

METHODOLOGY FOR DEVELOPING 4C SKILLS IN FUTURE PRIMARY SCHOOL TEACHERS

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Abstract: *The rapid development of modern society and the digital transformation of education require future teachers to possess not only professional knowledge but also essential 21st-century competencies. Among these competencies, the 4C skills—critical thinking, creativity, communication, and collaboration—occupy a central place in teacher education. This article examines the methodological foundations for developing 4C skills among future primary school teachers. The study analyzes pedagogical approaches, teaching methods, and educational technologies that contribute to the effective formation of these competencies. Experimental work conducted with undergraduate students in teacher education programs demonstrated positive changes in students' professional readiness and the level of 4C skill development. The findings indicate that integrating project-based learning, collaborative tasks, reflective activities, and digital educational tools significantly enhances the professional competence of future primary school teachers.*

Keywords: *4C skills, future teachers, primary education, critical thinking, creativity, communication, collaboration, pedagogical methodology.*

Аннотация: *Стремительное развитие современного общества и цифровая трансформация образования требуют от будущих педагогов не только профессиональных знаний, но и владения*

ключевыми компетенциями XXI века. В данной статье рассматриваются методологические основы развития навыков 4C (критическое мышление, креативность, коммуникация и сотрудничество) у будущих учителей начальных классов. Анализируются современные педагогические подходы, методы обучения и образовательные технологии, способствующие формированию данных компетенций. Результаты экспериментальной работы показали положительную динамику развития профессиональной готовности студентов и уровня сформированности навыков 4C.

Ключевые слова: навыки 4C, будущие учителя, начальное образование, критическое мышление, креативность, коммуникация, сотрудничество.

Annotatsiya: Zamonaviy jamiyatning jadal rivojlanishi va ta'limning raqamli transformatsiyasi bo'lajak pedagoglardan nafaqat kasbiy bilimlarni, balki XXI asrning muhim kompetensiyalarini ham egallashni talab qiladi. Ushbu maqolada bo'lajak boshlang'ich sinf o'qituvchilarida 4K ko'nikmalarini (tanqidiy fikrlash, kreativlik, kommunikativlik va hamkorlik) rivojlantirishning metodik asoslari yoritilgan. Tadqiqot davomida zamonaviy pedagogik yondashuvlar, ta'lim metodlari va texnologiyalarining samaradorligi tahlil qilindi. Eksperimental ish natijalari talabalarning kasbiy tayyorgarligi va 4K ko'nikmalari rivojlanishida ijobiy o'zgarishlar kuzatilganligini ko'rsatdi.

Kalit so'zlar: 4K ko'nikmalari, bo'lajak o'qituvchilar, boshlang'ich ta'lim, tanqidiy fikrlash, kreativlik, kommunikativlik, hamkorlik.

Introduction

The modernization of educational systems worldwide has led to a reconsideration of the competencies required of future teachers. In the context of the Fourth Industrial Revolution, educational institutions are expected to prepare specialists capable of adapting to rapidly changing social and professional environments. Therefore, teacher education programs increasingly emphasize the development of 21st-century skills, commonly known as the 4C skills: critical thinking, creativity, communication, and collaboration [1].

Future primary school teachers play a crucial role in shaping the intellectual and personal development of younger generations. Consequently, they must be equipped with innovative pedagogical competencies that enable them to foster similar skills among their pupils. The effective integration of 4C skills into teacher education programs contributes to professional growth, lifelong learning, and educational innovation [2].

Materials and Methods

The study employed theoretical and empirical research methods. The theoretical component included analysis of scientific literature, pedagogical concepts, and international educational frameworks related to 4C competencies. The empirical component involved pedagogical observation, questionnaires, interviews, and experimental teaching.

The experiment was conducted at a pedagogical higher education institution involving 60 undergraduate students enrolled in the Primary Education program. The participants were divided into experimental and control groups. The experimental group was taught using a specially designed methodology aimed at developing 4C skills through project-

based learning, collaborative assignments, problem-solving activities, digital technologies, and reflective practices.

The methodological framework was based on competency-based, learner-centered, and constructivist approaches. These approaches encourage active participation, independent learning, and meaningful interaction among students [3].

Results and Discussion

The findings demonstrated that systematic implementation of 4C-oriented educational activities positively influenced students' professional competencies. Critical thinking was enhanced through case studies, problem-based learning, and analytical discussions. Students learned to evaluate information critically, identify educational problems, and propose evidence-based solutions.

Creativity was developed through project work, innovative lesson design, and the creation of educational resources. Participants demonstrated increased originality and flexibility in solving pedagogical tasks. Communication skills improved through presentations, debates, peer assessment, and classroom discussions. Students became more confident in expressing ideas and engaging in professional dialogue.

Collaboration skills were strengthened through teamwork, cooperative learning strategies, and joint research projects. Participants developed the ability to work effectively in groups, negotiate responsibilities, and achieve common goals [4].

Figure 1. Dynamics of 4C Skills Development in the Experimental Group

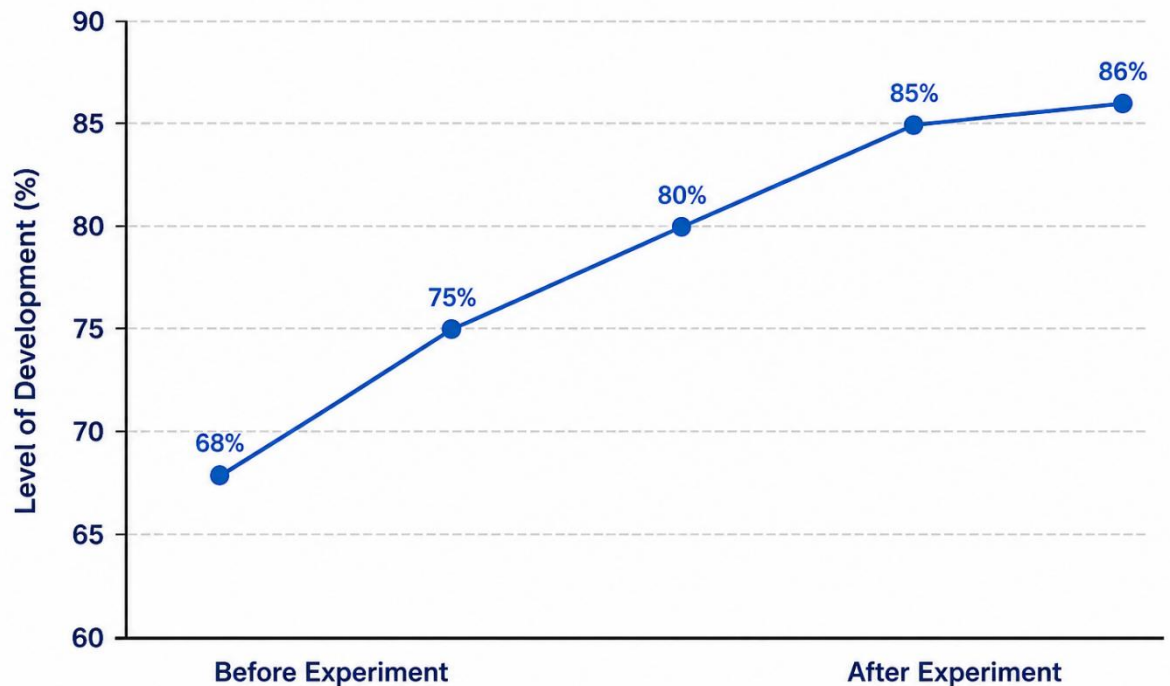


Figure 1. Comparative dynamics of 4C skills development among future primary school teachers before and after the pedagogical experiment.

The results indicate a significant increase in all four competency areas after the implementation of the proposed methodology. The average level of 4C skills increased from 68% to 86%, confirming the effectiveness of the experimental approach.

The integration of digital educational technologies also contributed substantially to competency development. Online collaboration platforms, multimedia tools, and interactive learning environments enhanced student engagement and facilitated meaningful learning experiences. These findings are consistent with previous international studies emphasizing the importance of innovative pedagogical practices in teacher education [5].

Furthermore, reflective activities enabled students to evaluate their learning progress, identify strengths and weaknesses, and develop professional self-awareness. Reflection served as a mechanism for continuous improvement and deeper understanding of pedagogical processes.

Conclusion

The study confirms that the development of 4C skills is an essential component of professional training for future primary school teachers. The proposed methodology, based on active learning strategies, collaborative practices, digital technologies, and reflective activities, effectively enhances critical thinking, creativity, communication, and collaboration.

The experimental results demonstrated that students participating in the 4C-oriented educational program achieved higher levels of professional competence compared to those receiving traditional instruction. Therefore, teacher education institutions should systematically integrate 4C skill development into curricula, teaching methods, and assessment practices.

The implementation of this methodology contributes to preparing innovative, competent, and adaptable teachers capable of meeting the challenges of contemporary education.

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