

IMPROVING THE METHODOLOGICAL PREPARATION OF FUTURE

PRIMARY TEACHERS TO TEACH COMPUTER SCIENCE

Shamshodjon Kuvondikov

Profi University Navoi branch

Department of "Humanities and Educational Activities"

Teacher of specialized subjects of primary education

shamshodquvondikov94@gmail.com

+998-93-435-95-85

Annotation: This article analyzes the content, significance, and pedagogical foundations of preparing future primary school teachers to teach the subject of Informatics. The study examined methodological approaches specific to teaching Informatics at the primary education level, the components of teacher competencies, and the possibilities of using modern digital tools. Based on existing scientific literature, as well as national and international experiences, methodological approaches were substantiated to help future teachers develop skills in computational thinking, digital literacy, and effective classroom management.

Keywords: primary education, Informatics, methodological preparation, digital competence, pedagogical technology, computational thinking, interactive teaching.

Аннотация. В данной статье анализируются содержание, значимость и педагогические основы подготовки будущих учителей начальных классов к преподаванию предмета «Информатика». В исследовании рассмотрены методические подходы, специфические для преподавания информатики на уровне начального образования, компоненты педагогической компетентности учителя, а также возможности использования современных цифровых инструментов. На основе существующей научной литературы, а также национального и международного опыта были обоснованы методические подходы, направленные на формирование у будущих учителей навыков алгоритмического мышления, цифровой грамотности и эффективного управления учебным процессом.

Ключевые слова: начальное образование, информатика, методическая подготовка, цифровая компетентность, педагогические технологии, алгоритмическое мышление, интерактивное обучение.

INTRODUCTION. In today's globalization and digital transformation processes, new requirements are being placed on all parts of the education system. In particular, teaching computer science from the early stages in primary education serves to form such vital competencies as algorithmic thinking, logical reasoning, problem solving, and digital literacy in students. This, in turn, requires future primary school teachers not only to have theoretical knowledge of computer science, but also to master the methodology of teaching it based on modern pedagogical technologies. In recent years, the rapid introduction of multimedia tools, interactive platforms, electronic textbooks, and digital didactic materials into the educational process has necessitated a review of the content and methodology of teaching computer science. Therefore, the development of effective approaches to improving methodological preparation for teaching computer science in higher educational institutions that train pedagogical personnel has become an urgent task.

Current observations show that the majority of future teachers do not have sufficient training in teaching computer science in a form adapted to primary school students, in the purposeful use of interactive tools, and in the effective selection of algorithmic exercises. These problems indicate the need to develop theoretical foundations and determine practical mechanisms for improving methodological preparation for teaching computer science. From this point of view, this study scientifically analyzes the factors of developing methodological preparation of future primary school teachers for teaching computer science, the possibilities of using modern pedagogical technologies, and the pedagogical conditions that ensure the improvement of methodological preparation.

LITERATURE REVIEW AND METHODS.

Although scientific research on the methodology of teaching computer science in primary education has expanded significantly in recent years, the development of methodological training of future teachers based on an integrated approach still remains a pressing issue. The theoretical foundations of computer science education, methods for developing algorithmic thinking, and concepts for the formation of computer literacy (Seymour Papert, Jeanette Wing, M. Resnick, etc.) are widely covered in world scientific literature, and they are an important source for determining the methodological foundations of computer science teaching at the primary education stage.

N.A. Kayumova's¹ scientific research on the training of future computer science teachers in an electronic learning environment based on an integrative approach, and M. Pardayeva's² scientific research on the management of the methodological system for implementing a competency-based approach in secondary schools, also provide the necessary conclusions and recommendations

for introducing modern approaches to computer science teaching methodologies in the educational process.

The research of local scientists has also extensively analyzed the content of computer science education, the formation of digital competencies, the effective use of ICT tools, and the creation of electronic educational resources. However, these sources do not sufficiently cover the training of future primary school teachers specifically focused on the methodology of teaching computer science, the integration of interactive technologies, and the practice of using digital pedagogical tools.

International publications (ISTE, UNESCO, OECD recommendations) propose conceptual approaches to the formation of digital competencies in primary grades, in which model-based teaching, project-based learning, computer-based learning environments, and creative coding principles are noted as priorities for the professional development of teachers. An analysis of this literature shows that when improving the methodology of teaching computer science at the primary level, it is necessary to pay attention to the following areas:

Qayumova N.A. Elektron ta'lim muhitida bo'lajak informatika o'qituvchilarini integrativ yondashuv asosida tayyorlash metodikasini takomillashtirish. Ped.fan.bo'yicha falsafa doktori (PhD) dissertatsiyasi. Toshkent – 2022.

Pardayeva M.D. Umumiy o'rta ta'lim maktablarida kompetensiyaviy yondashuvni joriy etishning metodik tizimini boshqarish (informatika va axborot texnologiyalari fani misolida), Ped.fan.bo'yicha falsafa doktori (PhD) dissertatsiyasi. Toshkent – 2020.

early formation of algorithmic and logical thinking in students;
increasing the interactivity of lessons through visual programming (Scratch, Blockly);

developing a methodology for creating digital didactic materials for teachers; integrating ICT, multimedia, and interactive technologies into the educational process; strengthening methodological preparation based on practical exercises, micro-teaching, and lesson analysis.

Therefore, an analysis of existing scientific sources shows that a comprehensive methodological approach is required in preparing future teachers to teach computer science.

The issue of teaching computer science in primary education is one of the areas that has been rapidly developing in recent years. In the process of studying the literature, it can be seen that in many sources, computer science education is interpreted as an important tool for developing logical thinking, algorithmic thinking, information culture and creativity in students. Although various studies have substantiated the effectiveness of teaching computer science from an early age, the issue of forming methodological training of primary school teachers in this subject is still relevant.

International scientific sources have widely covered experiences in organizing the computer science teaching process using visual programming tools (Scratch, Blockly), problem-based learning, project activities and game technologies. These approaches serve to gradually form algorithmic thinking in students. The importance of applying the principles of digital pedagogy in the teacher training system, using multimedia materials and electronic learning platforms in the teaching process is also emphasized.

The domestic scientific literature covers the content of computer science education, educational and methodological materials for primary school students, and the development of teachers' professional competencies. However, the analysis shows that many studies are limited to general methodological recommendations, and there is a need for a deeper and more systematic study of the readiness of future primary school teachers to teach computer science.

Although some sources cover aspects such as the integration of ICT tools into the educational process, the selection of software tools appropriate to the age and psychological characteristics of students, and the interactive organization of the lesson, all of them are not fully formed as a single methodological system. Therefore, there is a need to develop comprehensive approaches that ensure thorough methodological preparation of teachers for teaching computer science.

In general, the existing literature provides theoretical foundations for teaching informatics in primary grades, but the fact that scientifically based mechanisms for the formation of specific methodological training of future teachers have not been sufficiently developed determines the relevance of this study.

1. Theoretical analysis. Existing scientific developments, regulatory documents, curricula and methodological manuals on the methodology of teaching informatics, digital education, primary education psychology and pedagogical innovations were studied. Through this analysis, the theoretical foundations of the topic, scientific approaches and existing problems were identified.

2. Pedagogical observation. The current state of informatics lessons in primary grades, teachers' approaches to organizing lessons, and students' attitude to educational activities were observed. The results of the observation revealed difficulties and opportunities encountered in the practical process.

3. Questionnaire and interview method. The survey, which was conducted with the help of questions addressed to teachers, prospective teachers, and current computer science teachers, examined their methodological training level, needs, and problems they face in practice. The results of the survey allowed us to draw reasonable conclusions on improving methodological training.

RESULTS. During this study, a systematic analysis of existing scientific views, pedagogical approaches, and national and foreign experiences on improving the methodological preparation

of future primary school teachers for teaching computer science was conducted. Based on the analysis of the literature, a number of problems were identified related to methodological difficulties encountered at the initial stage of computer science education, the level of digital literacy of teachers, and the effectiveness of tools and methods used in the lesson.

The following scientific and practical conclusions were drawn as a result of the study:

1. It was determined that the main components determining the level of methodological preparation of future primary school teachers are theoretical knowledge, practical skills, digital competence, the ability to apply methodological innovations, and the ability to create an environment that develops the learning process.
2. It became clear that modern requirements for teaching computer science in primary grades require teachers to develop algorithmic thinking, teach the safe and effective use of digital tools, and use methods that guide students to logical, independent thinking.
3. The results of the analysis showed that the use of demonstration, visual modeling, game technologies, problem-based learning and interactive digital platforms in the educational process increases the effectiveness of computer science lessons in primary education.
4. Based on current scientific sources, a conceptual approach was developed to improve the methodological preparation of future teachers. It is based on the gradual mastering of educational materials in computer science, combining methodological knowledge with practical exercises, and developing creative pedagogical activity.
5. The analytical results showed the need to organize experimental work on the problem under study at the next stage, and to test the developed methodological approach in practice.

In general, the results of the research confirmed the relevance of the topic of the article and created a conceptual basis for improving the process of preparing future primary school teachers for teaching computer science.

DISCUSSION. During this study, a systematic analysis of existing scientific views, pedagogical approaches, and national and foreign experiences on improving the methodological preparation of future primary school teachers for teaching computer science was conducted. Based on the analysis of the literature, a number of problems were identified related to the methodological difficulties encountered at the initial stage of computer science education, the level of digital literacy of teachers, and the effectiveness of the tools and methods used in the lesson.

As a result of the study, the following scientific and practical conclusions were drawn:

1. It was determined that the main components determining the level of methodological preparation of future primary school teachers are theoretical knowledge, practical skills, digital competence, the ability to apply methodological innovations, and the ability to create an environment that develops the educational process.
2. It became clear that modern requirements for teaching computer science in primary grades require the teacher to form algorithmic thinking, teach the safe and effective use of digital tools, and use methods that direct students to logical, independent thinking.
3. The results of the analysis showed that the use of demonstration, visual modeling, game technologies, problem-based learning, and interactive digital platforms in the learning process increases the effectiveness of computer science lessons in primary education.
4. Based on existing scientific sources, a conceptual approach was developed to improve the methodological preparation of future teachers. It is based on the gradual mastering of educational materials in computer science, combining methodological knowledge with practical exercises, and developing creative pedagogical activity.
5. The analytical results showed the need to organize experimental work on the problem under study at the next stage, to test the developed methodological approach in practice.

In general, the results of the research confirmed the relevance of the topic of the article and created a conceptual basis for improving the process of preparing future primary school teachers for teaching computer science.

CONCLUSION. During the study, the issue of methodological preparation of future primary school teachers for teaching computer science was considered theoretically and methodologically. The analysis of the literature showed that at the initial stage of computer science education, the teacher's methodological literacy, digital competence, and the ability to organize the lesson process based on modern pedagogical approaches are the leading factors.

The results of the study made it possible to identify the main components that determine the training of teachers, to reveal the methodological difficulties inherent in primary education in informatics, and to substantiate the technologies that are effective for use in the educational process. It was also found that the development of algorithmic thinking in the pedagogical process, the use of digital tools for didactic purposes, the use of game elements and visual modeling serve to increase the level of methodological training of future teachers.

The theoretical considerations and analytical conclusions put forward in this scientific article create the necessary conceptual basis for organizing practical experimental work in the future, implementing the developed methodological approaches in practice and assessing their effectiveness. The relevance of the topic, the need to form new competencies of the informatics teacher in primary education once again confirm the importance of conducting consistent research in this area.

REFERENCES:

1. Abdullayeva, N., & Jo'rayev, R. (2021). Boshlang'ich ta'limda informatika elementlarini o'qitish metodikasi. Toshkent: O'zbekiston Milliy universiteti nashriyoti.
10. Shodmonov, S., & Raximjonova, N. (2019). "Informatika fanini o'qitishda interaktiv texnologiyalardan foydalanishning afzalliklari". Oliy ta'lim muammolari, 1(4), 72–77.
11. Xushboqov, A. (2021). Pedagogik texnologiyalar va raqamli ta'lim. Toshkent: Fan va texnologiya.
12. Yadav, A., Hong, H., & Stephenson, C. (2016). "Computational Thinking in Teacher Education". TechTrends, 60(3), 296–301.
13. Grover, S., & Pea, R. (2013). "Computational Thinking: A Review of the State of the Field". Educational Researcher, 42(1), 38–43.
2. Karimov, X. (2020). "Raqamli kompetensiyani shakllantirishning pedagogik asoslari". Ta'lim va innovatsiya, 3(2), 45–52.
3. Mardonov, B., & Sharipova, D. (2022). Boshlang'ich sinflarda AKTdan foydalanish metodikasi. Toshkent: Innovatsion rivojlanish ilmiy markazi.
4. Papert, S. (1993). Mindstorms: Children, Computers, and Powerful Ideas. New York: Basic Books.
6. Wing, J. M. (2006). "Computational Thinking". *Communications of the ACM, 49(3), 33–35.
7. Bers, M. (2018). Coding as a Playground: Programming and Computational Thinking in the Early Childhood Classroom. New York: Routledge.
8. Clements, D. H., & Sarama, J. (2016). Learning and Teaching Early Math: The Learning Trajectories Approach. New York: Routledge. (Informatika va algoritmik fikrlashga oid metodik tamoyillar uchun).
9. Mishra, P., & Koehler, M. J. (2006). "Technological Pedagogical Content Knowledge (TPACK) Framework". Teachers College Record, 108(6), 1017–1054.

10. Qayumova N.A. Elektron ta'lim muhitida bo'lajak informatika o'qituvchilarini integrativ yondashuv asosida tayyorlash metodikasini takomillashtirish. Ped.fan.bo'yicha falsafa doktori (PhD) dissertatsiyasi. Toshkent – 2022.
11. Pardayeva M.D. Umumiy o'rta ta'lim maktablarida kompetensiyaviy yondashuvni joriy etishning metodik tizimini boshqarish (informatika va axborot texnologiyalari fani misolida), Ped.fan.bo'yicha falsafa doktori (PhD) dissertatsiyasi. Toshkent – 2020.