



UDC 37:378.2
DOI: 10.58649/1694-8033-2025-2(122)-42-49

Received: 16.01.2025
Revised: 07.05.2025
Accepted: 02.06.2025

Technology for developing 4C competency in teacher training

Ainura Baitokova*

PhD in Pedagogical Sciences, Associate Professor
Jusup Balasagyn Kyrgyz National University
720033, 547 Frunze Str., Bishkek, Kyrgyz Republic
<https://orcid.org/0009-0001-0514-6477>

Gulnura Baitokova

Lecturer
Jusup Balasagyn Kyrgyz National University
720033, 547 Frunze Str., Bishkek, Kyrgyz Republic
<https://orcid.org/0009-0005-3493-8616>

Abstract. Modern society imposes new demands on the training of teaching personnel, especially in the context of digitalisation and global transformations in the field of education. Consequently, the integration of technologies aimed at developing key 21st-century competencies in future teachers has become highly relevant. The purpose of this study was to determine the effectiveness of integrating the 4C method into the training students majoring in education as a means of developing essential professional and universal competencies. The research employed methods of theoretical analysis of scientific literature, quantitative analysis with statistical data processing, a comparative approach to evaluating the results obtained through traditional and innovative teaching technologies, as well as student surveys conducted via the digital platform Kahoot. The study analysed the features of applying the 4C method (Creativity, Critical Thinking, Communication, Collaboration) in the educational process, compared the academic achievements of students from two experimental groups, and examined the impact of modern educational approaches on students' motivation and engagement. The results demonstrated that the application of this method significantly enhanced learning motivation, contributed to the development of sustainable professional skills, improved teamwork abilities, and fostered independent analytical thinking. Analysis of the findings showed a positive trend: the experimental groups exhibited higher levels of student engagement and improved overall learning outcomes. Additionally, it was established that the implementation of such technologies requires appropriate methodological support, digital resources, and teacher training for effective application. The practical value of this study lies in the fact that its results can be utilised by pedagogy instructors and educational methodologists when designing educational programmes aimed at developing 21st-century competencies among future education professionals

Keywords: 21st century; competence; digitalisation; educational standards

■ INTRODUCTION

The ongoing advancement of scientific and technological progress, the globalisation processes taking place around the world, and changes in society are also influencing the education system. The third-generation education standard for higher education institutions in the Kyrgyz Republic has raised the issue of reforming education within vocational training (Baitokova, 2017). Graduates of modern higher and secondary vocational-pedagogical institutions are

actively entering the teaching profession. In shaping behaviour, personal development, and communication – which play a vital role in the growth and formation of younger generations – alongside subject-based competencies, significant attention must also be paid to key competencies (informational, social-communicative, self-organisation, and problem-solving) (Grytsenko & Liashenko, 2023). The relevance of this research lies in the need to prioritise the

Suggested Citation: Baitokova, A., & Baitokova, G. (2025). Technology for developing 4C competency in teacher training. *Bulletin of the Jusup Balasagyn Kyrgyz National University*, 17(2), 42-49. doi: 10.58649/1694-8033-2025-2(122)-42-49.



Copyright © The Author(s). This is an open access article distributed under the terms of the Creative Commons Attribution License 4.0 (<https://creativecommons.org/licenses/by/4.0/>)

*Corresponding author

development of key and subject competencies in teacher training, particularly through the use of modern technologies in shaping these competencies.

The concept of “competence” first emerged in the 1960s in the United States within the context of activity-based education. Its aim was to prepare specialists capable of successfully competing in the labour market. As for the terms “competence” and “competency”: competence, derived from the Latin *competere*, meaning to match or correspond, refers to the ability of a specialist to resolve various types of issues and to appropriately apply knowledge in relevant situations. Competency, according to N. Asipova (2019), is defined as an integrative ability to independently apply knowledge, skills, and abilities in different conditions. Thus, competence is a set of knowledge, abilities, skills, and personal qualities necessary to perform a specific task, while competency is the degree to which a specialist has mastered certain competences to perform effectively.

Competency-based education aims to guide future professionals toward becoming versatile specialists who can withstand internal and external competition and act competitively in any field by acquiring the necessary competencies. This approach is gradually taking shape. The development of these competencies in younger generations is greatly supported by the 4C model of competence. In elaborating the theoretical basis of this research, various educators have shared their perspectives, and some scholars have explored the historical development of the four skills. In the United States, these four skills began developing alongside other professional skills within the framework of military training programmes. “Hard” skills reflect one’s competency, domain-specific knowledge, and professionalism, while “soft” skills relate to communication, analytical ability, and general critical thinking (Gladneva, 2022). Some researchers, however, have noted various obstacles in forming these four skills. For instance, O. Ovsyannikova (2023) highlights that social, linguistic, interpersonal, and temperamental characteristics may hinder the development of communicative competence.

In studying pre-school children’s development based on the four skills, scholars have particularly focused on the competency of critical thinking. They have shared their views on using Edward de Bono’s “Six Thinking Hats” technique for developing this skill, suggesting its application during the reflection stage at the end of a lesson (Hamzina & Abykenova, 2022). Furthermore, several recent studies underscore the importance of integrating 21st-century skills into the educational process (Tsymbal, 2020). For example, a study published in 2024 analysed how teachers integrated 21st-century skills into their curricula and assessment practices. The research revealed that incorporating these skills into the learning process positively impacted students’ academic quality (Herlinawati *et al.*, 2024). Additionally, another 2024 study examined the potential of developing students’ 4C skills through gamified interactive assessment materials. The findings indicated that such methods help enhance students’ creativity, critical

thinking, communication, and collaboration skills (Ekaputra *et al.*, 2024). I. Listiqowati *et al.* (2025) analysed integrated teaching models such as the Project-Based Flipped Classroom, aimed at developing 4C skills in education. These models have been shown to increase student engagement and foster both creative and analytical (critical) thinking. The results demonstrated that this form of teaching is effective in developing students’ skills and their ability to apply knowledge in practice.

Drawing on the above academic sources, the relevance, effectiveness, and practical application of the 4C method in teacher training becomes evident. Effectively developing these competencies is seen as one of the key pathways to modernising the education system and aligning students with labour market demands. The objective of the study was to identify ways of developing professional competencies in pedagogy students based on the 4C method – namely, Creativity, Critical thinking, Communication, and Collaboration – and to evaluate the effectiveness of applying these skills in pedagogical practice.

■ MATERIALS AND METHODS

The methodological foundation of the research was based on the use of a set of interrelated, complementary approaches. At the theoretical stage, contemporary trends in education, 21st-century skills, and the 4C method were thoroughly examined through the study of scientific and methodological literature (Klarin, 2010). In addition, academic sources exploring the use of digital education platforms – particularly tools such as Kahoot – were also taken into account (Dillenbourg, 1999). The works of B. Trilling & C. Fadel (2009), which highlight the importance of teaching aimed at fostering creativity and collaboration, as well as the TPACK model, which demonstrates the need to integrate technology into the educational process (Mishra & Koehler, 2006), served as key components of the analysis.

The empirical part of the research involved a pedagogical experiment, which was used as the primary method of collecting empirical data (Slattenin *et al.*, 2013). The experimental work was conducted face-to-face with students enrolled in the Pedagogy programme at the Kyrgyz National University named after Jusup Balasagyn, within the framework of the course “Pedagogical Mastery”. The study was carried out during the winter semester of the 2024-2025 academic year. Two academic groups participated in the study: 20 students from group DO-23-11 and 25 students from group DO-22-9. The experiment consisted of two main cycles. In the first stage, traditional teaching methods were applied – such as delivering lectures, working with texts, and completing model-based assignments. In the second stage, active teaching methods based on the 4C concept were employed – these included group work, solving practical case tasks, collaborative presentations, and team discussions. The differences in teaching approaches made it possible to compare their impact on the quality of the educational process and student engagement. After each cycle, anonymous feedback was collected from

students through a questionnaire. The Kahoot digital platform was used to ensure a unified and accessible format for the survey. The collected data were processed using mathematical and statistical methods, including frequency distribution and intergroup comparison. This approach enabled the identification of differences in how students perceived learning materials and evaluated the teaching process.

All stages of the research were conducted in full accordance with the ethical principles of pedagogical research. All participants were informed in advance about the aims and conditions of the study. Participation was voluntary and completely anonymous. The research was carried out in accordance with the British Educational Research Association (BERA, 2024) Ethical Guidelines for Educational Research. Scientific articles, methodological manuals, modern digital education platforms, and academic publications dedicated to 21st-century skills and innovative teaching methodologies were used as sources of information for the research.

■ RESULTS AND DISCUSSION

The impact of the 4C competency on education

According to the requirements of standards in the higher and secondary vocational education system, all competencies within a given speciality are considered and implemented in the teaching of relevant subjects (Skornyakova, 2022). These include universal competencies: general scientific (GC), instrumental (IC), social-personal, and general cultural (SC). General scientific competence enables students to apply acquired knowledge broadly in their daily lives. They develop the ability to orient themselves within their chosen profession, to express their thoughts clearly and effectively, to master communication skills, and to engage in independent inquiry. The skills gained in class help them to satisfy their future needs in the teaching profession. Instrumental competence (organisational and problem-solving ability) leads students to deeply understand the essence of the teaching profession. As a result, they reach a level where they can independently resolve issues in both their professional careers and personal lives. Social-personal and general cultural competence shapes students' interpersonal communication and teamwork abilities, gradually forming social interaction skills. It equips them with the ability to engage in respectful dialogue, honour elders, respect peers, practise etiquette in communication, and confidently defend and justify their opinions. This, in turn, lays the foundation for a sustainable teaching career. Professional competence refers to possessing the necessary knowledge, skills, and experience for one's professional activity, as well as being prepared to address a variety of challenges in professional practice (Klarin, 2010).

When it comes to developing these competencies in students, it particularly requires pedagogical mastery, innovative approaches, and a strong emphasis on inquiry. The application of modern methods, new technologies, and educational innovations in developing competencies is yielding improved learning outcomes and reshaping how

competency development is approached. Currently, within the framework of the new educational standards in Kyrgyzstan, there is a growing need to explore the experiences of other countries that prepare teachers based on integrative and competence-based approaches, in line with the demands of modern reforms in higher professional education (Concept for the Development of Education in the Kyrgyz Republic, 2021). According to various authors, the pedagogical education system must be redirected to better align with the competencies required in the 21st-century. This redirection should be guided by international best practices. The global trend shows that in training future educators, it is essential not only to provide knowledge but also to ensure comprehensive professional readiness. In this context, one of the competencies adapted to modern requirements – the 4C competency developed in the United States – can serve as an effective framework for shaping relevant skills.

The history of the emergence of the 4C method

Looking into the history of the emergence of the 4C method: the 4Cs – Critical thinking, Creativity, Collaboration, and Communication – are four key skills that help individuals work successfully in all fields. These skills originated in the United States during the 1950s, when specialists developed them for training personnel in the armed forces. Over time, these four skills have come to be recognised as essential for the 21st century, and the 4C system has begun to be applied across various scientific and practical disciplines. Integrating these skills into the educational process, particularly in the training of pedagogical staff, demands swift and deliberate action (Mishra & Koehler, 2006). This is because the current information society urgently requires the formation of individuals who can think critically, argue their points with reason, collaborate in teams, and communicate effectively. In this context, B. Trilling & C. Fadel (2009) highlight creativity, communication, collaboration, and critical thinking as the most vital skills for success in the 21st century. Creative thinking, critical reflection on information, and the ability to communicate are not only essential at school or work but are also crucial for life in general. These skills help in forming strategies for achieving goals and in solving various challenges and tasks. A study by the OECD (2018) also notes that the education of the future should focus on developing “flexibility and responsible decision-making in challenging situations”. Modern employers report that beyond professional skills directly linked to job functions, they greatly value well-developed soft skills. To better understand the pedagogical value of this approach, it is important to examine the specific competencies encompassed by the 4C model.

According to the definition by American scholar, educator, and psychologist D. Klooster, critical thinking is, first and foremost, independent thinking; secondly, it begins and ends with questioning; thirdly, it relies on information as a foundation; fourthly, it is reasoned thinking; and fifthly, it is social thinking. The author states that critical thinking encompasses these five characteristics. By

developing critical thinking, today's students can achieve several outcomes: they come to understand its importance for professional growth and success in modern society; it helps them analyse and comprehend complex issues; it supports self-awareness and personal development; it enables them to distinguish facts from opinions in information sources; and it fosters observational skills (such as quickly identifying problems and determining their causes), analytical abilities (such as evaluating information and verifying facts), and the capacity to draw conclusions (such as processing and synthesising gathered data). P. Facione (2015) characterises critical thinking as "the process of evaluating and justifying evidence for decision-making".

Creative thinking involves approaching problems with originality and the ability to generate unconventional solutions. Creativity is the ability to view situations from a unique perspective, propose new and original ideas and solutions, think broadly and globally, and make non-standard decisions. R. Sawyer (2012) defines creativity as "a social process involving the generation, development, and sharing of ideas". Creativity reflects a person's ability to think innovatively in response to new conditions, as creative individuals are capable of producing fundamentally new and valuable outcomes and finding effective solutions that are highly relevant in today's world. Since creativity is a distinctive way of thinking that involves seeing the world from an unusual perspective, it should be nurtured from early childhood. Therefore, educators must pay special attention to fostering creativity in children.

Communication skills – such as the ability to connect with others and express oneself clearly – are essential. Through social interaction, individuals experience personal growth and self-discovery, gaining new knowledge and ideas about themselves and the world. Effective communication also involves adapting to the goals and context of the interaction, meaning the ability to choose appropriate methods and strategies depending on the situation. Persuasive communication, which involves selecting and applying suitable techniques and tools to achieve a specific goal, is also crucial. Communication is not merely the transmission of information; it is a process that fosters mutual understanding, builds relationships, and establishes trust (Hargie, 2011). Furthermore, A. Burns (2016) describes communication as a "vital social skill" necessary for successful education, encompassing not only the ability to express oneself but also to listen, understand, and respond appropriately.

Collaboration is the process by which two or more individuals or organisations work together in a shared environment to achieve common goals, involving knowledge exchange, learning, negotiation, and consensus-building. In today's world, this skill is in high demand, as nearly every profession involves some degree of teamwork. Therefore, future teachers must not only impart knowledge but also prepare students to interact with diverse individuals, resolve conflicts, and communicate harmoniously within a group. D. Johnson & R. Johnson (2009) describe collaboration as "interdependence and responsible interaction aimed at

achieving a goal", emphasising that mutual respect and support are key to successful teamwork. P. Dillenbourg (1999) also notes that collaboration involves the co-construction and reworking of knowledge, distinguishing it from individual learning. To develop these competencies, various technologies and methods can be applied in the learning process. Learner engagement is one of the most important issues in pedagogical science (Slastenin *et al.*, 2013). Active learning involves engaging with material thoughtfully and intuitively, applying one's full potential, and reaching a new, higher level of learning activity. Key methods include case analysis, discussion, round tables, brainstorming, problem-based learning, and role-playing games.

Using information derived from analytical discussions encourages independent decision-making and collective reflection. In the discussion phase, a controversial issue is openly debated from multiple perspectives, with participants presenting and justifying their viewpoints. This process helps students learn to support their answers with evidence and understand the value of different suggestions. The main goal is to generate innovative and unique solutions through collective thinking (Mambetkunov & Siyayev, 2002). Project-based learning, which focuses on outcomes, planning, evaluation, and practical application of knowledge, also plays a key role. Communication tasks such as "station rotation" and "flipped classroom" approaches allow for personalised learning experiences. Information construction involves organising, systematising, summarising, and transforming data. Thus, the use of pedagogical technologies in competency development plays a vital and indispensable role, as demonstrated through the practical application of the methods mentioned above.

Practical application and analysis of the 4C competency model

The main objective of the study was to examine how the use of the 4C method in modern education affects students' learning quality and engagement. This method is aimed at developing students' creativity, critical thinking, communication skills, and collaboration abilities. The experimental research was conducted with third-year students from two groups of the Pedagogical College at Jusup Balasagyn Kyrgyz National University: DO-23-11 and DO-22-9. Each group underwent two stages: the first involved traditional teaching methods, while the second employed modern methods incorporating elements of the 4C model.

The lessons were conducted within the framework of the pedagogy course, with identical content and topics across both stages. The difference lay in the teaching approach: in the traditional stage, lectures and Q&A sessions were used, whereas in the 4C stage, students worked in groups, solved problem-based scenarios, prepared presentations, engaged in discussions, and completed creative tasks. At the end of the experiment, students' academic performance was assessed anonymously via the Kahoot platform, and additional surveys were used to gather their feedback and evaluations. As shown in Table 1, both

groups demonstrated improved results after being taught using the modern 4C method. In group DO-23-11, 85% of students rated the 4C methodology as effective, while in

group DO-22-9, this figure was 72%. These results indicate that students were more actively engaged in the learning process and better absorbed the material.

Table 1. The results summary

Group	Traditional method	4C-based method
DO-23-11	65% (13 out of 20)	85% (17 out of 20)
DO-22-9	48% (12 out of 25)	72% (18 out of 25)

Source: compiled by the authors

These findings confirm that a teaching system based on the 4C competencies is significantly more effective than traditional methods. Improvements were observed in class participation, student interaction, depth of thinking, and engagement in creative tasks. According to instructors' observations, students became more willing to express their ideas openly and learned to resolve disagreements constructively. At the same time, several challenges were encountered in implementing this method. Firstly, not all instructors were adequately prepared to apply these methods. Secondly, some students were initially unaccustomed to working in teams, which led to lower engagement at the beginning. However, they gradually adapted during the learning process. Additionally, limited access to technical equipment and digital tools in classrooms posed another challenge.

The results of the study allow for concluding that education based on the 4C competencies is a method that meets the demands of the 21st-century. It not only improves the quality of students' knowledge but also enhances their social competencies. This method plays a particularly important role in the training of pedagogical personnel and offers the potential to elevate the education system to a new level. The 4C method significantly transforms traditional forms of education, prompting a re-evaluation of the roles of both students and teachers. In the world, shaped by technology and globalisation, these competencies have become essential requirements for the future workforce and for social integration. Moreover, by incorporating digital technologies and modern teaching tools, the 4C method makes the learning process more engaging. However, its successful implementation is accompanied by several challenges. Notably, many education systems lack the modern resources and qualified teachers necessary to develop 4C skills effectively. Thus, the 4C method has proven its relevance for advancing education in the 21st-century. Its implementation can play a key role in ensuring the future success of individuals in both professional and personal spheres. This competency model should aim not only to transform students but also to reshape the entire education system.

CONCLUSIONS

The findings of the study demonstrated that the 4C method holds significant importance and relevance in the preparation of pedagogical personnel. Through this approach, students effectively develop skills that are in high demand in modern society – namely creativity, critical thinking, effective communication, and collaboration. The data obtained

by comparing traditional and modern teaching methods during the experiment confirmed that the 4C method increases student engagement and interest in the learning process, while also significantly improving their communication and teamwork skills. For instance, in group DO-23-11, 65% of students showed positive results under traditional instruction, whereas this figure rose to 85% when the 4C method was applied. A similar trend was observed in group DO-22-9, where the percentage increased from 48% to 72%. These results indicate, firstly, that the 4C approach contributes to enhancing the effectiveness of teaching, and secondly, that it positively influences students' social and personal development alongside the educational process. The use of digital platforms in lessons – such as interactive assessment tools like Kahoot – helped to increase student interest and encouraged more active participation. This, in turn, transformed the teacher-student relationship into a more reciprocal, dialogue-based interaction, rather than a one-sided transmission of knowledge.

Each component of the 4C model plays a distinct and important role in the educational process. Creativity helps students unlock their potential and increases their interest in learning. Critical thinking enables them to analyse information, solve problems, and make reasoned decisions. Communication skills allow students to express their ideas clearly, engage in effective dialogue, and navigate social environments with confidence. Through collaboration, students learn to listen to one another and share responsibility when working in teams. All of these skills directly influence students' future professional activities and contribute to their development as successful specialists. Based on the study, it was concluded that the 4C method not only improves the quality of education but also serves as a key factor in modernising the education system and preparing professionals who meet global standards. This approach supports the development of future teachers not only in terms of knowledge but also in essential social skills. Furthermore, it creates the conditions for raising the quality of the educational process by fostering students' creativity, analytical thinking, and ability to interact with society. Looking ahead, promising directions for further research include examining each of the 4C components individually, developing effective teaching strategies, fully leveraging the potential of digital platforms, and exploring the impact of this method on students' academic performance and professional readiness. In addition, it is necessary to systematically integrate the 4C elements into teacher

training programmes and to develop methodological recommendations aimed at enhancing teachers' ability to apply this method effectively. In conclusion, the 4C method has fully demonstrated its scientific and practical value in the modernisation of education and the preparation of future professionals. It is expected to become an integral part of the education system in the future, with its effectiveness aligning closely with the demands of 21st-century education.

■ ACKNOWLEDGEMENTS

None.

■ FUNDING

None.

■ CONFLICT OF INTEREST

None.

■ REFERENCES

- [1] Asipova, N.A. (2019). *Modern educational paradigms*. Bishkek.
- [2] Baitokova, A.S. (2017). *Universal human values in Ch. Aitmatov's works and their pedagogical aspects*. *Bulletin of the Kyrgyz Academy of Education*, 3, 67-71.
- [3] British Educational Research Association (BERA). (2024). *Ethical guidelines for educational research* (5th ed.). Retrieved from <https://www.bera.ac.uk/publication/ethical-guidelines-for-educational-research-fifth-edition-2024>.
- [4] Burns, A. (2016). *Research and the teaching of speaking in the second language classroom*. In E. Hinkel (Ed.), *Handbook of research in second language teaching and learning* (Vol. III, pp. 242-256). London: Routledge.
- [5] Concept for the Development of Education in the Kyrgyz Republic for 2021-2030. (2021). Retrieved from <https://edu.gov.kg/media/files/118d4b79-d6ea-4648-9c1c-56280444e7fd.pdf>.
- [6] Dillenbourg, P. (1999). *Collaborative learning: Cognitive and computational approaches*. Oxford: Elsevier.
- [7] Ekaputra, F., Syahri, W., & Fuldiaratman, F. (2024). Improving 4C skills through the application of gamification-based interactive evaluation media using Flipped Classroom integrated Project-Based Learning model. *EduLine: Journal of Education and Learning Innovation*, 4(3), 471-476. doi: 10.35877/454RI.eduline3032.
- [8] Facione, P.A. (2015). *Critical thinking: What it is and why it counts*. Retrieved from <https://surli.cc/tzwixo>.
- [9] Gladneva, S. (2025). *The 4C method*. Retrieved from <https://vgaps.ru/news/metod-4k>.
- [10] Grytsenko, L., & Liashenko, S. (2023). Innovative approaches to students' key competencies formation in the context of labor training. *Ukrainian Professional Education*, 7(1), 44-50. doi: 10.33989/2519-8254.2023.13.289938.
- [11] Hamzina, Sh.Sh., & Abykenova, Zh.K. (2022). The 4C model as a technological model for implementing a communicative approach in the development of preschool children's speech. *International Research Journal*, 5(119), 107-109. doi: 10.23670/IRJ.2022.119.5.093.
- [12] Hargie, O. (2011). *Skilled interpersonal communication: Research, theory and practice* (5th ed.). London: Routledge. doi: 10.4324/9780203833919.
- [13] Herlinawati, H., Marwa, M., Ismail, N., Junaidi, J., Liza, L.O., & Situmorang, D.D.B. (2024). The integration of 21st century skills in the curriculum of education. *Heliyon*, 10(15), article number e35148. doi: 10.1016/j.heliyon.2024.e35148.
- [14] Johnson, D.W., & Johnson, R.T. (2009). An educational psychology success story: Social interdependence theory and cooperative learning. *Educational Researcher*, 38(5), 365-379. doi: 10.3102/0013189X09339057.
- [15] Klarin, M.V. (2010). *Innovative models of learning in foreign pedagogy*. Moscow: Research Institute of School Technologies.
- [16] Listiqowati, I., Budijanto, B., Sumarmi, S., Ruja, I.N., Putra, E., & Ishak, N.A. (2025). Project-based Flipped Classroom (PjBFC) for enhancing 4C skills in Geography learning. *Jurnal Pendidikan Geografi: Kajian, Teori, dan Praktek dalam Bidang Pendidikan dan Ilmu Geografi*, 30(1), article number 5. doi: 10.17977/2527-628X.1179.
- [17] Mambetkunov, E., & Siyayev, T. (2002). *Fundamentals of pedagogy*. Bishkek: Pedagogika.
- [18] Mishra, P., & Koehler, M.J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record: The Voice of Scholarship in Education*, 108(6), article number 1017. doi: 10.1111/j.1467-9620.2006.00684.x.
- [19] OECD. (2018). *The future of education and skills: Education 2030 – the future we want*. Retrieved from <https://www.oecd.org/education/2030-project/>.
- [20] Ovsyannikova, O.A. (2023). *To the problem of personality's communicative competence formation*. Retrieved from <https://studfile.net/preview/17902125/>.
- [21] Sawyer, R.K. (2012). *Explaining creativity: The science of human innovation* (2nd ed.). Oxford University Press.
- [22] Skornyakova, N. (2022). *How to develop critical thinking and other 4C competencies in schoolchildren*. Retrieved from <https://skillbox.ru/media/education/kak-razvivat-kriticheskoe-myshlenie-i-prochie-4kkompetentsii-u-shkolnikov/>.
- [23] Slastenin, V.A., Isaev, I.F., & Shiyonov, E.N. (2013). *Pedagogy*. Moscow: Academia Publishing Center.
- [24] Trilling, B., & Fadel, C. (2009). *21st century skills: Learning for life in our times*. San Francisco: Jossey-Bass.
- [25] Tsybmal, S. (2020). Teacher digital competence: Bringing education to the next level. *Humanities Studios: Pedagogy, Psychology, Philosophy*, 8(1), 22-26. doi: 10.31548/hspedagog2020.01.022.

Педагогикалык кадрларды даярдоодо “4К” компетенциясын калыптандыруу технологиясы

Айнура Байтокова

Педагогика илимдеринин кандидаты, доцент

Ж. Баласагын атындагы Кыргыз улуттук университети

720033, Фрунзе көч., 547, Бишкек ш., Кыргыз Республикасы

<https://orcid.org/0009-0001-0514-6477>

Гульнура Байтокова

Окутуучу

Ж. Баласагын атындагы Кыргыз улуттук университети

720033, Фрунзе көч., 547, Бишкек ш., Кыргыз Республикасы

<https://orcid.org/0009-0005-3493-8616>

Аннотация. Билим берүү тармагындагы глобалдык өзгөрүүлөрдүн жана өзгөчө санариптештирүүнүн шартындагы заманбап коом, педагогикалык кадрларды даярдоого жаңы талаптарды коюп жатат. Ушуга байланыштуу келечектеги мугалимдердин XXI кылымдагы негизги компетенцияларын өнүктүрүүгө багытталган технологияларды билим берүү процессине киргизүү актуалдуу болуп жатат. Бул иштин негизги максаты – педагогикалык кесипке ээ болуучу студенттерди даярдоодо кесиптик жана универсалдуу компетенцияларды өнүктүрүүнүн каражаты катары “4К” ыкмасын интеграциялоонун натыйжалуулугун аныктоо болуп саналат. Изилдөөдө илимий адабияттарды, теориялык талдоо методдорун, натыйжаларды жыйынтыгын чыгарууда математикалык-статистикалык методдорду колдонуу менен сандык талдоо, окутуунун салттуу жана инновациялык технологияларын колдонуу менен алынган натыйжаларды баалоодо салыштыруу, ошондой эле Kahoot санариптик платформасын колдонуу менен студенттерди сурамжылоо колдонулган. Иштин жүрүшүндө “4К” ыкмасын (креативдүүлүк, критикалык ой жүгүртүү, коммуникативдүүлүк, кызматташуу) окуу процессинде колдонуунун өзгөчөлүктөрү талдоого алынып, эки эксперименталдык топтун студенттеринин билим алуудагы жетишкендиктери салыштырылып, заманбап билим берүү ыкмалары менен өтүлгөн сабактар студенттерге таасирин тийгизе алды жана алардын кызыгуусун жаратты. Натыйжалар көрсөткөндөй, бул технологияны колдонуу окуу мотивациясын олуттуу жогорулатууга мүмкүндүк берет, туруктуу кесиптик көндүмдөрдү калыптандырууга өбөлгө түзөт, командада иштөө жөндөмүн өркүндөтөт жана өз алдынча аналитикалык ой жүгүртүүнү өрчүтөт. Натыйжаларды талдоодо оң динамиканы көрсөттү: эксперименталдык топтордо студенттердин активдүүлүгү жана окуу материалын өздөштүрүүнүн жалпы деңгээли жогорулаган. Мындан тышкары, мындай технологияларды ишке киргизүү үчүн тиешелүү усулдук колдоо жана санариптик ресурстар, ошондой эле мугалимдерди аларды колдонууга үйрөтүү зарыл экендиги аныкталган. Изилдөөнүн практикалык баалуулугу анын натыйжаларын XXI кылымдын компетенцияларын өнүктүрүүгө багытталган билим берүү программаларын иштеп чыгууда келечектеги билим берүү чөйрөсүндөгү адистер, педагогика тармагындагы мугалимдер жана методисттер колдоно ала турганында

Негизги сөздөр: XXI кылым; компетенттүүлүк; стандарт; санарип

Технология формирования компетенции «4К» в подготовке педагогических кадров

Айнура Байтокова

Кандидат педагогических наук, доцент

Кыргызский национальный университет имени Ж. Баласагына

720033, ул. Фрунзе, 547, г. Бишкек, Кыргызская Республика

<https://orcid.org/0009-0001-0514-6477>

Гульнура Байтокова

Преподаватель

Кыргызский национальный университет имени Ж. Баласагына

720033, ул. Фрунзе, 547, г. Бишкек, Кыргызская Республика

<https://orcid.org/0009-0005-3493-8616>

Аннотация. Современное общество предъявляет новые требования к подготовке педагогических кадров, особенно в условиях цифровизации и глобальных преобразований в сфере образования. В связи с этим актуальным становится внедрение в образовательный процесс технологий, направленных на формирование у будущих учителей ключевых компетенций XXI века. Целью данной работы было определение эффективности интеграции метода «4К» в подготовку студентов педагогического направления как средства развития ключевых профессиональных и универсальных компетенций. В исследовании применялись методы теоретического анализа научной литературы, количественного анализа с применением статистической обработки результатов, сравнительный подход к оценке результатов, полученных при использовании традиционных и инновационных технологий обучения, а также анкетирование студентов с использованием цифровой платформы Kahoot. В процессе работы были проанализированы особенности применения метода «4К» (креативность, критическое мышление, коммуникация, кооперация) в учебном процессе, сопоставлены учебные достижения студентов двух экспериментальных групп, а также выявлено влияние современных образовательных подходов на мотивацию и вовлеченность студентов. Результаты показали, что применение данной технологии позволяет значительно активизировать учебную мотивацию, способствует формированию устойчивых профессиональных навыков, улучшает способность к работе в команде и развитию самостоятельного аналитического мышления. Анализ результатов показал положительную динамику: в экспериментальных группах наблюдалось повышение вовлеченности студентов и общего уровня усвоения учебного материала. Кроме того, установлено, что внедрение таких технологий требует соответствующего методического обеспечения и цифровых ресурсов, а также подготовки педагогов к их применению. Практическая ценность исследования заключается в том, что его результаты могут быть использованы преподавателями педагогики и методистами при разработке образовательных программ, направленных на развитие компетенций XXI века у будущих специалистов в сфере образования

Ключевые слова: XXI век; компетентность; цифровизация; стандарт обучения