




# Presenting a Model for Managing Teachers' Professional Growth with a Meta-analyze Approach

Jabar. Rezaei<sup>1</sup>, Sepideh. Jafari<sup>2\*</sup>, Faranak. Omidian<sup>3</sup>

<sup>1</sup> PhD student, Department of Educational Management, Ahvaz Branch, Islamic Azad University, Ahvaz, Iran

<sup>2</sup> Assistant Professor, Department of Educational Management, Ahvaz Branch, Islamic Azad University, Ahvaz, Iran

<sup>3</sup> Associate Professor, Department of Educational Sciences, Dezful Branch, Islamic Azad University, Dezful, Iran

\* Corresponding author email address: [sepedehjafari1402@gmail.com](mailto:sepedehjafari1402@gmail.com)

## Article Info

### Article type:

Original Research

### How to cite this article:

Rezaei, J., Jafari, S., & Omidian, F. (2023). Presenting a Model for Managing Teachers' Professional Growth with a Meta-analyze Approach. *International Journal of Innovation Management and Organizational Behavior*, 3(1), 82-90.

<https://doi.org/10.61838/kman.ijimob.3.1.10>



© 2023 the authors. Published by KMAN Publication Inc. (KMANPUB), Ontario, Canada. This is an open access article under the terms of the Creative Commons Attribution-NonCommercial 4.0 International (CC BY-NC 4.0) License.

## ABSTRACT

**Objective:** The primary goal of this research was to present a model for managing teachers' professional growth using a meta-analyze approach.

**Method:** This study was classified as applied research in terms of its objective and qualitative in terms of the nature of its data and analysis style, employing a meta-analyze method. The method of data collection in this research was based on documentary information. Research data were collected and analyzed using a meta-analyze approach to gather data related to the study, which involved all studies conducted in the field of teachers' professional growth, and then the effective components in these studies were identified and extracted using the seven-step method of Sandelowski and Barroso (2007).

**Findings:** The findings indicated that the model for managing teachers' professional growth comprises 124 indicators and 10 main dimensions including: Education, Educational Technologies, Skill Development, Learning and Knowledge Transfer, Educational Leadership, Interaction and Collaboration, Individual Factors, Organizational Factors, Professional Growth Strategies, and Evaluation and Feedback.

**Conclusion:** Based on the results, it can be said that teachers' growth has various dimensions, thus, educational system planners can pay attention to these dimensions and act towards enhancing and better managing teachers' growth.

**Keywords:** *Professional growth, teachers, meta-analyze approach.*

## 1 Introduction

For years, the education literature has been engaged in the debate of whether "teacher quality is the most important school variable affecting student progress and improving school quality." In this context, educational leaders, theorists, and researchers have focused on how to

improve teaching quality to enhance learning and student progress. Each year, countries invest millions of dollars to improve the skills and competencies of their teachers through the development of opportunities for their professional growth (Clark & Mayer, 2023; Parsakia, 2023).

The concept of professional growth has been discussed since the 1970s and has been defined in various ways;

broadly and extensively, professional growth can be defined as the growth and progress of an individual in their profession and work. In recent years, teachers' professional growth has been considered a long-term process that includes regular opportunities and systematic and planned experiences for career growth and development. Professional growth is an evolving, transformative, evolving process and part of life's emergence, where the teacher always experiences differences and action, dynamism, creativity, and productivity are its perpetual features. During growth, the teacher becomes more aware of their strengths and weaknesses, constantly moving from the path of "being" to the path of "becoming" (Finkelstein et al., 2014; Kamarei et al., 2021).

In the modern era, an era of complexity, competition, rapid changes, and innovation, organizational managers are obliged to create change and employ new paradigms and review their management systems and thinking. Technology has advanced, and most students demand higher quality services, especially in the field of student services and education; therefore, school managers need flexible strategies to encourage creativity and personal responsibility among staff, as today's management scholars believe that human resources are the most important, valuable, and strategic organizational asset and one of the distinguishing features of organizations' superiority over each other (Baharifar & Elahi, 2021; Puentedura, 2014). They play one of the most important roles that affect and are affected by the organization and expect to have a role and participate in organizational decision-making. On the other hand, in an era of rapid transformations, organizations strive to adapt themselves to the external environment for continuous effectiveness and efficiency and place continuous development at the forefront of their actions. Based on this, it has been believed that motivating and promoting employee growth can enhance their production quality and performance (Mishra & Koehler, 2006).

Unfortunately, research results show that one of the most significant challenges for organizations in general and educational organizations, in particular, is the insufficient use of intellectual resources, mental capacity, and the potential capabilities of their human capital. Educational organizations, in order to achieve greater effectiveness and productivity and respond to social demands, have no choice but to create necessary conditions for maximizing the use of this capital. Among the methods recommended by experts is the growth of employees (Liu et al., 2016; Louis & Marks,

1998; Macfarlane, 2020; Patfield et al., 2023; Sharma & Pandher, 2018).

Growth is a process aimed at improving and enhancing employees' skills, including aspects such as interpersonal communications, organizational structure, and individual and mental-psychological characteristics (Syman et al., 2021). Growth in educational organizations is of greater importance and necessity than in other organizations; because education is a comprehensive, dynamic institution that significantly impacts the overt and covert behaviors, norms, ethical, political, economic, religious, legal, social, and cultural aspects of society; the nature of its activities and its goals are to raise the spirit of creativity, flourishing, and the manifestation of talents, raising the level of general and specialized awareness, and setting policy in achieving excellence, development, happiness, and progress. However, studies conducted in the country show that currently, the human resource management system of the Ministry of Education lacks a suitable overall structure for the growth of its employees. Therefore, it can be stated that without having growing and efficient human resources, achieving organizational goals and vision is not possible, thus human resources play a fundamental role in the dynamic progress and growth or failure and destruction of organizations. It can be said that human resource growth is a new and effective approach towards developing employees' key competencies, thereby increasing productivity and creating a competitive advantage for the organization. Researchers consider professional growth as a way to increase decision-making at lower levels of the organization and strengthen employees' work experiences (Sharma & Pandher, 2018; Syman et al., 2021; Yakubov, 2021).

In fact, the mechanism of growth can be described in such a way that employees, through their knowledge, experience, and expertise, have latent power. Hence, growth involves unlocking and valuing this power, or in other words, it is the process of empowering individuals. This mechanism provides the potential capacities for using the potentials and talents of human resources that have been neglected. Growth is a macro policy used for continuous improvement and is a sign for employing experts' competencies in creative and innovative ways in all aspects of organizational performance. Growth connects the individual with others and means creating a common horizon that the organization should reach, skillfully linking organizational culture and environment with operational values, enabling all employees to creatively and actively collaborate in pursuing

organizational goals (Marzano & Warrick, 2011; McTighe & Wiggins, 2013; Polya, 2004).

Professional growth of teachers, as the main body of education, requires special attention, and it is necessary to first become familiar with the basics of teachers' professional growth. The topic of professional growth of teachers is an evolving, transformative process and part of life's emergence, where the teacher always experiences differences, and action, dynamism, creativity, and productivity are its perpetual features. By engaging in the implementation of the curriculum, the teacher gains new insights and understandings, in fact, it is the process of re-evaluating and shaping beliefs, values, and activities of the teacher, during which teachers as agents of change review and expand their commitment to the ethical ends of teaching and during this process create in themselves the knowledge, skills, and emotional intelligence required for thoughtful and professional performance, where learning is a lifelong process always creating new understandings for the teacher and continuously evolving their professional identity. In the course of growth, the teacher becomes more aware of their "weaknesses and abilities" and constantly has the path of being in front of the path of becoming (Kerr, 2022). Professional growth is a tool that countries use to improve the knowledge and skills of their employed teachers (Anna et al., 2022). In other words, professional growth is considered the most common prescription for enhancing the effectiveness and health of educational systems. Facilitating the professional growth of teachers is very important for policymakers and stakeholders to improve the quality of teaching and learning in schools. Investing in the professional growth of teachers guarantees higher student success (Liu et al., 2016; Louis & Marks, 1998).

To better understand how teachers can grow professionally, it is necessary to determine the various dimensions of growth for teachers. On the other hand, before starting the professional growth process, it is important to define what growth is, how it affects teacher and student outcomes, and to identify the effective factors and grounds affecting it (Buczynski & Hansen, 2010). Existing research has depicted an increasing demand for teachers' professional growth (Buczynski & Hansen, 2010; Conradt & Bogner, 2020; Feeney, 2017; Finkelstein et al., 2014; Garet et al., 2001; Girvan et al., 2016). In this way, the multidimensional structure and practical development of teachers' professional growth complicates the process through which it is implemented, but does not make it impossible. Therefore, to provide a meaningful and holistic view of professional

growth, a comprehensive model is needed. Hence, this study aims to present a model of teachers' professional growth with a meta-analyze approach to address the existing gap in research that reflects different perspectives and approaches around teachers' professional growth. This study will be conducted with the aim of providing a model of teachers' professional growth with a meta-analyze approach.

## 2 Methods and Materials

### 2.1 Study Design and Data Collection

This study is applied in terms of its objective and qualitative in nature regarding data and analysis style, conducted through a meta-analyze approach. Qualitative research is an approach to discover and understand the meaning that individuals or groups attribute to a social or human problem. The research process involves forming questions and methods of data collection, usually in the natural setting of research participants, analyzing data inductively from specific to general themes, and the researcher's interpretation of the meaning of data. The final report has a flexible structure, and those who engage in this type of research support inductive research focused on understanding or meaning from people's environments and the importance of expressing the complexity of the studied situation.

The method of data collection in this research is based on documentary information. Research data were collected and analyzed using a meta-analyze method to gather data related to the study, which involved all studies conducted in the field of teachers' professional growth, and then the effective components in these studies were identified and extracted using the seven-step method of Sandelowski and Barroso (2007). In this study, all published research in reputable domestic and international scientific databases were surveyed based on defined keywords to achieve a sample that would result in theoretical saturation. The basis of validity for this research was theoretical validity, and to achieve it, extensive field studies, theoretical pluralism, and the application of expert opinions were used. The research method is analytical-descriptive, and for data analysis, open and axial coding methods were used.

### 2.2 Data Analysis

To examine the findings in this research, the Sandelowski and Barroso meta-analyze method was used, which includes seven steps or stages:

1. The first step is setting research questions,
2. The second step is a systematic review of texts,
3. The third step is searching for and selecting appropriate articles,
4. The fourth step is extracting results,
5. The fifth step is analyzing and synthesizing qualitative findings,
6. The sixth step is controlling extracted codes, and the seventh step is presenting the findings.

### 3 Findings and Results

After identifying the research literature and selecting the relevant studies, the characteristics of teachers' professional growth were discovered among the data. In this step of the meta-analyze process, to analyze and then synthesize the qualitative findings, the characteristics affecting teachers'

professional growth were initially identified and categorized in the form of codes from the findings of previous research. This was done comparatively. At each stage, new codes were compared with previous ones and categorized into that section if they belonged to one of those codes. During this activity, previous codes were also revised as necessary. For example, some codes were deleted, merged, or new codes were defined. This method literally presents a strong synthesis and analysis of data from the studies. It is used to identify important and abstract concepts from separate studies. After that, the construction of classes and categories of relationships was undertaken in an accumulative manner throughout the study. Finally, the indicators and the relationships between them were categorized to present a coherent and systematic model. Table 1 presents a list of codes along with the number of articles referring to each code.

**Table 1**

*Summary of Extracted Codes*

Row	Code	Frequency
1	Formal education	11
2	Educational experience	4
3	Budget and financial resources	2
4	Technological factors	8
5	Virtual space-based learning	2
6	Training courses	5
7	Educational planning	2
8	Assessment of teachers' professional competency	2
9	Teachers' lived experiences and professional identity	2
10	Teachers' attitudes	5
11	Attention to learner diversity and their special needs	2
12	Knowledge management and sharing	3
13	Teaching skills	3
14	Research skills	4
15	Practical and experimental skills	3
16	Communication skills	4
17	Teaching methods	3
18	Performance evaluation	4
19	Different learning styles	4
20	Ability to transfer, disseminate, and expand knowledge	4
21	Research project management	2
22	Teamwork skills in research	2
23	In-service training	9
24	Effective educational leadership	11
25	Executive management and its styles	3
26	Collaboration with executive units	2
27	Problem-solving and conflict resolution	3
28	Cognitive skills	5
29	Self-change	1
30	Laws and regulations	4
31	Participation in developing professional growth strategies	5
32	Professional growth centers in education departments	1
33	Conducting training workshops	5
34	Visiting other schools	1

35	Coaching sessions	1
36	Personality traits	5
37	Utilization of appropriate professional growth methods	1
38	Skill development	4
39	Personal growth and capability	4
40	Decision-making independence	5
41	Responsibility for one's decisions (Autonomy)	4
42	Educational belief systems	2
43	Pre-learned concepts by teachers	1
44	Individual factors	7
45	Organizational factors	7
46	Management factors	3
47	School and organizational culture	5
48	Providing opportunities for growth and flourishing	4
49	Organizational climate	2
50	Empowerment	2
51	Educational needs assessment	5
52	Mission and clear vision	1
53	Appreciation and encouragement	1
54	Environmental-educational factors	7
55	Motivational strategies	3
56	Teachers' motivation and expectations	5
57	Specialized-professional teaching groups	2
58	School factors	3
59	Counseling	1
60	Educational strategies	7
61	Individual functions and outcomes	3
62	Efficient educational programs	2
63	Job competencies and skills	5
64	Collaborative learning	7
65	Self-learning	1
66	Self-directed learning	2
67	Personal development strategies	3
68	Specialized knowledge	6
69	Information technology knowledge	4
70	Personal ethics	2
71	Intra-organizational communication	3
72	Extra-organizational communication	5
73	Knowledge leadership program	2
74	Objectives and explanation of performance dimensions of educational groups	1
75	Supervision and guidance of educational group leaders on school educational activities	3
76	Institutionalization of process-oriented evaluation	4
77	Formal professional training programs	2
78	Managerial support for improvement programs	3
79	Creating a suitable environment for teacher development	1
80	Organizational learning	3
81	Cultural-social factors	2
82	Professional ethics and behavior	4
83	Collaborative and reflective strategies	5
84	Professional collaboration among teachers	3
85	Self-regulated learning	3
86	Globalization	1
87	Reevaluation in teacher assessment	4
88	Educational content knowledge	2
89	Validation of education	1
90	Teacher-led education based on participation	2
91	Teachers' attitudes towards educational changes	3
92	Competency in using information and communication technology	4
93	Active learning	3
94	Collective participation	5
95	Collaboration between university researchers and teachers	7

96	Support from supervisors and school leaders	2
97	Collaboration and cooperation among teachers	4
98	Learning-focused leadership	2
99	Teacher trust	3
100	Motivation for professional development	3
101	Learning culture	2
102	Focus on education	1
103	Self-organization	1
104	Collaboration and participation of teachers	7
105	Innovative attitude	2
106	University interaction with teachers	3
107	Support and encouragement from leaders	7
108	Teachers' collaboration and cooperation with other schools	5
109	Effective mechanism for teacher selection	2
110	Effective support systems and structures	1
111	Infrastructure for educational development	2
112	Time for planning and preparation of teachers	3
113	Development of educational technologies	3
114	Joint work and learning	2
115	Organizational and school changes	2
116	Primary teachers' participation in the planning and implementation of educational activities	2
117	School leaders	3
118	Educational system	1
119	Self-efficacy	4
120	Flexibility and responsiveness	3
121	Digital competencies	2
122	Organization of educational activities	2
123	Lifelong learning	2
124	Positive relationships between teacher and administrator	2

Using content analysis on 154 selected final articles, a total of 124 codes were identified, and their frequencies determined. After extracting the codes, they were categorized under the relevant sub-components. The sub-components were then categorized under key components, and in this way, we achieved a higher level of organization and integration of information, which organized the main

goal of our research. Ultimately, after open and axial coding, the researcher was able to provide a more general classification of the key components affecting professional growth to present a suitable framework for teachers' professional growth and introduced 10 main dimensions. The introduced dimensions are stated in [Table 2](#).

**Table 2**

*Dimensions of Teachers' Professional Growth*

Dimensions of Managing Professional Growth
Education
Educational Technologies
Skill Development
Learning and Knowledge Transfer
Educational Leadership
Interaction and Collaboration
Individual Factors
Organizational Factors
Professional Growth Strategies
Evaluation and Feedback

To control the quality of coding for the characteristics extracted from selected research and their categorization under sub-components, components, and dimensions; initially, the list of codes and their categorization under sub-

components, components, and dimensions was provided to two experts in the field. After applying their opinions, the comparison of the researcher's view with another expert researcher (the second researcher) was used. In this context,



the Cohen's Kappa coefficient was used. For this purpose, the list of extracted codes was given to the second researcher, who then proceeded to categorize the codes under sub-components and components. Then, the Kappa coefficient of the components presented by the two researchers was calculated using SPSS software.

Given the validation of the extracted codes and the categorization of codes (characteristics) under sub-

components, components, and dimensions, and the validation of their quality through the Cohen's Kappa test, the next step was to examine and analyze them. The calculation result of the index value using SPSS software was 0.682 at a significance level of 0.0001, as shown in [Table 3](#). Given the significance number is less than 0.05, the hypothesis of the reasoning of extracted codes is rejected. Also, the extraction of codes had appropriate reliability.

**Table 3**

*Summary of Cohen's Kappa Coefficient Calculations*

	Value	Standard Deviation	Significance Level
Cohen's Kappa Value	0.682	0.063	0.0001
Number of Valid Items	204		

#### 4 Discussion and Conclusion

The aim of the present study was to present a model for managing teachers' professional growth with a meta-analyze approach. The validity of the findings from the meta-analyze qualitative research was conducted using the procedures presented by Sandelowski and Barroso (2007), and it can be stated that the findings of the meta-analyze method provided have descriptive, interpretative, theoretical, and practical validity. The research findings showed that the basis of the extracted dimensions is 124 characteristics identified from the synthesis of 154 systematically selected articles. The result was the identification of 10 key components that introduce the characteristics of teachers' professional growth, including: Education, Educational Technologies, Skill Development, Learning and Knowledge Transfer, Educational Leadership, Interaction and Collaboration, Individual Factors, Organizational Factors, Professional Growth Strategies, and Evaluation and Feedback. To develop a suitable framework for teachers' professional growth, these components were categorized under the specified dimensions accordingly, with 4 components in the dimension of Education, 2 components in the dimension of Educational Technologies, 3 components in the dimension of Skill Development, 2 components in the dimension of Learning and Knowledge Transfer, 2 components in the dimension of Educational Leadership, 4 components in the dimension of Interaction and Collaboration, 6 components in the dimension of Individual Factors, 4 components in the dimension of Organizational Factors, 3 components in the dimension of Professional Growth Strategies, and 2 components in the dimension of Evaluation and Feedback. In explaining the results, it must be said that teachers'

professional growth is tantamount to empowerment. When teachers are empowered by their organization, they will have development in various professional dimensions. On the other hand, education and development play a very vital role in the growth and professional development of teachers in the field of education. Education, as a systematic and dynamic process, acquaints teachers with modern teaching theories and methods, updated curriculum content, and active learning techniques (Baharifar & Elahi, 2021; Clark & Mayer, 2023). This process enables teachers to keep pace with continuous developments in the field of education and learning and enhance their capabilities. Professional development, through in-service training and continuous learning opportunities, exposes teachers to the process of continuous improvement. This process not only has a direct impact on improving teaching skills but also helps to enhance motivation, create positive connections in the educational environment, and professional excellence of teachers (Osterman & Kottkamp, 2004; Tomlinson, 2017). Generally, attention to education and development as a fundamental factor leads to the improvement of education quality and guides teachers' career paths towards continuous advancement and growth. Also, technology factors play a crucial role in the growth and professional development of teachers, especially in today's advanced world. The use of modern technologies in the teaching and learning process of teachers provides the opportunity to enhance teaching methods and create diverse and dynamic educational experiences. The use of educational technologies enables teachers to bring the most up-to-date educational resources to students and align their teaching approaches with modern perspectives (Parsakia, 2023). On the other hand, participation in online educational environments and the use

of virtual tools like video conferences allow teachers to strengthen professional connections and benefit from the exchange of experiences with colleagues. Overall, technology as an empowering tool aids in the professional advancement of teachers, increases flexibility in the use of teaching methods, and improves their educational performance.

Among the limitations of this study, it can be noted that it was conducted only with a meta-analyze approach, and the results of this study were dependent on the validity of previous studies. Also, the number of articles that met the criteria was limited, indicating a research gap. Therefore, it is recommended that future researchers use mixed methods. It is also suggested that the Ministry of Education form a working group to define and prioritize the various dimensions of teachers' professional growth and manage it.

## References

- Baharifar, A., & Elahi, S. (2021). *Designing a structure for the documentation of managers organizational experiences* (Vol. 9). Tarbiat Modares University. [https://mri.modares.ac.ir/article\\_236\\_c59825420d0658b1f2b74cfd21a5ff14.pdf](https://mri.modares.ac.ir/article_236_c59825420d0658b1f2b74cfd21a5ff14.pdf)
- Buczynski, S., & Hansen, C. B. (2010). Impact of professional development on teacher practice: Uncovering connections. *Teaching and Teacher Education*, 26(3), 599-607.
- Clark, R. C., & Mayer, R. E. (2023). *E-learning and the science of instruction: Proven guidelines for consumers and designers of multimedia learning*. John Wiley & sons. <https://doi.org/10.1002/9781119239086>
- Conradty, C., & Bogner, F. X. (2020). STEAM teaching professional development works: effects on students' creativity and motivation. *Smart Learning Environments*, 7(1), 26. <https://doi.org/10.1186/s40561-020-00132-9>
- Feeney, S. E. (2017). Maximizing career and professional development during doctoral training. *The FASEB Journal*, 31(S1), 260.263-260.263. [https://doi.org/10.1096/fasebj.31.1\\_supplement.260.3](https://doi.org/10.1096/fasebj.31.1_supplement.260.3)
- Finkelstein, M., Iglesias, K., Panova, A., & Yudkevich, M. (2014). Prospects of Young Professionals in the Academic Labor Market: Global Comparison and Assessment. *Voprosy obrazovaniya / Educational Studies Moscow*(2). <https://doi.org/10.17323/1814-9545-2014-2-20-43>
- Garet, M. S., Porter, A. C., Desimone, L., Birman, B. F., & Yoon, K. S. (2001). What Makes Professional Development Effective? Results From a National Sample of Teachers. *American Educational Research Journal*, 38(4), 915-945. <https://doi.org/10.3102/00028312038004915>
- Girvan, C., Conneely, C., & Tangney, B. (2016). Extending experiential learning in teacher professional development. *Teaching and Teacher Education*, 58, 129-139. <https://doi.org/10.1016/j.tate.2016.04.009>
- Kamarei, A., Khorshidi, A., Hamidifar, F., Mahmoodi, A. H., & Shariatmadari, M. (2021). Professional development pattern of School principals in Technical and Vocational Schools (using the emerging foundation data theorizing approach). *Technology of Education Journal (TEJ)*, 15(3), 531-544. <https://doi.org/10.22061/tej.2021.7288.2520>
- Kerr, P. (2022). Career development or career delay? Postdoctoral fellowships and the de-professionalizing of academic work in South African universities. *British Journal of Sociology of Education*, 43(4), 550-565. <https://doi.org/10.1080/01425692.2022.2045902>
- Liu, K., Miller, R., & Jahng, K. E. (2016). Participatory media for teacher professional development: toward a self-sustainable and democratic community of practice. *Educational Review*, 68(4), 420-443. <https://doi.org/10.1080/00131911.2015.1121862>
- Louis, K. S., & Marks, H. M. (1998). Does Professional Community Affect the Classroom? Teachers' Work and Student Experiences in Restructuring Schools. *American Journal of Education*, 106(4), 532-575. <https://doi.org/10.1086/444197>
- Macfarlane, G. M. (2020). *Teachers' engagement in professional development: a study of the influences that affect groups of national and international English language teachers* University of Glasgow].
- Marzano, R. J., & Warrick, P. (2011). *A handbook for high reliability schools: The next step in school reform*. Solution Tree Press. [https://books.google.com/books?hl=en&lr=&id=aoe7BgAAQBAJ&oi=fnd&pg=PT11&dq=Marzano,+R.+J.,+Pickering,+D.+J.,+%26+Heflebower,+T.+\(2021\).+A+Handbook+for+High+Reliability+Schools:+The+Next+Step+in+School+Reform.+Marzano+Resources.&ots=v7v11uah-&sig=-jM23BU9XT9PBQbVNzmsv5ZrNG8](https://books.google.com/books?hl=en&lr=&id=aoe7BgAAQBAJ&oi=fnd&pg=PT11&dq=Marzano,+R.+J.,+Pickering,+D.+J.,+%26+Heflebower,+T.+(2021).+A+Handbook+for+High+Reliability+Schools:+The+Next+Step+in+School+Reform.+Marzano+Resources.&ots=v7v11uah-&sig=-jM23BU9XT9PBQbVNzmsv5ZrNG8)
- McTighe, J., & Wiggins, G. (2013). *Essential questions: Opening doors to student understanding*. Ascd. [https://books.google.com/books?hl=en&lr=&id=nQBRBAAAQBAJ&oi=fnd&pg=PP1&dq=McTighe,+J.,+%26+Wiggins,+G.+\(2013\).+Essential+Questions:+Opening+Doors+to+Student+Understanding.+ASCD.+Mishra,+P.,+%26+Koehler,+M.+J.+\(2019\).+Too+Cool+for+School%3F+No+Way!+Learning+and+Leading+with+Technology,+38\(7\),+10-14.&ots=EAD0wU\\_IgN&sig=3lZkiSoNIJw4wu9ZNa6VzG-kdGs](https://books.google.com/books?hl=en&lr=&id=nQBRBAAAQBAJ&oi=fnd&pg=PP1&dq=McTighe,+J.,+%26+Wiggins,+G.+(2013).+Essential+Questions:+Opening+Doors+to+Student+Understanding.+ASCD.+Mishra,+P.,+%26+Koehler,+M.+J.+(2019).+Too+Cool+for+School%3F+No+Way!+Learning+and+Leading+with+Technology,+38(7),+10-14.&ots=EAD0wU_IgN&sig=3lZkiSoNIJw4wu9ZNa6VzG-kdGs)

## Acknowledgments

The cooperation of all participants in the research is thanked and appreciated.

## Declaration of Interest

The authors of this article declared no conflict of interest.

## Authors Contributions

All authors have contributed significantly to the research process and the development of the manuscript.

## Ethics principles

In this research, ethical standards including obtaining informed consent, ensuring privacy and confidentiality were observed.



- Mishra, P., & Koehler, M. J. (2006). Technological Pedagogical Content Knowledge: A Framework for Teacher Knowledge. *Teachers College Record*, 108(6), 1017-1054. <https://doi.org/10.1111/j.1467-9620.2006.00684.x>
- Osterman, K. F., & Kottkamp, R. B. (2004). *Reflective practice for educators: Professional development to improve student learning*. Corwin Press. <https://cir.nii.ac.jp/crid/1130000793802382720>
- Parsakia, K. (2023). The Effect of Chatbots and AI on The Self-Efficacy, Self-Esteem, Problem-Solving and Critical Thinking of Students. *Health Nexus*, 1(1), 71-76. <https://doi.org/10.61838/hn.1.1.14>
- Patfield, S., Gore, J., & Harris, J. (2023). Shifting the focus of research on effective professional development: Insights from a case study of implementation. *Journal of Educational change*, 24(2), 345-363.
- Polya, G. (2004). *How to solve it: A new aspect of mathematical method* (Vol. 85). Princeton university press. [https://books.google.com/books?hl=en&lr=&id=z\\_hsbu9kyQQC&oi=fnd&pg=PP2&dq=Polya,+G.+\(2018\).+How+to+Solve+It:+A+New+Aspect+of+Mathematical+Method+\(2nd+ed.\).+Princeton+University+Press.&ots=o\\_jQijWO2&sig=OFn1LRlhsJLhunvjSxIHVOMarLc](https://books.google.com/books?hl=en&lr=&id=z_hsbu9kyQQC&oi=fnd&pg=PP2&dq=Polya,+G.+(2018).+How+to+Solve+It:+A+New+Aspect+of+Mathematical+Method+(2nd+ed.).+Princeton+University+Press.&ots=o_jQijWO2&sig=OFn1LRlhsJLhunvjSxIHVOMarLc)
- Puentedura, R. R. (2014). SAMR: A contextualized introduction. *Lecture at Pine Cobble School*. Retrieved March, 13, 2014. <http://hippasus.com/rrpweblog/archives/2014/01/15/SAMRABriefContextualizedIntroduction.pdf>
- Sharma, P., & Pandher, J. S. (2018). Teachers' professional development through teachers' professional activities. *Journal of Workplace Learning*, 30(8), 613-625.
- Syman, K. Z., Andronov, V. P., Girich, Z., Rodionova, I. V., & Litwinowa, M. Y. (2021). Professionals and the Problem of Introducing Innovations in the University: Prospects for the Development of Distance Education, Advantages and Disadvantages. *Laplage Em Revista*. <https://doi.org/10.24115/s2446-6220202173b1538p.202-212>
- Tomlinson, C. A. (2017). *How to differentiate instruction in academically diverse classrooms*. Ascd. [https://books.google.com/books?hl=en&lr=&id=DYzgEAAAQBAJ&oi=fnd&pg=PP4&dq=Tomlinson,+C.+A.+\(2017\).+How+to+Differentiate+Instruction+in+Academically+Diverse+Classrooms.+ASCD.&ots=C9Lms4xlVr&sig=DduW\\_yB5Nqj2bk5kErJJXdrAEJ4](https://books.google.com/books?hl=en&lr=&id=DYzgEAAAQBAJ&oi=fnd&pg=PP4&dq=Tomlinson,+C.+A.+(2017).+How+to+Differentiate+Instruction+in+Academically+Diverse+Classrooms.+ASCD.&ots=C9Lms4xlVr&sig=DduW_yB5Nqj2bk5kErJJXdrAEJ4)
- Yakubov, A. E. K. (2021). Developing Professional Creative Skills of Future Teachers in the Technology Field of Education. *Psychology and Education Journal*. <https://doi.org/10.17762/pae.v58i1.1724>