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EFFECTIVENESS OF USING MODERN DIGITAL EDUCATIONAL TECHNOLOGIES IN TEACHER PROFESSIONAL DEVELOPMENT

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Abstract. This article analyzes the pedagogical and practical effectiveness of using modern digital educational technologies in the process of improving the skills of teachers. It highlights the role of digital educational platforms, distance learning, videoconferencing, mobile technologies, multimedia tools, artificial intelligence and electronic assessment systems in the development of teachers' professional competencies. The study substantiates the expansion of opportunities for flexibility, individualization, interactivity, rapid feedback and continuous professional development of digital technologies in the educational process. It also examines the impact of factors such as teachers' digital competence, motivation, technical infrastructure, methodological support and institutional support on the effectiveness of digital professional development. The article concludes that the systematic and responsible use of digital technologies in accordance with pedagogical objectives is an important condition for improving the quality of modern education.

Keywords: teacher training, digital educational technologies, digital competence, distance learning, online learning, artificial intelligence, e-learning, professional development, digital pedagogy, educational effectiveness.

Аннотация. В данной статье анализируется педагогическая и практическая эффективность использования современных цифровых образовательных технологий в процессе повышения квалификации учителей. Подчеркивается роль цифровых образовательных платформ, дистанционного обучения, видеоконференцсвязи, мобильных технологий, мультимедийных инструментов, искусственного интеллекта и электронных систем оценки в развитии профессиональных компетенций учителей. Исследование обосновывает расширение возможностей гибкости, индивидуализации, интерактивности, быстрой обратной связи и непрерывного профессионального развития цифровых технологий в образовательном процессе. Также рассматривается влияние таких факторов, как цифровая компетентность учителей, мотивация, техническая инфраструктура, методическая и институциональная поддержка, на эффективность цифрового профессионального развития. В заключение делается вывод о том, что систематическое и ответственное использование цифровых технологий в соответствии с педагогическими целями является важным условием повышения качества современного образования.

Ключевые слова: подготовка учителей, цифровые образовательные технологии, цифровая компетентность, дистанционное обучение, онлайн-обучение, искусственный интеллект, электронное обучение, профессиональное развитие, цифровая педагогика, эффективность образования.

Annotatsiya. Mazkur maqolada pedagoglarning malakasini oshirish jarayonida zamonaviy raqamli ta’lim texnologiyalaridan foydalanishning pedagogik va amaliy samaradorligi tahlil qilingan. Unda raqamli ta’lim platformalari, masofaviy ta’lim, videokonferensiyalar, mobil

texnologiyalar, multimedia vositalari, sun'iy intellekt va elektron baholash tizimlarining pedagoglarning kasbiy kompetensiyalarini rivojlantirishdagi o'rni yoritilgan. Tadqiqotda raqamli texnologiyalarning ta'lim jarayonida moslashuvchanlik, individuallashtirish, interaktivlik, tezkor fikr-mulohaza va uzluksiz kasbiy rivojlanish imkoniyatlarini kengaytirishi asoslab berilgan. Shuningdek, pedagoglarning raqamli kompetensiyasi, motivatsiyasi, texnik infratuzilma, metodik ta'minot va institutsional qo'llab-quvvatlash kabi omillarning raqamli malaka oshirish samaradorligiga ta'siri ko'rib chiqilgan. Maqolada raqamli texnologiyalarni pedagogik maqsadga muvofiq, tizimli va mas'uliyatli qo'llash zamonaviy ta'lim sifatini oshirishning muhim sharti ekanligi xulosa qilingan.

Kalit so'zlar: pedagoglarning malakasini oshirish, raqamli ta'lim texnologiyalari, raqamli kompetensiya, masofaviy ta'lim, onlayn ta'lim, sun'iy intellekt, elektron ta'lim, professional rivojlanish, raqamli pedagogika, ta'lim samaradorligi.

In the twenty-first century, the rapid development of information and communication technologies has significantly transformed the educational process and created new requirements for teachers' professional competence. The teacher of the modern educational environment is expected not only to have deep knowledge of a particular subject but also to possess digital competence, use modern educational resources effectively, organize technology-supported learning, communicate through digital platforms, and continuously improve professional skills. As a result, teacher professional development is increasingly moving from traditional short-term training courses toward a continuous, flexible, and technology-supported system of lifelong learning. Modern digital educational technologies have become an important component of this transformation because they provide teachers with opportunities to access educational resources at any time and from any location, participate in online courses, communicate with colleagues, receive feedback, use artificial intelligence, and independently monitor their professional growth.

The integration of digital technologies into teacher professional development is particularly important because the educational environment itself is becoming increasingly digital. Students regularly use smartphones, online platforms, multimedia resources, educational applications, and artificial intelligence tools. Therefore, teachers must be prepared to operate effectively in the same environment. Professional development should consequently focus not only on subject-specific knowledge and traditional teaching methods but also on the effective pedagogical application of digital tools. UNESCO's ICT Competency Framework for Teachers emphasizes that digital competence is an important component of both initial teacher education and continuing professional development. The framework connects technological knowledge with pedagogy, collaboration, problem solving, and the development of innovative learning environments [1].

The effectiveness of digital technologies in teacher professional development should not, however, be understood simply as the availability of computers, internet access, or online platforms. Technology can improve professional learning only when it is integrated into a well-designed pedagogical system. The success of digital professional development depends on such factors as teachers' digital literacy, motivation, quality of educational content, instructional design, accessibility of technological resources, institutional support, feedback mechanisms, and opportunities to apply acquired knowledge in real classroom situations. Therefore, the main objective of this article is to analyze the effectiveness of modern digital educational technologies in improving teachers' professional qualifications, identify the major advantages and challenges of

digital professional development, and determine the conditions necessary for achieving sustainable educational outcomes.

Modern digital technologies provide a wide range of opportunities for organizing teacher professional development. One of the most widely used tools is the learning management system, which provides an integrated environment for organizing courses, distributing educational materials, conducting assessments, collecting assignments, and maintaining communication between teachers and trainers. Through learning management systems, professional development programs can be organized systematically and continuously. Teachers can access video lectures, electronic textbooks, presentations, methodological recommendations, tests, and practical assignments without being physically present in a training center.

Online learning platforms also contribute considerably to the democratization of professional development. Teachers working in remote or rural areas can participate in high-quality training programs without the need to travel. This is particularly important in educational systems where geographical distance creates unequal access to professional learning opportunities. Online courses can also be adapted to the professional schedules of teachers. Instead of participating only during fixed hours, teachers can study asynchronously, review materials repeatedly, and complete assignments according to their individual pace.

Video conferencing technologies have expanded opportunities for synchronous interaction. Online seminars, webinars, virtual workshops, and professional meetings allow teachers to communicate directly with trainers and colleagues. These technologies can combine the advantages of face-to-face interaction with the flexibility of distance education. Recorded sessions can also be reused, allowing teachers to review complex topics and strengthen their understanding.

Mobile technologies have further expanded access to professional development. Smartphones and tablets allow teachers to read professional literature, participate in online discussions, watch instructional videos, complete short learning activities, and communicate with professional communities. Mobile learning is especially useful for microlearning, in which complex professional content is divided into short and manageable learning units. Such an approach can reduce the time burden on teachers while supporting continuous learning [3].

In conclusion, the effective use of modern digital educational technologies can contribute substantially to the formation of competent, innovative, reflective, and digitally literate teachers. A well-organized digital professional development system can improve the quality of teaching, support lifelong learning, reduce geographical and time barriers, and create conditions for continuous professional growth. Therefore, the development of teachers' digital competence should be considered a strategic priority in the modernization of contemporary education.

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