

Improving the Formation of Professional Competence of Future Teachers with the Help of Digital Educational Technologies

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Abstract:

Modern schoolchildren live in the world of digital technologies, quickly navigate in and are actively exploring new opportunities. Therefore, in the preparation of future teachers, one should pay attention to the formation of their relevant competencies, the development of skills for working in digital educational environment. The purpose of the study is to determine the effectiveness of the author's module "Designing Digital Educational Resources", implemented within the framework of the discipline "Methods of Teaching Mathematics". The module introduces students to the bases of ready-made digital resources both for subject training and extracurricular activities, helps, according to the developed criteria, to choose the most high-quality ones, supplement and process ready-made digital educational resources (DER), and most importantly, to design and create their own.

Keywords: future teacher, mathematics, digital competencies, methodological training, educational resources.

Effective formation of future teachers of digital competencies specified in draft professional standard "Teacher (pedagogical activity in the field of primary general, basic general, secondary general education) (teacher)" and including requirements for the possession and use of digital technologies and tools, is a pressing issue for the scientific community.

The level of sufficient qualification of school pedagogical workers (teachers) implies the implementation of their professional activities in the framework of the implementation of programs primary (basic, secondary) general education based on standard schemes and templates. And to assign a classification, it is necessary to confirm the successful completion of an intermediate certification for at least three years of study in a higher education program in specialties and areas of training "Education and Pedagogical Sciences". The new author's training module "Design of digital educational resources", introduced into the discipline "Methodology teaching mathematics", is designed to update the digital competencies of teachers.

The assimilation of electronic culture by a mathematics teacher is extremely important, since is the key to the acquisition of digital competencies by students (Kuzenkov, Zakharova, 2021).

P.V. Nyukhtilin, S.A. Deeva consider the information culture of future teachers mathematics and computer science in the process of teaching them to design educational and information resources (Nyukhtilin, Deeva, 2016). It is noted that for future teachers, effective and productive tasks that are of great interest and related to the use of information technologies are: designing,

creating their own digital educational resources, as well as studying the possibilities of their application in the educational process (Bychkova, 2021).

The pandemic that shocked the whole world accelerated the digitalization of education and forced schools to switch to distance learning, learn how to organize classroom and extracurricular activities using online learning platforms. Graduates of the “Education and Pedagogical Sciences” field of study should now not only know the content of the national project “Education”, but also have the qualities that they need to successfully work in a digital educational environment: flexibility of thinking, mobility, stress tolerance and creativity. The question of how to develop such qualities in young teachers is constantly discussed both by higher education specialists and employers.

In order for the future teacher to be able to work successfully in the modern educational environment, he must be able to actively use various digital platforms. To do this, in universities, students study disciplines related to the use of electronic and Internet technologies.

(Anisimova et al., 2021). The involvement of digital resources in the educational process improves the quality of the material being mastered and enhances educational effects. In addition, their application makes it possible to implement a differentiated approach to teaching students with different levels of training, because it creates conditions for independent learning activities at an individual pace using the optimal way for a particular student to perceive information. Practicing teachers argue that the use of information and communication technology allows them to effectively organize practice-oriented activities students. It is based on real and virtual experiments, collective forms of work, which enable the teacher not only to study with schoolchildren the sum of facts and concepts of a certain subject area, but also to develop their ability to think, reason and act as researchers and designers of a given subject regions (Stroscher, Dokuchaeva, 2019).

The use of modern digital and electronic educational resources in mathematics lessons is a way to develop interdisciplinary connections, skills of independent the work of students in the classroom, the formation of computer literacy, information culture, the creative style of students' activities, as well as the implementation of an individual, student-centered approach in education.

To enrich students with new relevant competencies, innovative training methods should be used, including the design of educational video materials on subjects for their further use in the educational process.

Let us visualize some of the results of the work carried out on testing the module (Fig. 1)

Figure 1 - Survey results

The data in Figure 1 indicate that the majority of respondents before mastering the additional program possessed digital competencies at a weak or average level. This is due to the fact that in the first years students only update and enrich their mathematical potential. Ability to teach your subject using digital technologies they acquire in senior years in the process of studying the discipline "Methods of Teaching Mathematics" and during the passage of pedagogical practices at school.

After the implementation of the “Designing Digital Educational Resources” module, the survey showed an improvement in the performance of future teachers. This was also confirmed by the results of the practice and feedback from the leaders of student groups - school teachers of mathematics. Themselves study participants noticed that the introduction of digital technologies into the preparation process helped to increase their motivation to learn and improve their understanding of mathematics. In general, 89 works were submitted to the commission's judgment. Topics were selected taking into account their presentation with the help of mathematical computer tools; the experience of the authors of the article was taken into account on the design of new competencies related to the possession of basic mathematical computer

tools for data visualization, establishing dependencies, relationships; descriptions of processes, geometric objects (Svyatina, 2017; Anisimova, Ganeeva, 2017).

2nd-4th year students of the Bukhara state university presented videos on the following topics: “Using the GeoGebra environment for solving equations and systems of equations with parameters”, “Methods for finding the distance between crossed lines”, “Combinatorial methods for information processing”, “Solution of trigonometric equations Unified State Examination in Mathematics”, “Solving practice-oriented problems on the topic “Circumference and area of a circle””, and received not only prizes, but also a huge experience in designing and presenting educational videos that will be useful to them in future in professional activity.

Competitions of this kind allow revealing the creative potential of young teachers. Students, having gone through all the stages of designing videos under the competent guidance of teachers, improve the professional competencies of the teacher. Thus, the effectiveness of the module “Designing Digital Educational Resources” developed by the authors within the discipline “Methods of Teaching Mathematics” was confirmed during its testing by future teachers. Implementation in the educational process of this module allowed students to successfully design and implement educational video content for schoolchildren. This experience can be successfully introduced into the higher education system in different countries, and also taken into account in the training of future teachers of various profiles. It should be noted that the module “Designing digital educational resources” can also be introduced into teacher training programs, and after expansion and refinement, it is included in master’s programs of direction 44.04.01 Pedagogical education, profile “Digital education”.

BIBLIOGRAPHY:

1. Анисимова Т.И., Ганеева А.Р., Григорьева Е.О. Организация процесса обучения в школе на основе использования цифровых инструментов и сервисов // Обзор педагогических исследований. 2021. Т. 3, № 6. С. 84–89.
2. Бычкова Д.Д. Формирование профессиональных компетенций у будущих учителей-предметников в области создания цифровых образовательных ресурсов // Информатика и образование. 2021. № 3 (322). С. 23–30. <https://doi.org/10.32517/0234-0453-2021-36-3-23-30>.
3. Кузенков О.А., Захарова И.В. Компетенции цифровой культуры в математическом образовании и их формирование // Современные информационные технологии и ИТ-образование. 2021. Т. 17, № 2. С. 379–391. <https://doi.org/10.25559/SITITO.17.202102.379-391>.
4. Нюхтилин П.В., Деева С.А. Повышение информационной культуры будущих учителей математики и информатики // Научное обозрение: гуманитарные исследования. 2016. № 5. С. 33–37.
5. Святкина М.А. Применение профессионального стандарта «Педагог» при разработке должностных инструкций // Учебный год. 2017. № 3 (48). С. 37–48.
6. Штрошер С.Н., Докучаева Н.Г. Содержательно-методические условия эффективного использования электронных и цифровых образовательных ресурсов на уроках математики в современной школе // Современная наука: актуальные вопросы, достижения и инновации. Пенза, 2019. С. 275–277. Anisimova T.I., Ganeeva A.R. Features of Subject Training for Future Mathematics Teachers // Modern Journal of Language Teaching Methods. 2017. Vol. 7, iss. 9. P. 634–641.
7. Anisimova, T.I. & Ganeeva, A.R. (2017) Features of Subject Training for Future Mathematics Teachers. Modern Journal of Language Teaching Methods. 7 (9), 634–641.

8. Anisimova, T.I., Ganeeva, A.R. & Grigoryeva, E.O. (2021) Arrangement of the School Learning Process at Based on the Use of Digital Tools and Services. *Obzor pedagogicheskikh issledovaniy*. 3 (6), 84–89 (in Russian).
9. Bychkova, D.D. (2021) Formation of Professional Competencies of Future Subject Teachers in the Field of Creating Digital Educational Resources. *Informatika i obrazovanie*. 3 (322), 23–30. Available from: doi:10.32517/0234-0453-2021-36-3-23-30 (in Russian).
10. Kuzenkov, O.A. & Zakharova, I.V. (2021) Competencies of Digital Culture in Mathematics Education and Their Formation. *Sovremennye informatsionnye tekhnologii i IT-obrazovanie*. 17 (2), 379–391. Available from: doi:10.25559/SITITO.17.202102.379-391 (in Russian).
11. Nyukhtilin, P.V. & Deeva, S.A. (2016) Increase of Information Culture of the Future Teachers of Mathematics and Computer Science. *Nauchnoe obozrenie: gumanitarnye issledovaniya*. (5), 33–37 (in Russian).
12. Shtrosher, S.N. & Dokuchaeva, N.G. (2019) Content and Methodical Conditions of Effective Using the Electronic and Digital Educational Resources in Maths Lessons in the Modern School. In: *Sovremennaya nauka: aktual'nye voprosy, dostizheniya i innovatsii*. Penza, pp. 275–277 (in Russian).