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INNOVATIVE EDUCATIONAL PROGRAM DESIGNED FOR DEVELOPING TRANSVERSAL SKILLS OF PROSPECTIVE TEACHERS

Contemporary preparation of pedagogical personnel is characterized by rapid changes and the emergence of new interdisciplinary professional and scientific fields, which makes the mission of higher pedagogical education more uncertain and complex. In this regard, this article presents the issue of possible formation of transversal competencies among students of a professional pedagogical university. The concept of transversal competency is analyzed and its components are defined. Additionally, the development of a competency-oriented educational environment can be considered from the perspective of transversal orientation. In this context, a survey was conducted to identify the initial state of transversal skills among future teachers. The theoretical analysis and empirical research presented in this article resulted in the development of an Innovative educational program "Mentor-teacher of primary education" designed for developing transversal skills of prospective teachers.

The conducted study has expanded the understanding of the implementation and development of transversal skills in the preparation of future educators. The results obtained in the process of writing this article will have a positive effect on the preparation of future teachers. The transformation of domestic and foreign advanced experience in the development of transversal skills will serve as a basis for the development of design thinking among future teachers. Additionally, the proposed innovative educational program will serve as a foundation for improving the quality of professional training for future teachers in the university and for effective planning and organization of the educational process by practicing teachers.

Key words: transversal competency, transversal skills, 21st-century competencies; adoption of innovation; innovative educational program; teacher perceptions; prospective teachers.

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Болашақ мұғалімдердің трансверсалды дағдыларын дамытуға арналған инновациялық білім беру бағдарламасы

Педагогикалық кадрларды заманауи даярлау тез өзгерумен және жаңа пәнаралық кәсіптік және ғылыми салалардың қалыптасуымен сипатталады, осыған байланысты жоғары педагогикалық білім беру миссиясы мен мазмұнын анықтау күрделі болуда. Осыған байланысты, мақалада кәсіптік-педагогикалық бағыттағы ЖОО-ның студенттерінің трансверсалды құзыреттіліктерін қалыптастыру мүмкіндіктері негізделген. Трансверсальды құзыреттілік ұғымына талдау жасалып, оның компоненттері, құзыреттілікке бағытталған білім беру ортасын қалыптастыру трансверсальды бағыт тұрғысынан қарастырылуы мүмкіндігі анықталған. Осыған байланысты мақалада болашақ мұғалімдердің трансверсальды дағдыларының бастапқы жағдайын анықтау үшін сауалнама жүргізілді. Мақалада жүргізілген теориялық талдау мен эмпирикалық зерттеуінің нәтижесінің негізінде «Бастауыш білім берудегі ментор-педагог» атты инновациялық білім беру бағдарламасын әзірленді. Орындалған зерттеу болашақ педагогтарды даярлау барысында трансверсальды дағдыларды енгізу және іске асыру туралы идеяны дамытады. Мақала жазу барысында алынған нәтижелер болашақ мұғалімдерді даярлауға оң әсерін тигізеді. Трансверсальды дағдыларды дамытудың отандық және шетелдік озық тәжірибесін трансформациялау болашақ мұғалімдердің дизайн-ойлауын дамытуға негіз болады. Оған қоса, ұсынылып отырған инновациялық білім беру бағдарламасы ЖОО-дағы болашақ мұғалімдердің кәсіби даярлығының сапасын арттыруға, сондай-ақ практик-мұғалімдердің білім беру процесін тиімді жоспарлау мен ұйымдастыруға негіз болады.

Түйін сөздер: трансверсалды құзыреттілік, трансверсалды дағдылар, XXI ғасыр құзыреттері; инновацияны бейімдеу; инновациялық білім беру бағдарламасы; мұғалімнің қабылдауы; болашақ мұғалімдер.

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Инновационная образовательная программа развития трансверсальных навыков у будущих учителей

Современная подготовка педагогических кадров характеризуется быстрой сменой и появлением новых межпредметных профессиональных и научных областей, в связи с чем, миссия высшего педагогического образования становится более сложной и появляются некоторые ситуации неопределенности. В этой связи в данной статье представлены вопросы возможного формирования трансверсальных компетенций у студентов профессионально-педагогического вуза. Представлен анализ понятия трансверсальная компетенция, определены ее компоненты. Также формирование компетентностно-ориентированной образовательной среды может быть рассмотрено с точки зрения трансверсальной направленности. В этой связи авторами было проведено анкетирование для выявления исходного состояния трансверсальных навыков у будущих учителей. Результатом теоретического анализа и эмпирического исследования является разработка инновационной образовательной программы "Ментор-педагог начального образования" для развития трансверсальных навыков будущих учителей. Выполненное исследование расширило представление о внедрении и реализации трансверсальных навыков в ходе подготовки будущих педагогов. Полученные в ходе написания статьи результаты окажут положительный эффект на подготовку будущих учителей. Трансформация отечественного и зарубежного передового опыта развития трансверсальных навыков послужит основой развития дизайн-мышления будущих учителей. Кроме того, предлагаемая инновационная образовательная программа послужит основой для повышения качества профессиональной подготовки будущих учителей в вузе, а также для эффективного планирования и организации образовательного процесса учителями-практиками.

Ключевые слова: трансверсальная компетентность, трансверсальные навыки, компетенции 21 века; внедрение инноваций; инновационная образовательная программа; восприятие учителя; будущие учителя.

Introduction

One of the key changes in the modern Kazakhstani education system in the era of globalization is the implementation of a competence-oriented environment. Currently, the process of preparing future teachers is becoming an area for implementing innovative educational programs aimed at developing key transversal competencies, which transform acquired professional knowledge into action.

In general, transversality is a concept that originated from linear algebra, differential and geometric topology in the early 19th century, describing the possibilities of intersection of space and being the opposite of tangency (Цветков, 2009: 86)[1]. The adjective "transversal" was used to denote a line that penetrates a spatial curve.

Transversal competencies are skills and abilities related to a wide range of professions and industries. They are considered as basic, general professional, universal, or 21st-century competencies (Gratton, 2014)[2]. As researchers note, the phenomenon of globalization and internationalization, technological development, and the pursuit of sustainable development imply constant changes in the social sphere and continuous transformation of lifestyles, the ability to constantly work and learn (Voogt & Pareja-Roblin, 2012: 299)[3].

The UNESCO TVETipedia glossary defines them as "not specifically related to a particular job, task, academic discipline or field of knowledge, but which can be applied in a wide range of situations and work conditions (for example, organizational skills)" (UNESCO: TVETipedia Glossary)[4]. These skills are increasingly in demand for successful adaptation to changes and leading a full and productive life. Step by step, as transversal competencies are acquired, they become factors that facilitate the learning of disciplinary skills, factors that generate and explain success in higher education.

The European system of key competencies is adapted to national conditions and characteristics in different countries. For example, European countries such as France and Italy focus on universal models of competencies, while Finland and Estonia consider applied competencies related to the development of the digital economy and entrepreneurship. Overall, the development of transversal competencies in the higher education system of European Union countries is considered crucial for future professional success. This process involves the involvement of various stakeholders, such as employers, stake-

holders, learners, and teachers, who interact in the process of formal and informal education (Proposal for a council recommendation on Key Competences for LifeLong Learning)[5].

Another set of transversal skills was presented by the "Global Action Program," aimed at preparing adults for tasks and functions in the domestic work sector and implemented by the International Labour Organization in Switzerland in 2016. Transversal skills are considered essential skills for employment, reflecting a person's ability to learn, communicate well, participate in constructive and healthy dynamics of teamwork, demonstrate creative abilities, and solve emerging problems. Behavioral skills, such as initiative, confidence, readiness, perseverance, goal-orientedness, and others, are considered a subset of related skills and characterize a worker's attitude towards work (Кононова, 2020: 34)[6].

Recently, the focus of research has shifted towards the development of transversal skills – parameters of the educational environment that favour their implementation and realization in future professional and pedagogical activities.

For instance, a group of foreign researchers provide a systematic review of the transversal competencies for employability in university graduates from an employer's perspective, with consideration of the importance of the topic in the cross-national context. Within 52 articles from the Scopus and Web of Science (JCR only) databases in the ten years between 2008 and 2018 they find out 5 dimensions of main transversal competencies, such as Job-related basic skills, Socio-relational skills, and Self-management skills, Entrepreneurship skills, Social and professional responsibility skills (García-Álvarez, Vázquez-Rodríguez, Quiroga-Carrillo & Priegue Caamaño, 2022a)[7].

Aligning learning goals with the needs of the labour market is a difficult task for universities, especially in the present day. Although organisations seek professionals with flexible and varied skills, universities often underestimate the importance of cross-curricular skills. Thus, Helena Belchior- Rocha, Inês Casquilho-Martins and Eduardo Simões identify the perception of recent graduates as to the importance of the transversal skills that they acquired and developed at university and the ways in which they are now applied in the work environment. In their exploratory study, they sent a questionnaire to recent graduates that allowed them to analyse the development and applicability of these competencies in organizations. The results show the broader framework of how universities adapt to the strong socio-economic challenges that characterize current times and the integration of recent graduates into the labour market (Belchior- Rocha, Casquilho-Martins & Simões, 2022)[8] .

In Finland, programming was introduced in the core curriculum in the fall of 2016 as a brand new element that was integrated into both the mathematics and crafts objectives and a set of transversal competencies. The transversal approach emphasises programming as a 21st-century competence in addition to subject-based learning, and it is present in the curriculum as a mandatory cross-curricular theme. The transversal competencies that consider global future-oriented skill development are as follows: taking care of oneself and managing daily life; work-life competence and entrepreneurship; participation involvement and building a sustainable future; thinking and learning to learn; cultural competence, interaction and expression; multiliteracy and digital competence.

The Finnish curriculum promotes an understanding of programming as a concept that is broader than merely coding or programming: it is a part of transversal competencies across disciplines, subject areas and grade levels. Thus, it is recognised that the act of teaching programming includes the development of computational thinking and is linked to other digital and pedagogical competence-building (Korhonen, Salo, Laakso, Seitmaa, Sormunen, Kukkonen & Forsstrom)[9].

The study explored the perceptions, attitudes, and emotions of Finnish pre-primary, primary and secondary school teachers regarding programming being integrated into the national curriculum at the time when it was first introduced (Abdykhalykova, Abibulayeva & Slambekova, 2022: 59)[10].

In the Kazakhstan context, current research reflects the lack of fundamental developments in the area of transversal skill development for future teachers. Thus, in the study by Abdykhalykova Zh.Ye., Abibulaeva A.B., and Slambekova T.S., transversality is considered an educational paradigm that unites knowledge and skills necessary for effective work and productivity in the chosen professional field. This is a traditional measure of competence on which universities concentrate their efforts, developing educational programs that encourage the acquisition of knowledge and skills through an explicitly professional approach to "professionalization," which prepares future graduates for work (Slambekova, Abdykhalykova & Otarova, 2023: 111)[11].

Group of Kazakhstani researchers came to the conclusion that the transversal skills, significance, content, and the interrelationships between com-

petencies and skills have been analyzed in relation to the global trends in education. This analysis is aimed at implementing the Kazakhstani educational system and training educators to meet the standards of modern education (Otarova, 2021: 20)[12].

Otarova T. in her article, discusses the importance of developing transversal competency among students in higher education institutions. The components of transversal competency and methods aimed at forming students as citizens in accordance with the education system suitable for a developing society are analyzed.

The connection between 21st-century skills or «life skills» and transversal competency is demonstrated. These competencies are widely used in scientific literature and in the learning process under the following names: generic competencies, strategic competencies, and core competencies (Johanssón, 2015: 36) [13].

Thus, a theoretical analysis of the sources studied showed the absence of exhaustive answers to the research problem and the need to develop and implement pedagogical universities in the educational process, an Innovative educational program designed for developing transversal skills of prospective teachers.

Description of materials and methods: the main methods of the presented article are analytical-synthetic and comparative methods of scientific, theoretical and methodological literature, open questionnaires for prospective teachers, and webinar, where the problems of developing transversal skills of prospective teachers have been discussed.

Results and Discussion

To determine the initial state of transversal skills among future teachers during a webinar on the topic of "Current Issues in Developing Transversal Skills for Future Teachers," the research team conducted a questionnaire consisting of the following questions:

1. How do you understand transversal skills?
2. Identify the components of transversal skills.
3. Why are transversal skills necessary for future educators?
4. In your opinion, which disciplines contribute to the development of transversal skills?

Questions 1 and 2 of the questionnaire were focused on the respondents' understanding of these skills and were asked prior to the start of the webinar, when participants had limited knowledge of the topic. Questions 3 and 4 were asked after the webinar, as respondents had listened to several presentations on transversal skills and participated in discussions.

A total of 62 students participated in our questionnaire, including future educators, undergraduates, and graduate students.

Regarding Question 1, "How do you understand transversal skills?" 83,7% of respondents stated that they did not have a clear understanding of this concept, while 16,3% affirmed that they had knowledge of it through courses such as "Pedagogy" and "Educational Psychology." (Figure 1).

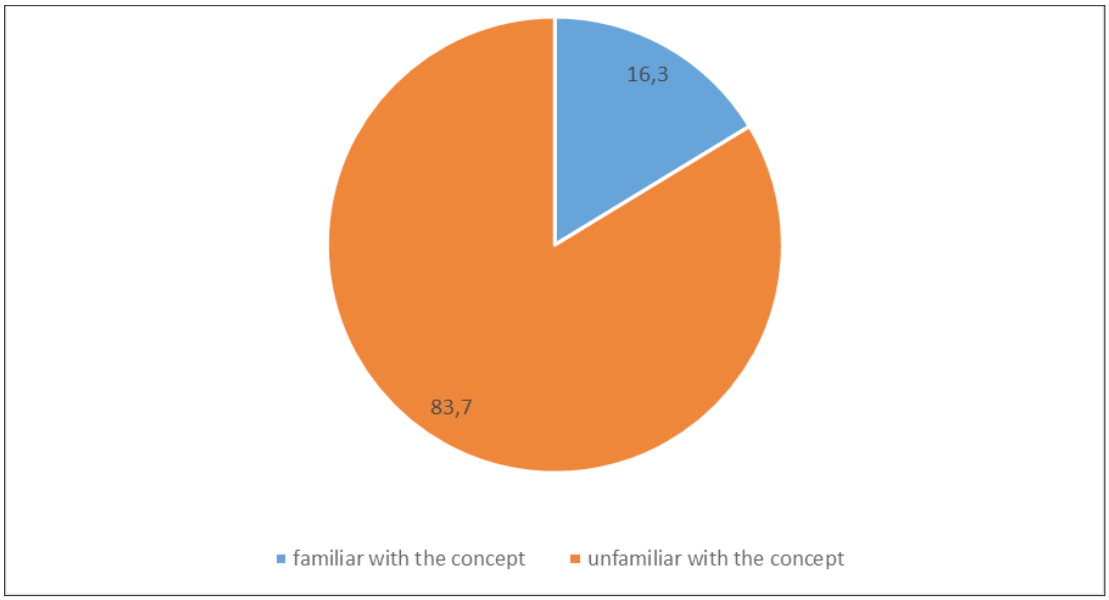

Figure 1 – Basic knowledge of respondents regarding transversal skills

As this was an open-ended question, positive and negative responses regarding transversal skills were coded and determined using statements (Table 1).

In response to question 2, «Identify the components of transversal skills,» 94% of respondents answered that they were «unfamiliar with the components of transversal skills,» while 6% were able to identify types such as digital skills, research skills, multitasking, and collaboration (Figure 2). As this was an open-ended question, we coded positive and negative responses regarding the components of transversal skills and determined them using statements (Table 2).

Table 1 – Data examples for the reported coding

Coding	Examples
those who do not familiar with transversal competence	I don't know, I have no idea, difficult to answer, abstain
those who familiar with transversal competence	basic signs, general skills, general vocational skills, skills necessary for future professional activities.

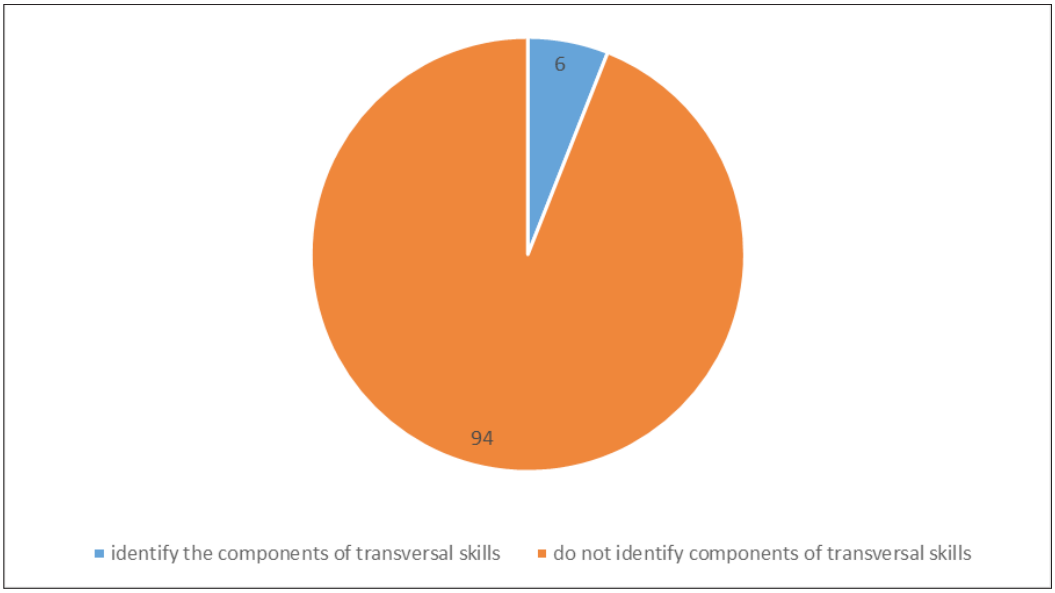

Figure 2 – Identification the components of transversal skills by respondents

Table 2 – Data examples for the reported coding

Coding	Examples
those who do not know the components	don't know, have no idea, difficult to answer, hard to answer, abstain
those who know individual types of components	organizational skills, time management skills, decision-making skills, positive attitude and motivation, ability to apply theory to practice, independent work skills, emotional intelligence, and career management skills

In response to question 3, "Why are transversal skills necessary for future educators?" various answers were obtained, but we grouped them by meaning and presented them in the following 2 categories: contributed for personal development ("for general development", "for self-realization", "to be able to work in a team") – 31,4%, contributed for career development ("for future teaching

career”,”for successful career building “, “for self-realization as a professional”, “required skills in the workplace”) – 68,6%.

Regarding question 4, “Which disciplines, in your opinion, contribute to the development of transversal skills?” there were no clear answers. 76.3% of respondents had difficulty answering, while 13.7% believed that transversal skills are developed in disciplines such as “Psychology,” “Oratory Art,” “Information and Communication Technologies,” and “Leadership.”

Moreover, to study the initial state of the presence of transversal skills in the educational programs of the Republic of Kazakhstan, 4 leading pedagogical universities were selected. The subject of the analysis included the following categories: the purpose of the educational program, competencies being formed, learning outcomes, basic and profile disciplines.

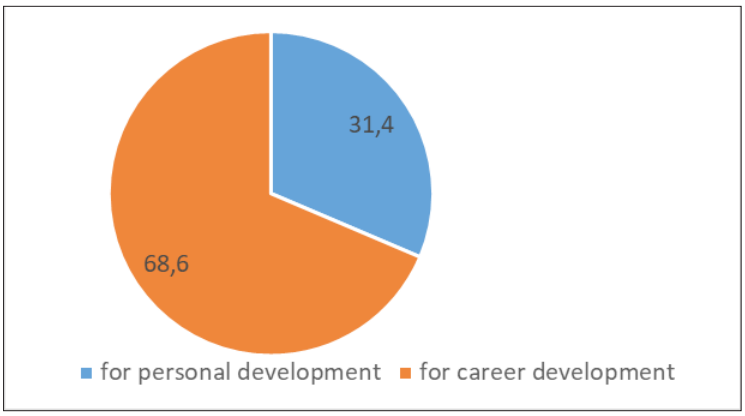

Figure 3 – The necessity of transversal skills for future educators

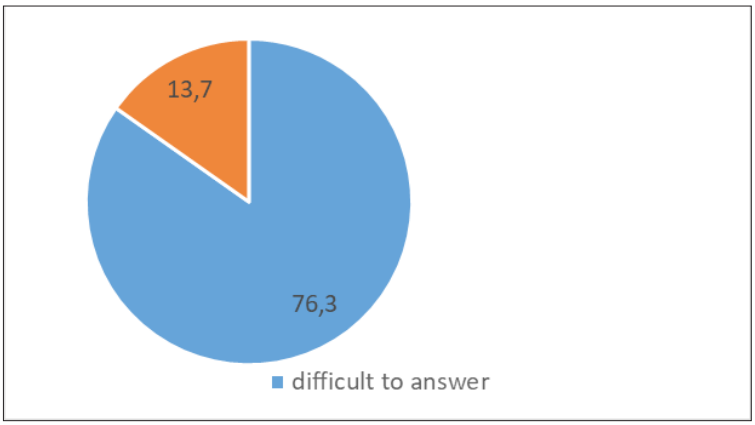

Figure 4 – Contribution of disciplines to the development of transversal skills

Table 3 – Analysis of Educational program of Four leading Kazakh universities of pedagogical profile, bachelor’s degree level

University	Number of courses	Percentage of transversal skills
University 1	8	16%
University 2	7	14%
University 3	11	22%
University 4	10	20%

After analyzing the undergraduate educational programs of 4 leading pedagogical universities, we came to the conclusion that there is no specific goal and learning outcomes aimed at developing transversal skills, but nevertheless, some individual components of transversal skills are developed in the course of studying individual disciplines, which at the same time insufficient, as evidenced by the percentage presented in Table 3.

At the university level, a framework of transversal skills that the university wants to develop in its students has not been formally established. As such, each teacher has transposed various and diverse compemencies in the educational programme, leading to many possible redundant or non-integrated skills being taught.

Based on the results, we concluded that future teachers lack systematic knowledge about transversal skills and their importance in future professional activities. Students are not sufficiently informed about the components of transversal skills that need to be developed in the context of pedagogical education. All of this underscores the need for the development and implementation of a pedagogically focused university curriculum and Innovative educational program "Mentor Elementary Educator" designed to develop the transversal skills of prospective teachers.

Title of educational program: "Mentor-teacher of primary education"

The aim of the educational program is to prepare a mentor-teacher for primary education who possesses transversal skills.

Prerequisites for Educational Programme in the global educational space

1. The program is based on a study of the educational experiences of institutions in Kazakhstan, such as the Abai Kazakh National Pedagogical University, Pavlodar Pedagogical University, and South Kazakhstan State Pedagogical University

2. The study of foreign experiences: the National Agency for Education in Finland, the University of Turku, Estonia, Singapore, and universities in the United States such as Michigan University, Teachers College Columbia University, Washington University, University of Georgia, and Arizona State University.

The educational program comprises several blocks

- *Global awareness* (responsibility, civic, ethical, cultural, social literacy, multicultural competence, ability to work in an international context, humanism, and obligatory disciplines)
- *SMART education* (digital learning, information management skills)
- *Pedagogical design* (teaching strategies, teaching and learning assessment and management, student consultation and support, innovative methods, and integrated technologies in education and teaching)
- *Entrepreneurship in education* (leadership, creativity and innovative skills, project and management skills, research skills, multitasking, collaboration)
- *Self-management* (flexibility and adaptation, analytical skills, ability to apply theory in practice, time management, positive work attitude, and motivation)

The proposed innovative educational program consists of two trajectories: 1) teaching in the modern world and 2) methodological leadership (educational resource/product designer) (Table 3).

Table 4 – The result of learning

№	Type of competences	Code The learning outcomes	The result of learning (according to Bloom taxonomy)
1	Soft skills	LO1	Engage in communication in oral and written forms in Kazakh, Russian, and foreign languages to solve tasks related to interpersonal, intercultural, and professional communication;
		LO2	Utilize digital technology and various forms of information and communication technology for searching, storing, processing, protecting, and distributing information, and apply entrepreneurial knowledge in various areas of life
		LO3	Apply philosophical knowledge to form a worldview position, analyze the main stages and patterns of historical development of society to form a civic position

Table continuation

№	Type of competences	Code The learning outcomes	The result of learning (according to Bloom taxonomy)
2	Digital skills	LO4	Collect and interpret information in the field of elementary education to form judgments considering social, ethical, and scientific considerations;
		LO5	Orient oneself in various sources of information, critically evaluate and interpret information obtained from various sources;
3	Hard skills	LO6	Apply modern scientific principles and research methods in practice, formulating concepts and a conceptual framework for scientific research, providing support for scientific research, mastering the methods and techniques of organizing educational quality monitoring to conduct expert evaluation of the educational environment, selection, modeling and construction of pedagogical activities, and accumulating professional pedagogical experience
		LO7	Apply modern learning technologies in psychological and pedagogical activities and verify communicative abilities management in practice. Possess skills in applying theoretical knowledge and managerial tools in professional activities, possess skills in managerial reflection and developing leadership qualities
		LO8	Professionals in the field of education should possess a range of skills and competencies in order to effectively carry out their managerial duties. This includes the ability to apply theoretical knowledge and management tools to their work, as well as engage in managerial reflection and develop leadership qualities.
		LO9	Professionals should also possess skills in organizing collaborative activities and interpersonal interactions within the educational environment. This involves implementing projects and programs aimed at conflict resolution and mediation, as well as preventing conflicts between staff members and educational service providers.
4	Transversal skills	LO10	In addition, professionals should be able to determine expert strategies, develop business plans for educational products, and model and adjust entrepreneurial educational activities in accordance with market trends. They should also be able to demonstrate effective leadership behavior within the context of primary education.
		LO11	Professionals should possess skills in organizing and evaluating classroom processes using innovative management technologies that correspond to general and specific patterns of development within the educational system. This includes collaborating on team projects, using individual and group technologies to solve practical management problems, and planning and implementing their own professional and personal development.
		LO12	Finally, professionals should be able to synthesize and combine the instrumental, interpersonal, systemic, and integrative components of competencies necessary for the comprehensive development of students in primary education. These competencies include complex transversal skills required to support the process of student development and learning

The learning outcomes (LO) 1-3 include the module “Global awareness”, (LO) 4-5 “SMART education”, (LO) 6-9- “Pedagogical design”, LO 10-12 “The module of transversal competencies” which are aimed for developing contiguous competencies in the field of elementary education.

Methods for teaching and training transversal skills

Teaching methods are diverse and build on the tradition and innovative approaches. They are mostly defined by established teaching methods, but, however, it is up to individual teachers to decide how they conduct their teaching. Transversal skills are very often taught within diverse courses without being mentioned specially in the curriculum or the course descriptions. Here are some of the approaches to teaching used by teachers at University: Flipped classroom, Learning by developing, Peer-to-peer teaching, and Final remarks.

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Conclusion

Today, employers require competent specialists and work with an education system that quickly responds to the needs of the labor market. In the modern context characterized by rapid information exchange, future teachers must possess general skills and dispositions that can be transferred to many professional fields and situations. For this reason, universities need to pay close attention to competencies, considering transversal competencies as key elements in providing a more flexible workforce capable of adapting more quickly to the constant changes occurring in an increasingly interconnected world. This is supported by domestic and international research that has been studied in the preparation of this article. Overall, the development of transversal competencies in the higher education system of the Republic of Kazakhstan is considered to be of decisive importance for the future professional success of teachers. In conclusion of the theoretical analysis on the research problem, we have come to the conclusion that students of professional-pedagogical universities need to possess the following transversal skills:

1. Job-related basic skills;
2. Self-management skills;
3. Socio-relational skills;
4. Entrepreneurship skills;
5. Social and professional responsibility skills (García-Álvarez, J.; Vázquez-Rodríguez, A.; Quiroga-Carrillo, A.; Priegue Caamaño, D.,2015b) [7].

According to the results of the survey and our own research, we have concluded that future teachers lack systematic knowledge about transversal skills and their importance in future professional activities. This indicates the need for the development and implementation of educational programs in pedagogical universities that address transversal skills.

As a result of this study, we have developed an Innovative educational program called “Mentor-teacher for primary education” designed to develop transversal skills for prospective teachers. It includes the program’s objectives, approaches, trajectories, learning outcomes based on transversal competencies, modules of academic disciplines in accordance with the learning outcomes, and proposed methods for teaching and training transversal skills.

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