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Designing professional development for teachers in the post-course period

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Abstract

The article is devoted to the study of approaches and technologies for setting professional development goals for teachers in the post-course period. Clear goal-setting plays a key role in ensuring conscious professional development directed by the teachers themselves. Aim: to search for tools that enable teachers to design a personalized professional development program in the post-course period based on goal-setting. The authors used survey methods and content analysis to assess the quantitative characteristics of the collected material, to identify features in setting professional development goals, and changes in their formulation. A survey of 21,681 teachers was conducted to determine their educational needs and their conscious attitude towards professional development in the post-course period. To test the methodology associated with the use of a specially developed tool for designing a personalized program, 84 teachers were involved voluntarily. The results made it possible to justify an innovative solution to the problem of designing a personalized professional development program based on the definition of specific, achievable goals in the form of a patentable utility model. Its applicability as a self-configurable constructor due to the personalized visual configuration of the set elements demonstrates its potential use when new requirements for teacher qualifications and competencies.

Keywords: Agency, Continuous professional development of teachers, Heutagogy, Personalized teacher professional development program, Post-course period, Professional development goals of teachers, Utility model, Mobile configurable set.

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Transparency: The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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1. Introduction

The professional development of teachers is based on the integration of several approaches that complement each other. These include andragogy, reflective learning, social interaction, and heutagogy (self-determined learning). The combination of these approaches ensures a systematic development of teachers and prepares them for adaptation to the changing educational and technological realities [1-6].

Heutagogy significantly expands adult-oriented approaches and emphasizes the growth of autonomy and self-determination in professional development, enabling teachers to independently design individual learning trajectories by adapting them to the constantly changing conditions of the educational environment, professional tasks, and personal interests [4]. The process of professional development becomes continuous, and the teachers themselves act as the initiator of change and a full partner in creating a flexible, adaptive learning system capable of responding quickly to the challenges of the time.

We consider teachers as active agents directing their own development within their professional activities, with the starting point being the ability of teachers to clearly envision how they intend to improve their practice and develop as professionals in the near future.

In our study, we assumed that teachers' agency is related to how they define the goals of their professional development after attending courses or seminars. This assumption is reflected in our research questions:

1. How is the setting of professional development goals by teachers related to their current professional interests?
2. How do teachers design their professional development trajectory?

A literature review highlights goal-setting and goal-alignment as key mechanisms that ensure effective continuous professional development of teachers [7, 8]. Teachers are recommended to set personal goals for professional growth, paying special attention to self-discipline and motivation, which are crucial for continuous improvement [9]. Researchers consider professional development goals as an intended change in behavior [10] as the initial stage in planning their own learning [11] starting from the level of university education [12]. Strategic planning should correspond to the individual needs of teachers and the requirements of the education system, ensuring direction and interest in continuous development Bahriadi et al. [13]. Cwikla [14] argues that clearly defined goals set by teachers for a specific period influence the success of professional development, which in turn affects the improvement of students' academic performance [15].

Researchers agree that defining clear and achievable professional development goals is essential for its effectiveness. Goal setting encourages teachers to engage in purposeful and conscious actions to examine their teaching practices and to plan their personal path toward learning and improvement [16]. Understanding their own goals and aligning them with the education system affects their commitment and passion for their profession [17] and may vary at different stages of teachers' professional lives and in different educational contexts [18].

The study of the formation of teachers' professional competencies has led to the conclusion that goal-setting must be included as one of the stages in this process [19] and that is advisable to organize special training in goal-setting skills for both future teachers and practicing teachers during professional development courses, using the SMART method ("smart" goal-setting) [20].

We proceed from the assumption that autonomy, meaningfulness, and personal significance of the educational process are important for the sustainability of professional growth [2]. Teachers will be motivated if their professional development is connected to their life or professional goals.

Worth and Van den Brande [21] identified that teacher autonomy is most weakly manifested in the definition of professional development goals and is significantly related to job satisfaction [21]. Therefore, increasing teachers' autonomy regarding their professional development goals has the greatest potential to improve teachers' job satisfaction and their commitment to the profession.

Worth and Van den Brande [21] interpret teacher autonomy in accordance with Self-Determination Theory [22] as the ability to make reasoned decisions and/or act independently. The concept of "autonomy" is similar to, although not identical with, the concept of "agency" used in scientific literature. Agency, as a concept, implies the presence of a certain degree of freedom in an individual, future orientation through goal-setting, the ability to build several trajectories to achieve one's goals, while possessing a realistic understanding of available resources and existing limitations [23].

Neradovskaya and Starodubtsev [24] also consider agency "as a specific transformative activity of the individual, expressing their individuality" (subjectivity) [24]. A teacher with a high level of agency consciously participates in the implementation of educational reforms and is firmly convinced of their significance in influencing the outcomes of their work [25].

Continuous professional development of teachers (CPD) assumes that setting clear, achievable goals applies not only to formal education programs in courses or seminars but also to the period following training. Short-term professional development should become a stimulus for defining professional development goals, and the substantive elements of teachers' activities after courses should be aimed at developing agency in situations where known ways of achieving goals are ineffective, and a new system of actions based on the educational request formulated by the teachers themselves needs to be designed.

According to Martin Karlberg, CPD in most countries is dictated by national or regional reforms, which undermines the idea of motivated and personal CPD, reducing the role of the teacher to implementing ideas imposed "from above" [26].

Therefore, there is a need to move from the linear model of professional development "state administration-teacher" to a personalized CPD model, where the teacher is at the center of professional development, becoming an active subject of their own learning, acting from a personal idea of serving an ideal, a moral purpose [27, 28].

2. Methodology, Materials and Methods

The study of teachers' ability to define professional development goals was accompanied by determining the level of teachers' conscious attitude toward professional development in the post-course period and by offering new solutions.

In 2024, a large-scale survey was conducted among school principals and teachers across Kazakhstan to study professional development needs in the post-course period. A total of 21,681 teachers from all regions of Kazakhstan participated in the survey. The study covered teachers of various qualification categories and lengths of professional experience.

Among the key questions designed to assess teachers' awareness regarding their professional development during the post-course period was a question about their professional development goals. Respondents were asked to specify their professional development goal; if they had none, they were to state that explicitly. A significant portion of teachers (61%) reported having no clear understanding of how they intended to develop professionally in the near future. The majority of the remaining 28% of teachers formulated very general professional development goals such as developing a well-rounded personality, improving competence, enhancing the quality of knowledge, continuous learning, perfecting professional skills, self-development, improving learning outcomes, and so on. The survey results showed that the absence or vagueness of professional development goals was not related to the qualification level, as such responses were given by teachers of high qualification categories as well.

10% of teachers specified concrete outcomes as their professional development goals for the post-course period, indicating either a product of activity (such as the creation of an original subject teaching program, preparation of methodological recommendations, or teaching aids), a career advancement stage (such as successfully passing a qualification exam, obtaining a higher qualification category, or becoming a deputy principal or school principal), or subject teaching tasks (such as developing students' speaking skills, using graphic organizers in lessons, or applying differentiated tasks). Only a small portion of the respondents (1%) set goals directly related to professional competencies: creating an inclusive learning environment, mastering assessment methods in lesson planning and delivery, using information technologies in the learning process to expand learning opportunities, and mastering ways of providing feedback to support and develop learners.

The next stage of the study was the development of the utility model "Mobile Configurable Set," designed for modeling the continuous professional development of teachers. The utility model is included in the State Register of Utility Models of the Republic of Kazakhstan and has been patented by the National Institute of Intellectual Property of the Ministry of Justice of the Republic of Kazakhstan [29].

The set can be used both before the completion of a course at a training organization and during the post-course period within the educational institution where the teacher works. The use of the set enables the design of a personalized professional development program and the visualization of its design process.

The Mobile Configurable Set includes a magnetic board and a case containing four sets of magnetic cards for designing a professional development program. Each of the four sets contains 20 magnetic cards.

The magnetic cards are organized according to their content:

Set 1 – Cards describing professional competencies.

Set 2 – Cards describing forms of professional development.

Set 3 – Cards describing professional development resources.

Set 4 – Cards describing practical results of professional development.

The structure of each card includes its title (1), digital code (2), visual image of the card title (3), color marking (4), description (5), and recommendations (6) (Figure 1).

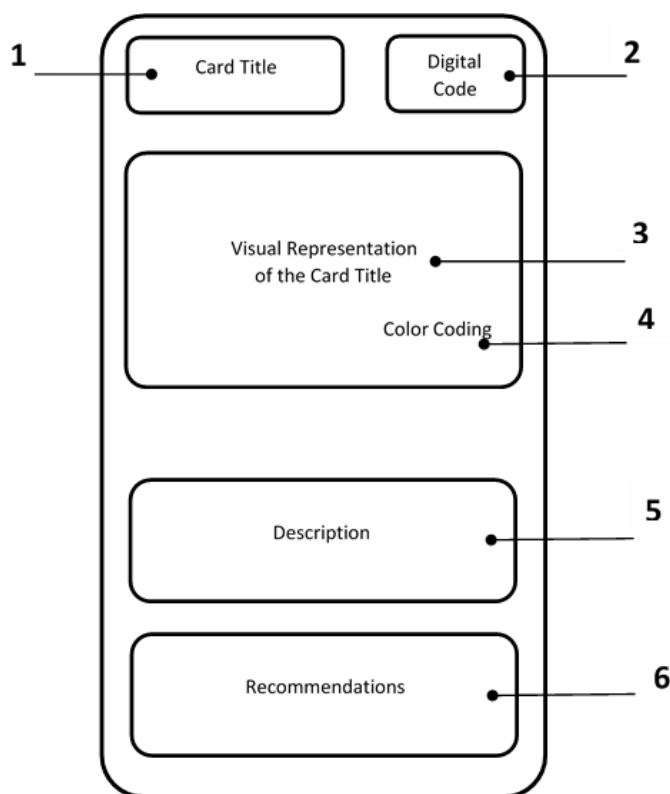


Figure 1.
Card structure.

The color coding and visual imagery enhance the speed and efficiency of working with the cards.

When developing the cards describing professional competencies, we were guided by the professional standard "Teacher," which serves as a navigator for teachers' professional development and is used to manage changes and adapt the content of their own teaching activities [30].

The set is used as follows: the teacher studies the descriptions of the cards and then, independently or with the support of a mentor/methodologist, selects those that will define their professional development program: the professional competencies that need to be formed or developed, the resources and forms required for this, and the expected practical results. Then, using the magnetic cards, the teacher visualizes the professional development program on the magnetic board. Depending on the professional gaps and needs of individual teachers, the program for each of them will have a personalized configuration.

A distinctive feature of this set is that it is a mobile, flexible, and convenient tool for designing professional development after-course training, allowing teachers to visually consider various trajectory options. Moreover, as the program is implemented, its configuration can change and be supplemented.

Another feature of the set is that the card sets can be modified to meet new requirements for teachers' qualifications and competencies, as well as to accommodate new resources and forms of professional development.

The "Mobile Configurable Set" was tested during experimental work on designing a personalized professional development program. The results of the trial were analyzed using content analysis.

3. Results and Discussion

Traditionally, constructors [31, 32] and resource maps [33] are used to determine individual professional development pathways. These tools help the teacher by providing varying degrees of autonomy in their actions. When designing certain components of an individual educational trajectory, a teacher may use phrase options from a constructor "as examples for formulating tasks of forthcoming activities, educational objectives, forms of presenting results" [31]. Alternatively, an online constructor may formulate the professional development goal itself after the teacher "analyzes their previous experience and identifies a problem, the solution to which will enable them to grow professionally" [32]. However, technically, the teacher may skip the proposed analysis and intuitively select the most appropriate options from the existing ones.

The utility model "Mobile Configurable Set" does not provide the teacher with ready-made samples or templates, which aligns with the concept of "agency" and allows the teacher to act as an active subject.

The experimental work was organized in two stages.

At the first stage, 72 teachers – participants in professional development courses – were involved in the experimental work. The set was used to organize the interaction of participants in small groups of 4-5 people. This form of work simulated the activity of a creative group in which experienced and novice teachers of different qualification levels identified existing difficulties in each other's professional activities and jointly discussed possible trajectories of

professional development and their outcomes. The positive impact of such group work on teachers' professional development is confirmed by the experience of Lesson Study [34] or Teacher Activity Groups [35].

The work algorithm at the first stage included several actions.

First, a plenary discussion was held with the entire group regarding the purpose of the post-course period. Participants shared their experiences of developing professional competence after completing courses. Emphasis was placed on professional development goals: whether the teacher was aware of the need to set them, whether they formulated them, how they were formulated, and what served as the starting point for setting them.

Next, the participants formulated a professional development goal considering the content of the professional development course: how the acquired knowledge, skills, abilities, and competencies would be applied in practice and what results were expected. The study of these goals showed that 98.6% of teachers formulated their professional development goal in a generalized manner.

To organize small group work, the composition and purpose of the set were explained. Then each small group received a set of cards and studied its contents: which cards belonged to which set, what competencies, forms, resources, and products of professional development were included in each set.

The next action involved selecting one group member to build a personalized professional development program. Teachers acted intuitively, without a clear algorithm. They determined the candidate for this task in various ways. Some groups first discussed the professional development goals they had formulated to select a goal that matched some of their ideas. Others looked for a teacher who showed initiative and decided to volunteer as the subject. A third approach was to choose a teacher who lacked sufficient experience, following the principle of peer group mentoring [36]. A fourth method was not to choose a specific teacher at all but to work with an image of a hypothetical teacher.

The design of the personalized professional development program began with the selection of one or more professional competencies proposed by the Mobile Configurable Set. This became the goal of professional development. The selection by groups was not always conscious. Groups were guided by various considerations. Observations of teachers' statements revealed several patterns:

- Attractiveness, value, curiosity: "This competency looks interesting! Let's choose it."
- Deficit, need, requirement: "I lack this competency. Let's select it to work on."
- Obligation, requirement, rule: "This competency relates to the requirements for the qualification category I want to obtain. Therefore, I will choose it for work."
- Development, improvement, professionalism: "This competency is an expected outcome of our training courses. I will continue working on its development after the courses."

The choice of professional competencies determined the preference for forms, resources, and products of professional development. The designed personalized professional development program was then presented to the entire group with explanations of the choices made.

An example is presented in Table 1.

Table 1.
Example of choosing a teacher.

Category	Description
Competencies	<ul style="list-style-type: none"> - Development of educational products - Self-awareness, self-efficacy - Subject competence
Forms of professional development	<ul style="list-style-type: none"> - Conferences - Professional development courses - Competitions
Resources for professional development	<ul style="list-style-type: none"> - Systematic and methodological complex (SMC) - Website of the National Scientific and Practical Center for the Development of Special and Inclusive Education - Platforms for trial testing (OZP): testter.kz/nkt, test-online.kz/nkt_predmet.html, nqt.kz/ru/ozp-nkt-test, nqt-test.online - Online platform for developing soft skills (4brain.ru) - Educational channel "Orleu"
Products of professional development	<ul style="list-style-type: none"> - Successful completion of the Teacher Qualification Test - Advancement in the qualification category - Development of didactic materials (collections of tasks, lesson (class, event) plans, workbooks, training manuals)

At the final stage of the first phase, a reflection session was held. A plenary discussion with the entire group took place again, with the following questions posed:

- Did the set help you understand the prospects for your professional development?
- How would you now formulate your professional development goal?
- What is the most important factor in determining the trajectory of professional development?
- How can this set be used when working with teachers?

Teachers positively evaluated the influence of the set on their understanding of their future professional development. They noted that clearly formulated competencies with descriptions, precisely named forms, resources, and professional development products made it easy to select the necessary options and build a trajectory.

Teachers identified possible ways to use the set: for mentoring young teachers, for administrative work with teachers, or for teachers themselves to determine the necessary actions for achieving the desired qualification category.

After the reflection session, teachers revised their previously formulated goals by including specific competencies. The analysis of these goals showed that, after using the set, only 33.3% of teachers were able to concretize their professional development goals by specifying certain competencies.

For example, after the introductory discussion, a teacher wrote the following professional development goal: "to acquire knowledge, skills, and abilities through the use of AI in work," but after using the set, the goal became more specific: "to develop competence in researching one's own teaching practice using the digital resources studied during the course."

Therefore, it was decided to continue the experimental testing of the utility model in individual work with participants. This work constituted the second phase of the experimental study, in which 12 teachers participated.

The algorithm of work remained the same: introductory plenary discussion, explanation of the purpose of the set development the professional development, trajectory, presentation, and reflection. However, three changes were introduced:

1. To ensure teachers acted consciously, the introductory discussion immediately included an analysis of possible sources of professional development goals. Using open questions, participants were guided to understand that such sources could include shortcomings, deficits, weak areas, interests, needs, or career aspirations. Nevertheless, the tendency to formulate generalized professional development goals remained the same as in the first stage: 83.3% of teachers formulated generalized goals such as "professional growth for competitiveness" or "improvement in subject teaching to enhance pedagogical skills."

2. After explaining the features of the utility model and studying the cards, participants immediately proceeded to design their personalized professional development program.

3. During the reflection stage, participants worked individually. They were asked to revise their previously formulated professional development goal and answer three questions in a semi-structured interview:

- How did the use of the utility model influence the formulation of your professional development goal?
- How can this utility model be used in the professional activity of a teacher?
- What did the utility model make you reflect upon?

When answering the first question, teachers pointed out the opportunity to:

A) Define the algorithm of professional development. For example: "I identified the important stages and systematized the steps towards achieving further results."

B) Identify a professional deficiency. For example: "The set helped me organize concepts in my mind, identify the problem area, and correctly formulate the goal."

C) Build a model of professional development. For example: "I built the correct structure, understood the significance of certain formulations, ways of observation, and constructed my own model for overcoming difficulties or finding solutions."

Ways of using the utility model have expanded to include specific areas of work such as self-education, self-analysis, consulting, coaching, professional development, and development planning for educational organizations.

Answers to the third question indicated that the utility model helped teachers realize that they formulated their professional development goals in a vague manner, that there were many options for building a professional development trajectory, and that such a set makes this process quick and simple. A good confirmation of this is the response of one teacher: "This set made me think about how vaguely we formulate our goals, how we fail to see some problems, and how easily this can be done with such a tool at hand; also, that the set could even be supplemented."

After working independently with the utility model, 91.7% of teachers managed to specify their professional development goals.

Content analysis of the professional development goals in the first and second phases of the experimental work before using the set showed that when formulating goals:

- 35.7% of teachers focused on the use of new technologies (without specifying which ones). For example: "to introduce acquired knowledge and methods into the educational process to improve teaching quality, student motivation, and development of research skills," "to use innovative teaching technologies and digital resources to enhance students' motivation."
- 17.6% of teachers referred to raising their professional level (improving professional competence, enhancing professional skills). For example: "to remain professional, stay up-to-date, know all innovations in my specialty, and conduct high-quality lessons," "to constantly improve pedagogical mastery through experience exchange."
- 17.6% of teachers mentioned learning something new. For example: "to learn new things, gain experience from colleagues, establish new acquaintances and communication," "to learn something new, get the necessary knowledge for further professional development. I took the course to be able to teach my subject more effectively and competently."
- 15.5% of teachers intended to apply the knowledge gained during the professional development course in practice. For example, participants of courses on "Robotics and STEM education" formulated goals such as: "to apply STEM

education technology in teaching geography and biology," "to use STEM in working with students in chemistry lessons and extracurricular activities"; participants of the course "Development of Receptive and Productive Skills in Teaching and Learning English" – "to apply artificial intelligence and new teaching methods to develop students' interest and improve the quality of knowledge in English lessons," "to develop students' speaking skills considering the use of artificial intelligence."

- 4.8% of teachers planned to improve the efficiency of the learning/lesson process. For example: "to improve the quality of English lessons and students' motivation using the latest digital technologies"; "to increase the effectiveness of the learning process through the integration of modern EdTech tools, creating interactive assignments, and developing students' communication skills while adapting teaching to the individual needs and interests of children."

The professional development goals of 8.3% of teachers were very narrow and concerned with individual actions. For example: "to prepare more interesting and informative assignments for students," "to achieve a higher qualification category."

After using the utility model, 45.2% of teachers formulated their professional development goals clearly and in detail:

- 8.3% of teachers indicated developing competence in digital content creation;
- 7.1% of teachers chose to develop competence in designing educational products;
- 6% of teachers focused on developing competence in researching their own practice;
- 3.6% of teachers showed interest in developing creativity.

13.1% of teachers aimed to develop such competencies as emotional intelligence, empathy, analytical skills, and communication skills.

In 54.8% of teachers, the content of the professional development goal remained at the level of "implementing what was learned during the course," "improving professional competence," "developing professional skills," "upgrading qualifications."

7% of teachers by the end of the second phase were still unable to specify their goals and did not provide an answer.

The results of the experimental work showed that a significant number of teachers have difficulty clearly defining their professional development goals. Supporting teachers and training them in setting professional development goals can solve this problem. Such support during professional development courses may be provided by the course instructor or trainer, and in the post-course period – by a mentor, colleague, methodologist, or administrator within the teacher's organization. Training in setting professional development goals can be organized during professional development courses using the utility model.

The experimental work confirms that the "Mobile Configurable Set" effectively helps to specify the teacher's professional development goals and build their personalized pathway. To achieve this, work with the utility model should be conducted individually, where the teacher independently designs their own professional development trajectory or with the support of a mentor assisting in the design of a personalized program.

4. Conclusion

The concept of continuous professional development requires new approaches and innovative solutions for fostering teachers' agency in the post-course period. A key condition for enhancing teachers' ability to guide their own development within their professional activities is the clear definition of its goals.

The developed utility model "Mobile Configurable Set" can provide a significant advantage for teachers' conscious approach to designing a personalized professional development program and selecting its goals. During the testing of the set, 91.7% of teachers managed to specify their professional development goals. Conducting experimental work contributes to the accumulation of empirical data for studying the relationship between goal-setting and teacher agency, the meaningfulness of their activities, and the personal significance of the educational process.

Prospects for further research:

- Studying the impact of professional development goals defined using the "Mobile Configurable Set" on the effectiveness of teachers' activities in the post-course period.
- Expanding the sets of cards considering the specifics of teachers' professional activities (for example, for special education teachers, additional education teachers) to create personalized educational trajectories.

Thus, the proposed solution, based on the configurable set, contributes to the development of an effective CPD system, offering a scalable and practical tool for creating a personalized professional development program for teachers.

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