannot be viewed in isolation from classroom climate, as teachers take into account the atmosphere of the class and the socio-emotional relationships among students when selecting methods and content (Vilotijević & Vilotijević, 2016). Conversely, the weakest correlations were found between educational technology and collaboration ( $r = .236$ ), as well as between research and technology ( $r = .252$ ). These findings may reflect the specificities of technology use in teaching, which depends on teachers' individual preferences and institutional support, as well as possible methodological limitations in the operationalization of these dimensions. When compared with the study by Österholm et al. (Österholm, Bergqvist, Liljekvist, Van Bommel, 2024), differences in the patterns of association become evident: whereas their research reported the strongest links between collaboration and research practice, in the Serbian context the strongest correlation was found between classroom climate and lesson planning.

*Table 6. Correlations between factors of the PDQT instrument*

	Envi- ronment	Pla- nning	Teaching research	Techno- logy	Collabo- ration
Learning environment	1.000	.653	.280	.510	.305
Lesson planning	.653	1.000	.398	.466	.377
Teaching research	.280	.398	1.000	.252	.439
Educational technology	.510	.466	.252	1.000	.236
Collaboration	.305	.377	.439	.236	1.000

## Discussion

Based on the obtained results, it can be concluded that the adapted instrument for assessing teacher professional development demonstrates high reliability and satisfactory construct validity. The reduction in the number of dimensions from eight to five facilitates interpretation and tailors the instrument to the specificities of the Serbian educational context. The identified dimensions: learning environment, lesson planning, teaching research and evaluation, educational technology, and collaboration represent key aspects of teacher professional development, whose interrelatedness was confirmed by the correlation analysis. These findings are consistent with those of Molina and López (2019), who also established a strong link between lesson planning and evaluation. Similarly, Kennedy (2016) emphasized that teacher professional development is often more appropriately represented through a smaller number of broadly defined dimensions. This view is supported by the present results, as the structure of the instrument was reduced from eight to five dimensions. Based on these findings, the first hypothesis, which predicted the retention of the original eight dimensions, was not confirmed.

The second hypothesis, which assumed the existence of correlations among the dimensions, was confirmed. The correlation analysis revealed statistically significant relationships between the dimensions, indicating their interconnection within the framework of teacher professional development.

The third hypothesis, which predicted high internal consistency of the instrument, was also confirmed. Dimensions such as learning environment and lesson planning are grounded in constructivist principles that emphasize teacher reflection and collaboration, which is consistent with previous research (Chitanana, 2012; Molina & López, 2019). Moreover, the overlap of items related to lesson planning highlights the importance of precise evaluation and adaptation of lesson plans to meet students' needs, which can enhance knowledge acquisition and retention (Richter & Richter, 2024). Effective teacher professional development programs improve lesson planning skills and promote strategies that increase student engagement (Kalinowski, Gronostaj, Vock, 2019). In addition, the integration of educational technology has proven to be a key element in contemporary education, as it enables the implementation of innovative teaching methods and personalized learning. The dimensions of educational technology and research and evaluation of teaching practice reflect the need for continuous improvement of skills related to the use of technology, which is consistent with the findings of Hennessy et al. (2022). Within the educational context, collaboration represents another important dimension, as teachers often emphasize the value of collegial support and teamwork. Unlike the findings of Österholm et al. (2024), who did not establish a significant correlation between collaboration with colleagues and changes in teaching practice, the results of this study indicate a meaningful impact of collaboration on the use of effective teaching strategies. Teacher collaboration is essential for experience sharing, professional support, and the

development of collaborative learning (Chan, Maneewan, Koul, 2021). Collaborative models and mentoring programs contribute to improving the quality of teaching and reducing teacher stress (Ilgan, Özü-Cengiz, Ata, Akram, 2015).

Nevertheless, although the adapted PDQT instrument demonstrated high overall reliability, it is necessary to highlight its limitations. Several items displayed high uniqueness values, suggesting weaker integration into the factor structure. The semantic ambiguity of certain items (16, 18, 43) may lead to different interpretations by teachers. Partial overlap of constructs was also observed, with some dimensions not being clearly delineated. In addition, the use of self-assessment and online data collection carries the risk of subjectivity in responses and potential influence of socially desirable behavior. While these findings do not diminish the applicability of the instrument, they indicate the need for further revision and refinement in future research. When interpreting the results, it is also important to consider the specific features of the Serbian educational context, particularly the regulatory framework of teacher professional development and the institutional forms of collaboration within schools.

## **Conclusion**

The key findings of this study demonstrate that the adapted version of the PDQT instrument is applicable within the Serbian context. The validated instrument can serve as a reliable tool for assessing the state of teacher professional development in educational institutions. The results highlight the need for professional development programs that foster teacher collaboration, create inclusive learning environments, and integrate educational technology into the teaching process. In addition, specific items that did not cluster within the existing dimensions may indicate additional aspects of professional development, thereby opening avenues for further theoretical and empirical research. It is particularly important that future studies examine the predictive validity of the instrument in relation to teaching practice outcomes and conduct longitudinal research to track changes in teacher professional development over time. In this way, the adapted PDQT may represent a significant contribution to improving the practice of evaluating teacher professional development and to the advancement of educational policies aimed at supporting the teaching profession.

## References

- AbdulRab, H. (2023). Teacher Professional Development in the 21st Century. *African Journal of Education and Practice*, 9(4), 39–50. <https://doi.org/10.47604/ajep.22>
- Ayyoobi, F., Pourshafei, H. & Asgari, A. (2016). Codification and Validation of Professional Development Questionnaire of Teachers. *International Education Studies*, 9(4), 215–224. <http://dx.doi.org/10.5539/ies.v9n4p215>
- Avis, J., Fisher, R. & Thompson, R. (2018). *Teaching in Lifelong Learning 3e: A guide to theory and practice*. Columbus: McGraw-Hill Education.
- Chan, S., Manewan, S. & Koul, R. (2021). Teacher educators' teaching styles: relation with learning motivation and academic engagement in pre-service teachers. *Tea-ching in Higher Education*, 28(8), 2044–2065.
- Chitanana, L. (2012). A constructivist approach to the design and delivery of an online professional development course: A case of the iEARN online course. *International Journal of Instruction*, 5(1), 23–48.
- Day, C. (1999). *Developing teachers: The Challenges of Lifelong Learning*. London: Falmer Press.
- Fung, Y. (2000). A constructivist strategy for developing teachers for change: a Hong Kong experience. *Journal of in-service education*, 26(1), 153–167. <https://doi.org/10.1080/13674580000200108>
- Hennessy, S., D'Angelo, S., McIntyre, N., Koomar, S., Kreimeia, A., Cao, L. & Zubairi, A. (2022). Technology use for teacher professional development in low-and middle-income countries: A systematic review. *Computers and Education Open*, 3, 100080.
- Ilgan, A., Özü-Cengiz, Ö., Ata, A. & Akram, M. (2015). The relationship between teachers' psychological well-being and their quality of school work life. *The Journal of Happiness & Well-Being*, 3(2), 159–181.
- Kalinowski, E., Gronostaj, A. & Vock, M. (2019). Effective professional development for teachers to foster students' academic language proficiency across the curriculum: A systematic review. *Educational Research and Evaluation*, 5(1), 1–23.
- Kennedy, M. M. (2016). How does professional development improve teaching? *Review of Educational Research*, 86(4), 945–980. <https://doi.org/10.3102/0034654315626800>
- Librera, W. L., Eyck, R. T., Doolan, J., Brady, J. & Aviss-Spedding, E. (2004). *New Jersey professional standards for teachers and school leaders*. New Jersey Department of Education.
- Marić Jurišin, S. & Malčić, B. (2022). *Samoprocena nastavničke profesije u savremenom obrazovnom kontekstu [Self-assessment of the teaching profession in the modern educational context]*. University of Novi Sad: Faculty of Philosophy.

- Molina, C. A. & López, F. S. (2019). Teachers' collaborative work: new toward for teacher's development. *Psicología Escolar e Educacional*, 23, 1–7. <http://dx.doi.org/10.1590/2175-35392019017926>
- Osman, D. J. & Warner, J. R. (2020). Measuring teacher motivation: The missing link between professional development and practice. *Teaching and Teacher Education*, 92, 103064. <https://doi.org/10.1016/j.tate.2020.103064>
- Österholm, M., Bergqvist, T., Liljekvist, Y. & Van Bommel, J. (2024). Professional development at national scale: Effects on teacher knowledge and practice. *Studies in Educational Evaluation*, 83, 101381. <https://doi.org/10.1016/j.stueduc.2024.101381>
- Richter, E. & Richter, D. (2024). Measuring the quality of teacher professional development: A large-scale validation study of an 18-item instrument for daily use. *Studies in Educational Evaluation*, 81, 101357. <https://doi.org/10.1016/j.stueduc.2024.101357>
- Rout, S. & Behera, S. K. (2014). Constructivist approach in teacher professional development: An overview. *American Journal of Educational Research*, 2(12A), 8–12. <https://doi.org/10.12691/education-2-12-2>
- Standards of Competences for the Teaching Profession, Educators, and Professional Associates (2011). *Official Gazette of the Republic of Serbia*, No. 5/2012.
- Statistical Office of the Republic of Serbia (2023). *Statistical Yearbook of the Republic of Serbia*. Statistical Office of the Republic of Serbia. <https://publikacije.stat.gov.rs/G2023/Pdf/G20232056.pdf>
- The Minister of Education, Science and Technological Development (2021). *Bylaw on Continuing Professional Development of Teachers and Education Staff*.
- Vilotijević, M. i Vilotijević, N. (2016). Model razvijajuće nastave [*Models of developmental teaching*]. Beograd: Učiteljski fakultet.