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ISSUES OF TEACHERS' PROFESSIONAL DEVELOPMENT IN THE WORKS OF MODERN RESEARCHERS

Abstract: This article attempts to assess the current state of scientific understanding and the main trends and directions of research in the field of teachers' professional development. As a result of the study of databases of peer-reviewed scientific publications such as Web of Science, Scopus and EBSCO, as well as the works of domestic researchers, new approaches, methodologies and best practices in the field of teacher professional development were identified. The research allowed us to formulate the main provisions of organizing effective forms of teacher training that contribute to teachers' professional development.

Keywords: teacher, educational process, updated content of education, quality of education, methods and strategies of activity, professional development, advanced training.

Introduction

In 2021, Kazakhstan completed a total renewal of school education. The Organization for Economic Cooperation and Development views this renewal as a positive step towards modernizing the education system as a whole. The Concept of Development of Preschool, Secondary, Technical and Vocational Education of the Republic of Kazakhstan for 2023-2029 notes that the content of education fully reflects "the knowledge, skills, attitudes and values required by 21st century learners in accordance with national priorities, as well as the challenges and opportunities of a rapidly changing world". It is actualized the continuation of work to improve the content of secondary education "on the basis of value-oriented, activity-oriented, personality-oriented and communicative approaches", to ensure compliance of "modern pedagogical theory and practice with the level of requirements imposed on the sphere of education by the processes of economic, socio-political, scientific and technological development" (Concept, 2023).

Further development of the education system requires a resource in the form of qualified and motivated personnel. The Law of the Republic of Kazakhstan "On the Status of the Teacher" promoted the introduction of a set of systemic initiatives aimed at creating a supportive environment for teachers and encouraging their professional development. At the same time, in the context of improving the status of teachers, improving the quality of education in general, it is required to address the problems associated, first, with "the insufficient level of professional competencies and professional development of teachers", and second, with "the insufficient level of qualification of teachers on the development of IT-competencies, emotional intelligence, lesson study, research in action, critical thinking, time management, working with children of special educational needs" (Law, 2019).

The effectiveness of a modern teacher's work is determined by his or her inclusion in professional development programs as a conscious activity aimed at improving the quality and scope of knowledge, skills and abilities. Inclusion of a teacher in formal, non-formal and informal education programs is considered as a way of professional development of a teacher. This determines the relevance of our research on "Issues of teachers' professional development in the works of modern researchers as a basis for finding effective forms of their education", the results of which are reflected in this article.

The purpose of the study is to analyze the works of modern researchers in the field of teachers' professional development and to identify the most effective forms of teachers' professional development.

In order to achieve the formulated goal, the task of reviewing the existing works of modern researchers in the field of teachers' professional development is defined to understand the current state of knowledge in the field of teachers' professional development, to identify the main trends and directions of research.

Research methodology and methods

According to the research methodology on the problem of professional development, we organized a review of existing works of modern researchers based on the analysis and critical thinking of existing publications. The review of works is aimed at understanding the current state of knowledge in the field of teachers' professional development, identifying gaps in research, as well as identifying theoretical and practical grounds for further research into the issues of organizing non-formal education of teachers.

Thus, the purpose of the organized review is to clarify the categories of "teacher professional development", "professional development", as well as to identify effective methods and approaches to improve their professional development based on the analysis of existing international and domestic publications on this problem.

The key databases and academic resources we used for the literature search were Web of Science, Scopus, and EBSCO search engines, which allowed us to identify relevant and authoritative sources of information.

Works in the Web of Science, Scopus, and EBSCO databases of peer-reviewed scholarly publications were searched using keywords such as "teacher professional development." We examined papers from the period 2013-2023 in *Journal of Research in Science Teaching*, *British Journal of Educational Technology*, *Science Education*, *International Journal for Lesson and Learning studies*, *Journal of Research on Technology in Education*, *Research Papers in Education*, *Frontiers in Psychology*, *Tech Trends*, and other journals. We excluded articles that did not present the results of the study or that did not provide sufficient information about the data collection and analysis process, participants, and other important aspects of the study.

The logistics of the organization of search systems allowed us to conduct an effective search of works of the period 2013-2023, by keywords, authors, topics, to identify the journals in which the articles on the problem of interest to us were published.

Table 1 shows the quantitative ratio of articles in the databases of peer-reviewed publications by year, by keywords, "teacher professional development".

Table 1

Overview of the number of articles in databases of peer-reviewed publications for the keywords "teacher professional development"

<i>Time period</i>	<i>Number of articles</i>	<i>Name of journals</i>
<i>January-December 2013</i>	61	<i>Journal of Engineering Education – 15 articles</i>
<i>January-December 2014</i>	49	<i>ETS Research Report Series – 14 articles</i>
<i>January-December 2015</i>	48	<i>Journal of Research in Science Teaching – 11 articles</i>
<i>January-December 2016</i>	41	<i>Journal of Research in Science Teaching – 8 articles</i>
<i>January-December 2017</i>	62	<i>School Science and Mathematics – 10 articles</i>
<i>January-December 2018</i>	72	<i>British Journal of Educational Technology – 10 articles</i> <i>Journal of Research in Science Teaching – 9 articles</i>
<i>January-December 2019</i>	63	<i>European Journal of Education – 10 articles</i>
<i>January-December 2020</i>	73	<i>Foreign Language Annals – 8 articles</i>

		<i>The Curriculum Journal – 7 articles</i>
		<i>British Journal of Educational Technology – 6 articles</i>
January-December 2021	51	<i>Science Education – 6 articles</i>
		<i>British Journal of Educational Technology – 5 articles</i>
January-December 2022	50	<i>Journal of Research in Science Teaching – 5 articles</i>
		<i>Science Education – 5 articles</i>
		<i>British Journal of Educational Technology – 4 articles</i>
January-December 2023	73	<i>European Journal of Education – 8 articles</i>
		<i>Journal of Computer Assisted Learning – 6 articles</i>
		<i>Science Education – 6 articles</i>
		<i>British Educational Research Journal – 5 articles</i>
		<i>British Journal of Educational Technology – 5 articles</i>
Total	643	

The organization of the search made it possible to track the latest research, trends in the field of professional development and professional development, which contributed to the efficiency of structuring the material of this article.

As can be seen from the table, researchers show the greatest interest in studying the problems of teacher professional development in the period from 2017 to 2020 (62-73 articles). Then there is a slight decline (50-51 articles), which, in our opinion, can be explained by the shift of researchers' interests to the search for effective forms of online learning during the COVID-19 pandemic, and again a sharp increase in work in 2023 (73 articles). This suggests a renewed interest in the problem of teacher professional development in the context of a return to offline modes. It should be noted that the highest number of articles, for the keywords, 'teacher professional development' for the period 2013-2023 are recorded in indexed journals such as Journal of Research in Science Teaching (2015, 2016, 2018, 2022), British Journal of Educational Technology (2018, 2020, 2021, 2022, 2023) and Science Education (2021, 2022, 2023).

In general, we can speak about the existing interest of researchers to the problem of teachers' professional development and professional development.

For further critical analysis we selected 45 works from the review of 643 studies, which were identified using search strategies.

Results and discussion

Professional development of teachers plays a key role in ensuring high quality education. The Concept of Development of Preschool, Secondary, Technical and Vocational Education of the Republic of Kazakhstan for 2023-2029 prioritizes the continuous professional development of teachers, as this process not only contributes to the improvement of teachers' competence, but also has a significant impact on the educational environment as a whole. The notion of teacher professional development is defined as "a lifelong growth process involving collaborative and/or autonomous learning.... Teachers are engaged in this process and actively reflect on their practice" (Concept, 2023).

In international review of the literature about teacher professional development: Villegas-Reimers (2014) strongly supports the notion that teacher professional development is a continuous process that begins at university and continues throughout the career until retirement. Villegas-Reimers (2014) actively supports the concept that teacher professional development is a continuous process that begins at university and continues throughout a teacher's career until retirement. The scholar examines a model of continuous professional development that encompasses both initial teacher education and the subsequent stages of teachers' careers. The author considers the models of stimulating teachers' professional development applied by the USA, Australia, Canada and many European countries, which are

based on taking into account rapid changes in the forms and methods of teachers' professional development (Villegas-Reimers, 2014).

Zakharova (2011) considers teacher's professional development as an active qualitative transformation of the teacher's inner world, internal determination of teacher's activity, leading to a fundamentally new way of professional life activity. Professional development is determined by the direct zone of responsibility of the person himself, who wants to become successful and stay in the profession (Luzina, 2018).

Kolesnikova (2017) states that the highest achievement of a teacher's professional development is the introduction of pedagogical innovations. This includes the application of new and modern ideas, bases and methods in the educational process, which leads to a significant improvement in its quality.

Studies by Yugfeld and Ipatova (2022), Derlin-Hammond (2000) consider teachers' professional development in the context of political, social, cultural and economic aspects.

Yugfeld and Ipatova (2022) based on the analysis of historical aspects, emphasize the importance of an individual approach to the professional development of teachers, taking into account modern trends and technologies, as well as regional opportunities for professional support.

The modern image of a teacher, according to the authors, assumes, first of all, the presence of professionalism, creativity and ethics. He should be oriented to the development of the student's personality, be able to set and achieve educational goals, adhere to moral principles and respect the cultural identity of each student. These qualities are the basis for building the teacher's own image and determine his or her success in the educational process.

The authors came to the conclusion that teachers should be actively involved in the system of continuing education, using the opportunities of formal, non-formal and informal learning. Teachers should have the skills to plan personal and professional development, which will allow them to determine the directions and content of their professional growth. In this context, analyzing new trends and changes, studying their impact on professional activities, identifying and disseminating best practices, as well as providing mentoring and tutoring support and coordinating the actions of all participants of social and professional interaction play a key role in the development of the region as a whole.

The works of domestic scientists on the issues of teachers' professional development are of significant research interest.

In December 2022, Kazakhstan adopted a new Professional Standard "Educator" (2022) based on 4 groups of competencies: professional values, professional knowledge, practice of teaching/learning and education, and professional development. For each qualification category, the standard presents precise criteria of teacher competencies, which allows not only to understand the requirements for teachers of relevant qualifications when assessing their professional performance, but also for teachers themselves to plan their professional development. The detailed description of the content of pedagogical activity and requirements to the level of teacher training included in the professional standard will allow laying the foundation for the development of educational programs of teacher education, professional development of teachers and retraining of specialists from other spheres of activity. It also stimulates reflection processes and aims to support the professional growth of teachers; standards stimulate activity within professional communities, promote the penetration of research methods and innovative approaches into the practice of teaching and education.

Kazakhstan scientists Karayev et al. (2023) in the work "Professional development of a teacher as a factor in improving the quality of education in schools" emphasize the importance of professional development of teachers to improve the level of education in schools. The portrait of a modern teacher is considered as a set of his professional qualities, skills and values necessary for successful work in the modern educational environment. Evaluation of teachers'

professional development is presented through criteria and indicators, such as the results of students' mastering educational programs, development of students' abilities through participation in intellectual competitions, personal contribution of a teacher to improving the quality of education by improving teaching methods, generalization of teaching experience and research activities of a teacher.

The results of the research by Tazhbaeva and Dolidze (2021) on teachers' professional development through online collaboration are of interest. Thus, the paper "Gains of e-collaboration in professional engagement initiatives" presents an analysis of the SR Teaching and Learning community, which was initially established as an organization engaged in professional development of English language teachers in Baku, Azerbaijan. Online learning is seen as an effective form of professional development for teachers. The authors state that "in today's world, successful implementation of e-collaboration between teachers is a prerequisite for their professional development", providing minimal time costs, thus, according to scholars, increasing the effectiveness and relevance of professional development.

Kuzhabekova et al. (2018), studying the issues of professional development "Educational Flagships as Brokers in International Policy Transfer: Learning from the Experience of Kazakhstan", based on the experience of "Nazarbayev Intellectual Schools" state the need to involve in the professional development of teachers only highly qualified and motivated teachers and staff who have experience working abroad and speak English. According to the authors, this position is a condition for increasing the level of teacher's professional mastery, continuity and quality of their training.

Of interest is the work of a team of researchers "Teacher Leadership in Kazakhstan" (Kanai et al., 2023), which examines teacher professional development under the leadership of the teacher. The authors believe that the most effective model of teacher professional development is the bottom-up model, which views teachers as professionals who are capable of developing themselves and managing change in education. The emphasis in teacher professional development is on the development of non-formal forms of school-based teacher education.

The analysis of modern approaches allows us to formulate the following definition of the concept of "teacher's professional development" as a continuous process aimed at expanding and deepening the professional knowledge, skills and abilities of a teacher, as well as improving the level of his/her professional qualification. In our opinion, this process should include continuous learning, self-development, adaptation to changing educational requirements and the context of educational content, as well as active introduction of new pedagogical methods and technologies in pedagogical practice.

It should be noted that a significant number of studies reviewed within the framework of the objectives of this article are devoted to modeling, methodology and forms of teachers' professional development (68%).

What is the position of scientists regarding approaches and strategies for organizing teachers' professional development? For example, Johnston (2009) proposes the idea of collaborative teacher professional development, which involves teachers' cooperation with colleagues, university researchers, students and other participants in the educational process. Kraft, in turn (2000), suggests a wide range of methods such as independent learning, pedagogical research, on-the-job coaching, mentoring, learning partnerships, reflection, cooperative learning and the use of technology in teaching and others.

Cullen (1997) notes that traditional forms of teacher professional development include "short-term or one-time professional development programs conducted by external 'experts' that represent a transfer of knowledge, mostly created by other 'experts.'" These programs are often popular because they give teachers an opportunity to get out of routine, meet colleagues, and discuss new ideas. However, the main problem with such programs is that the knowledge

gained often does not take into account the real contexts and needs of teachers, both practically and conceptually.

In "Developing Teachers: The Challenges of Lifelong Learning", author Day (2013) discusses not only the nature of teacher professionalism, but also the importance of continuous professional development and the conditions in which this development takes place. According to Day, teachers play a key role in the educational process, being a valuable resource of the school. They pass on knowledge, skills and values to the next generation. However, in order to be successful in their educational roles, they need to be well prepared for their profession and continually develop their skills throughout their careers. Supporting their well-being and professional development is therefore integral to improving standards of teaching, learning and achievement. The author also takes the position that teachers need to develop actively in the course of their professional life, so it is important that they are centrally involved in decisions about the direction and process of their own learning.

In her article "Professional development of a teacher as a response to external topical challenges" Pozdneva (2022) discusses the importance of professional development of a teacher as a continuous process reflecting changes in external requirements to the set and level of professional competencies and the list of professional and personal qualities. The scholar, analyzing various approaches to teacher development, draws attention to mastering new educational technologies, participation in innovative educational projects, and development of research skills. For example, considering the Peer Coaching technology, the author shows that it promotes mutual professional growth, allowing teachers to observe the process of introducing a new method used by a more experienced teacher, and then apply it in their own work, exchanging help both in preparation for the lesson and during the lesson itself.

Also, in the context of teachers' professional development, the author considers the technology of teachers' research skills formation and participation in research work. On the one hand, research is associated with the teacher's participation in educational innovations, where he/she makes real changes in teaching practice and studies the results of such changes. On the other hand, research is seen as a special form of professional activity of a teacher, which helps him/her to solve complex professional problems. The teacher's participation in research work is manifested in the choice of his/her research area, active participation in changes in educational practice, and dissemination of new pedagogical knowledge in the professional community.

In addition, three main directions in the development of pedagogy are highlighted: improving professional mobility, the principles of open professionalism, and encouraging dialog in collaborative professional activities.

Developing the thought of researchers Kanai (2023), Frost et al. (2023) on the role of informal forms of school-based teacher training in the context of the need for their professional development, let us point out the work of Ivanova and Antonov (2019) "Professional development of teachers in the conditions of educational organization", which focuses on the system of in-school professional development. In-school professional development, according to the researchers, maximally takes into account the potential and needs of teachers of the school, the resources of the educational organization. This system is characterized by flexibility, mobility and ability to respond quickly to the demands of the professional community, as well as to take into account the peculiarities of a modern school. The authors consider different approaches to this problem, identify components, criteria and indicators of professional development, substantiate the possibilities and stages of socio-pedagogical design as a basis for the professional development of teachers, and describe the mechanism for developing an individual trajectory of professional development of teachers of an educational organization.

Using the collective work of researchers Gracheva et al. (2020) "Teacher professional development models and practices in foreign educational systems", in Tables 2 and 3 we present the results of the scientific analysis organized by the authors of the article based on the sociocultural approach to the organization of the system of additional professional education for teachers, the concepts of continuous and non-formal lifelong learning, as well as methodological approaches and methods developed and applied in the field of comparative pedagogy.

Table 2

A model of teacher professional development in Hong Kong

<i>Unit</i>	<i>Description</i>
<i>Professional education</i>	teachers must have a bachelor's degree; every certified teacher must register and obtain a teaching permit; mandatory compliance with the Code of Professional Ethics for Teachers.
<i>Formats and practices of professional development</i>	active mini-research (analysis of the results of one's own teaching activities); mentoring; professional communication through social networks; intensive interaction between teachers within the team; internships, open lessons, exchange of experience; master classes and short-term courses.

Table 3

Model of teacher professional development in Finland

<i>Unit</i>	<i>Description</i>
<i>Prestige of the profession</i>	teacher training curriculum is based on complete autonomy; participation of teachers in continuing (continuous) education in Finland does not affect their career growth or salary, but is in demand, as it allows them to maintain their professionalism; responsibility for the professional growth of teachers lies with employers represented by heads of educational organizations and municipal committees.
<i>Teacher training system</i>	teacher training is carried out only by universities; all applicants for the teaching profession in Finland must have at least a master's degree; universities offer various modules for advanced training and retraining of teachers (in individual disciplines, pedagogy, interdisciplinary courses, etc.), long-term courses for mastering competencies that allow working with children with special educational needs
<i>Standards for entry into the profession and continuity of teacher education</i>	only every 10 th applicant is allowed to receive pedagogical education, a ranking of applicants is maintained; continuous professional pedagogical development includes 3 phases - teacher education, "entry" into the profession (3-5 years of work after graduation), additional professional pedagogical education
<i>Practical orientation</i>	teacher training involves extensive practice (from 15 to 25% of the entire training program); students are required to work for a year in schools assigned to their universities or in partner schools before receiving a diploma

<i>Research focus</i>	<ul style="list-style-type: none"> - each student actively participates in scientific seminars and projects, where he practically applies various modern research methods and approaches
<i>Personification of the teacher professional development system</i>	<ul style="list-style-type: none"> - autonomy and independence of schools; - lack of a level system of career development for teachers (a successful teacher can become a school director); - work of a national mentoring network for professional adaptation of graduates of pedagogical universities
<i>Practices of using resources of partnerships and multi-professional cooperation</i>	<ul style="list-style-type: none"> - the content of teacher professional development programs is multifaceted and project-based (trainings, open lessons); teacher's project activities. The content of the projects largely reflects the needs of local education (education of children with disabilities, education of gifted students, etc.); work of specialized educational centers for pedagogical support; multi-professional cooperation (integration of scientific disciplines within the framework of STEM education)

Derlin-Hammond's (2000) survey of teacher development policies in the 50 states (SASS) for 1993-1994 and analysis of the National Assessment of Educational Progress (NAEP) suggests that investments in the quality of teacher development can lead to improvements student success. Quantitative analysis shows that teacher preparation and certification measures have the greatest impact on student achievement. State policy analysis also suggests that state policies have an impact on the overall level of teacher qualifications and competencies.

Aslam (2013), having conducted a study of the content of professional development of teachers in public and private schools in Pakistan, concluded that the effectiveness of professional development is ensured by the flexibility of training curricula and the high level of motivation of teachers in advanced training programs.

We consider the research result of a group of Qatari scientists Abu-Tineh and Sadiq (2017) to be productive, since the education system of this state is going through a period of intensive renewal of the content of school education, as in Kazakhstan. Thus, considering models of professional development of teachers, the mentoring model was classified as an effective form. The least effective model was the online training for teachers.

The authors consider advanced training programs lasting from 30 to 100 hours in total to be one of the most effective models for teacher training. At the same time, the authors note that this process should be continuous (annual). According to research results, the average duration of annual teacher training courses of 49 hours increases the quality of knowledge of students by 21%, while short-term courses of 14 hours have virtually no positive effect on the achievements of students.

Lindvall and Ryvea (2019), having studied 95 works on professional development of teachers in different countries of the world, came to the conclusion that in most models' teachers are primarily considered as implementers who must adapt their professional development in accordance with external and predetermined goals and practices. This behavior reflects a top-down model of teacher professional development. The "bottom-up" model of teacher professional development is considered more productive, which assumes a high level of trust in teachers, which allows them to choose the trajectory of their professional development.

The content of research into the forms of professional development of teachers could not but be affected by the trends in the development of information and communication technologies. Thus, Selik et al. (2022) pay great attention to the professional development of teachers in the field of using artificial intelligence for the effective organization of the

educational process. In general, there are three areas of professional development for teachers in the field of artificial intelligence: planning, application and assessment.

Also, Selik et al. (2022) note the need to use video technologies for teacher collaboration in the process of their professional development. Ramos et al. (2022) also highlight the use of video technology to ensure effective teacher professional development through collaborative learning, collaboration and reflection.

Thus, our research highlights the importance of a systematic approach to teacher professional development. Effective professional development must be integrated into the overall school strategy and supported at all levels, from administrative to practical. This approach helps to create a sustainable environment for the continuous improvement of teaching skills, which ultimately leads to improved quality of education and satisfaction of all participants in the educational process.

Conclusions

Our research on the topic “Issues of professional development of teachers in the works of modern researchers as the basis for searching for the most effective forms of their training” allows us to draw the following conclusions:

1. Modern research by domestic and foreign scientists emphasizes the critical importance of continuous professional development for teachers, as it directly affects the quality of education and student achievement. Professional development helps improve teaching skills, update knowledge and introduce innovative teaching methods.

2. Researchers have identified various forms and methods of informal teacher education, including workshops, professional development courses, professional communities and online learning. Each of these forms has its own advantages and can be tailored to the specific needs of teachers and schools.

3. Modern technologies are playing an increasingly significant role in the professional development of teachers. Online platforms and digital resources provide access to a wide range of educational materials and allow teachers to learn at their own time, which promotes flexibility and individualization of the educational process.

Research shows that the most effective professional development programs take into account individual needs and teacher preparation levels. A personalized approach allows you to maximize learning outcomes and meet the specific needs of teachers.

Important factors for successful professional development are collaboration and support from colleagues and school administration. Professional communities and mentoring help teachers share experiences, solve problems, and implement best practices in the teaching process.

In conclusion, we point out that in the context of searching and developing models of professional development for teachers, it seems promising to us to study models based on non-positional leadership in schools. Non-positional leadership involves influencing and supporting colleagues without formal authority and plays a significant role in creating a supportive and inspiring learning environment.

Conflict of Interest Statement

The authors declare no potential conflicts of interest regarding the research, authorship, or publication of this article.

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