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The Digital Department project in developing digital competencies in future preschool teachers

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Abstract : The article examines the Digital Department project as a modern mechanism for developing digital competencies in students of higher education institutions who do not have specialized IT training, including future preschool teachers. Digital transformation education The digital age requires teachers to possess modern skills and abilities, including the effective use of digital tools, the design of interactive learning resources, and the provision of digital security for students. The Digital Department project aims to create structural units within universities that provide students with additional qualifications in digital technologies. This article provides a detailed analysis of the experience of Mari State University, which implemented the professional retraining program "Applied Web Technologies. Basic Level" in the 2023-2024 academic year. The program is aimed at students in non-core fields and focuses on developing skills in the design, creation, and maintenance of web resources, multimedia, and interactive applications. University faculty and representatives of the regional IT community participate in the training, ensuring the practical focus and relevance of the content. The competencies acquired by students enable them to apply digital technologies in educational activities, develop interactive teaching materials, and effectively utilize digital tools in teaching. The experience of Mari State University confirms the importance of digital departments for training a new generation of teachers capable of working in conditions digitalization education .

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INTRODUCTION

The modern education system is undergoing a period of active digital transformation, affecting all levels of education—from preschool to higher education. The digital transformation of education is becoming not only a technological but also a pedagogical challenge, requiring specialists to develop new competencies related to the use of digital tools, the design of digital educational environments, and the organization of educational interactions in the online space. It should be noted that the issue of digital literacy is particularly pressing for future preschool teachers, who must not only master modern technologies but also be able to apply them in a manner that takes into account the age-appropriate characteristics of children, as well as the principles of developmental learning and the security requirements of the digital environment.

Therefore, modern society places high demands on the quality of training for future teachers, including those in preschool education. In the context of the digital transformation of education, teachers must not only master modern digital technologies but also be able to integrate them into the educational process, ensuring safe interaction with preschool-age children. Regulatory documents of the Russian Federation, including the Federal Law "On Education" (Federal Law "On Education in the Russian Federation," 2012) and the Federal State Educational Standard for Preschool Education (Federal State Educational Standard for Preschool Education, 2013), emphasize the need to develop teachers' competencies in information and communication technologies. These competencies include the ability to work with digital educational resources, design and evaluate educational processes using digital tools, create interactive and multimedia materials, and ensure children's safety in the digital environment (Sukhova, Semichev, 2021).

The professional standard for preschool teachers further highlights proficiency in digital tools as one of the key functions necessary for the successful implementation of educational programs and the development of students in modern conditions (Order of the Ministry of Labor and Social Protection of the Russian Federation, 2013)

Thus, digital competencies are an integral part of the professionalism of a modern teacher, as they require the ability to adapt digital technologies to educational goals, create interactive materials, and use digital resources to organize a developmental environment. Mastering these skills contributes to both improving the quality of teaching and developing teachers' skills in working in a digital educational environment and safe online behavior (Yachina , Fernandez , 2018; Fedorova, Dozhdikova , 2022; Golikova, 2025).

One of the key projects aimed at systematically developing digital competencies in students in non-IT fields is the federal project "Digital Department," implemented by the Ministry of Science and Higher Education of the Russian Federation as part of the national program "Digital Economy of the Russian Federation." Its main goal is to provide students in the humanities, education, medicine, economics, and other non-IT fields with the opportunity to receive additional education in information technology and acquire qualifications in demand in the digital economy (Federal Project "Digital Department," 2022).

The project launched in 2022 and encompasses over 100 leading Russian universities, including federal, national research, and regional universities. Training in the digital departments' programs is offered at the universities through additional professional programs—advanced training courses and professional retraining programs. Participation in these programs allows students to acquire additional competencies in data analysis, artificial intelligence, web development, digital security, digital marketing, and other areas. Particular attention is paid to the practical component: classes are taught not only by university professors but also by representatives of IT companies, digital agencies, and technology centers.

The Digital Department project represents an important step toward integrating digital technologies into the higher education system. It not only develops students' digital literacy but also fosters their critical thinking skills, project-based work, and working within digital ecosystems. This is especially significant for future teachers, as mastery of modern digital tools is becoming an integral part of the professional competencies of 21st-century educators.

As part of this project, many universities, including the Mari State University, have actively participated in the development and implementation of supplementary educational programs aimed at developing digital competencies in students majoring in teaching. These programs help expand the professional horizons of future teachers, enhance their competitiveness in the labor market, and develop their readiness to effectively utilize digital resources in the educational process at preschools (Mari State University, Digital Department Project).

MAIN PART

Mari State University has been a participant in the Digital Department project since 2022. The university has developed and is successfully implementing a professional retraining program, "Applied Web Technologies. Basic Level," aimed at students studying in fields unrelated to digital technologies, including future teachers. The program aims to develop students' competencies necessary for designing, creating, modifying, and maintaining websites, corporate portals, and multimedia and interactive applications. The program is based on current educational legislation, the requirements of Federal State Educational Standards, and the professional standard for "Web and Multimedia Application Developer."

This program is implemented using the LMS Moodle distance learning system (LMS Moodle , n.d.), which ensures flexibility, interactivity, and personalization of the educational process. Training is conducted from September to June and includes 20 thematic sections, grouped into four content modules, aimed at developing students' basic and applied digital competencies in web development, design, and internet resource administration . Each module combined lectures, presentation materials, and practical assignments, promoting a comprehensive understanding of the theoretical and practical aspects of working in a digital environment.

The first module, "Introduction to Design," focused on developing an understanding of the structure and logic of web resource construction and mastering the basic concepts of web technologies and internet applications. Students explored the analysis and formulation of web resource requirements and learned techniques for interface design and prototyping . The practical portion of the module focused on creating website sketches and mockups, as well as mastering front-end and back-end development tools .

The second module, "Introduction to Frontend Development. Markup," focused on HTML and CSS, as well as the principles of web page structure and visual design. Students learned how to work with content elements, forms, tables, images, and media , applied the BEM methodology, and became familiar with responsive layout technologies (Flexbox , Grid). Much attention was paid to creating CSS animations , transformations, and media queries , which contributed to the development of students' design thinking and creative skills.

The third module, "Dynamic Pages in Frontend Development. Programming Basics," covered the fundamentals of algorithms and JavaScript programming . During the course, students learned about the concept of algorithms, data types, control structures, loops, and functions, and mastered the principles of working with arrays and objects. During practical exercises, students created interactive interface elements using event handling, timers, and Window object methods , which helped develop their skills in designing dynamic and feature-rich web pages.

The fourth module, "Website Content Management," focused on mastering the principles of working with content management systems (CMS). Students analyzed commercial and open-source solutions, compared their capabilities and selection criteria, and mastered content structuring methods based on their subject area. During practical exercises, students worked with the 1C-Bitrix CMS, integrated templates, configured SEO parameters, and analyzed website promotion features.

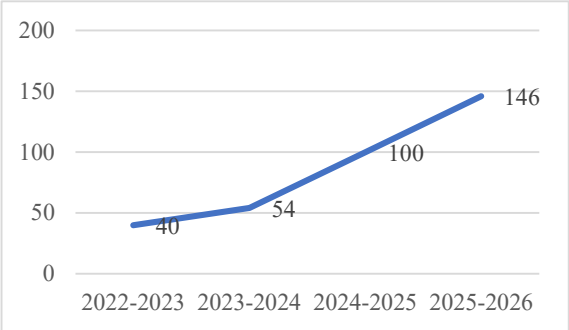
It's also worth noting that, starting in the second module, students worked individually or in teams of three to four, completing a group project to create a fully functional web resource. Each participant was responsible for developing two unique sections or one standalone page, which required team members to coordinate technical solutions and artistic elements. This contributed to the students' development of teamwork, planning, and communication skills in a digital environment, as well as project-based and critical thinking.

The educational process was implemented in a blended format: lectures were held remotely, the lecturer was a leading front-end developer at Travelline. System , ensuring the course's relevance and professional focus, while practical classes were held in person in computer labs under the guidance of Mari State University faculty and representatives of IT employers. This combination of academic and applied learning enabled students to gain a holistic understanding of the web development process, from design to website publication.

The program concluded with the defense of individual and group projects, presenting their website. Students presented their developed websites to a panel of experts, demonstrating an understanding of web resource architecture, the use of modern tools and adaptability principles, and client interaction skills. The final assessment demonstrated a high level of digital competencies among students, a practical readiness for web

resource development and administration, and an understanding of the potential of these technologies in teaching and learning.

It should be noted that during the training, the



project's partner university conducted an independent assessment of the developed competencies . The training period included three stages: introductory, midterm, and final assessments , which allowed for an objective assessment of the students' digital skills growth and the effectiveness of the program (Institute of Continuing Education, Assessment Center, n.d.).

We emphasize the importance of the "Digital Department" project for students of the Faculty of Psychology and Education, for whom developing digital competencies is key to successful professional readiness in a digital educational environment. Future teachers learn to use modern web tools to create educational websites, electronic portfolios, multimedia assignments, and interactive teaching materials for preschoolers.

The number of students enrolled in the program is increasing each year, demonstrating growing interest among students of the Faculty of Psychology and Education in developing digital competencies. Forty students were enrolled in the 2022-2023 academic year, 53 in the 2023-2024 academic year, 100 in the 2024-2025 academic year, and 146 students from the Faculty of Psychology and Education are currently enrolled in this program in the 2025-2026 academic year. The program is offered full-time to students beginning in their second year, ensuring a high level of awareness, motivation, and readiness to master digital technologies. This growth in enrollment reflects not only interest in digital technologies but also the successful implementation of the Digital Department project. The growth in enrollment is shown in Figure 1.

Figure 1: Dynamics of growth of students among the Faculty of Psychology and Education in the program "Applied Web Technologies. Basic Level" .

In addition to quantitative indicators, an important source of information on the effectiveness of the "Applied Web Technologies. Basic Level" program within the Digital Department project is the feedback from the students who completed the training. Here are some of the testimonials:

Second-year student 001, studying in the bachelor's program : "This program gave me exactly what I expected – practical skills in creating websites from scratch. The instructors were truly competent and, most importantly, they strived to convey the material to each student. Their approach of "teaching students to think and write code independently" is a huge plus. This kind of experience is a significant competitive advantage for a student in the job market, and I am very grateful to the university for this opportunity. Of course, it's a heavy workload. Balancing the intensive year-long course with the main curriculum was challenging, and during exam periods and project deadlines, it was truly challenging. This requires good self-organization and a willingness to invest significant time. But despite this, I have never regretted my choice. The course was worth it."

Second-year student 002, studying in the bachelor's program : "I want to share my impressions of the course 'Applied Web Technologies. Basic Level'. I absolutely loved it! The course was the perfect introduction to the world of programming. Everything was laid out very logically: from the simple fundamentals of HTML and CSS to more interesting aspects. The most valuable thing was the practical approach. We didn't just listen to theory; we immediately tried everything out, and in the end, each of us created our own, working website! It was incredibly motivating and gave us a sense of accomplishment. I'm incredibly grateful to the instructors for their patience, clear explanations, and support at every stage. Now I have not only knowledge but also a real project for my portfolio."

Second-year student 003, studying in the bachelor's program : "The course 'Applied Web Technologies. Basic Level' was very useful and informative. I learned a lot about web design techniques and design elements. For me, it was an immersion into a completely new field, and the most valuable outcome was that I now have not only theoretical knowledge but also practical experience in website creation, which I'm sure will be useful in the future."

An analysis of student feedback from the professional retraining program "Applied Web Technologies. Basic Level" as part of the Digital

Department project demonstrates its effectiveness and practical focus. Students noted the logical structure, the progressively more challenging course content, and its focus on independent mastery of web development skills. Students particularly praised the instructors, their professionalism, support, and accessible presentation. Students also noted that the course not only enabled them to master the basics of HTML , CSS , and JavaScript , but also to create their own websites, demonstrating their practical application of the knowledge gained and the development of their professional portfolio.

Thus, positive student feedback and the observed growth in enrollment demonstrate that the Digital Department project is developing key digital competencies necessary for the successful professional work of future teachers in the digital environment.

CONCLUSION

An analysis of the professional retraining program "Applied Web Technologies. Basic Level" as part of the "Digital Department" project confirms its importance in developing the digital competencies of future preschool teachers. The implementation of this program at Mari State University has demonstrated that students' digital training successfully integrates with the core professional educational program of higher education, strengthening its practical focus. The annual increase in the number of students demonstrates a growing interest in mastering digital technologies among Mari State University students, including those in the Faculty of Psychology and Education.

Learning outcomes and student feedback demonstrate that the program not only develops basic and applied web technology skills, but also fosters independent and project-based learning, critical thinking, self-organization, and professional preparedness in a digital educational environment.

Thus, the experience of implementing the Digital Department project confirms its effectiveness in developing the necessary digital competencies in future teachers for successful professional work in the digital educational environment.

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