



DEVELOPMENT OF INFORMATION AND COMMUNICATION COMPETENCE AMONG STUDENTS OF TECHNICAL UNIVERSITIES

Atajonova S.B.

Andijan Machine-Building Institute

Doctor of Philosophy in Pedagogical Sciences,

head of the department of information technologies

Tayanch so'zlar: texnik universitetlar, axborot-kommunikatsiya kompetensiyasi, interaktiv texnologiyalar, o'qitish usullari, professional muloqot, raqamli savodxonlik.

Ключевые слова: технические вузы, информационно-коммуникативная компетентность, интерактивные технологии, методы обучения, профессиональная коммуникация, цифровая грамотность.

Key words: technical universities, information and communicative competence, interactive technologies, teaching methods, professional communication, digital literacy.

Резюме:

Maqolada texnik oliy o'quv yurtlarida tahsil olayotgan talabalarning axborot-kommunikatsiya kompetensiyasini shakllantirish usullari va yondashuvlari muhokama qilinadi. Axborotni izlash, qayta ishlash va uzatish ko'nikmalarini oshirish va rivojlantirishga qaratilgan o'qitishning zamonaviy interaktiv uslub va texnologiyalaridan foydalanishga alohida e'tibor qaratilmoqda. Bundan tashqari, tadqiqotning maqsadi kasbiy muhitda talabalar va o'qituvchilar o'rtasidagi muloqot darajasini oshirishga qaratilgan. Ushbu yondashuvlarni ta'lim jarayoniga joriy etish samaradorligini ochib beruvchi tadqiqotlar natijalari keltirilgan.

Резюме:

В статье рассматриваются методы, а также подходы формирования информационно-коммуникативной компетентности студентов обучающихся в технических вузах. Особо подчеркивается использование современных интерактивных методик и технологий обучения, целенаправленных на повышение и развития навыков поиска, обработки и передачи информации. Кроме этого, цель исследования фокусируется на повышение уровня общения студентов и преподавателей в профессиональной среде. Представлены результаты исследований, выявляющие эффективность внедрения данных подходов в образовательный процесс.

Summary:

The article discusses methods and approaches to the formation of information and communication competence of students studying in technical universities. Particular emphasis is placed on the use of modern interactive teaching methods and technologies aimed at improving and developing the skills of searching, processing and transmitting information. In addition, the goal of the study is focused on improving the level of communication between students and teachers in a professional



environment. The results of studies are presented that reveal the effectiveness of introducing these approaches into the educational process.

Introduction. Modern society requires specialists to have developed communication and information skills, as well as a high level of professional knowledge. In this article, we set ourselves the goal of studying the level of development of students in technical fields in professional information orientation. The article reveals the content of this focus and its connection with the professional competence of future specialists. In the context of technical universities, where students study complex engineering disciplines, the formation of information and communication competence becomes one of the key tasks. This competence includes the ability to effectively search, analyze, structure and transmit information, as well as apply these skills in professional and educational situations. The introduction of new technologies into the educational process opens up wide opportunities for the development of these skills, making learning more flexible and personalized. Constant updating of the information space stimulates the development of new cultural demands and forces a person to look for effective ways of communication in a rapidly changing world. The demands on personnel training in technical universities have shifted significantly due to the expectations of society and the state, resulting in a need to prepare highly qualified specialists with strong professional competence. Based on the analysis of scientific and methodological literature, it is possible to identify key components of competence orientation: motivational, cognitive, value and reflexive. During the training, students apply theoretical knowledge by participating in the development of projects, discussions and solving practical cases.

The project method turned out to be the most effective in the formation of professional focus, especially in the discipline "Information systems in technical systems" [1]. Research methods. In the process of professional training of students, the case method, project method, business games, discussions, and case solving are used to develop a professional and information focus. In this process, electronic educational tools play a vital role in fostering students' independent learning skills. By utilizing digital resources, students are encouraged to engage actively with content, explore topics autonomously, and develop self-directed learning habits. These tools not only provide access to a wide range of information but also offer interactive and adaptive learning environments that cater to different learning paces and styles, enhancing students' ability to manage and assess their own learning progress. Evaluation of academic performance and learning outcomes can be discussed by students and teachers via the electronic platform "Hemis", which can allow for prompt correction of student work. Electronic resources posted in the resource department of each subject are actively used for additional independent education of students [2].



Globalization and digitalization of society are transforming education, creating a digital educational environment. This environment promotes continuous personal development due to:

- **Openness and flexibility:** digital technologies make education accessible to a wide range of people and allow the learning process to be adapted to individual needs [3].
- **Interactivity:** students actively participate in the learning process, receiving constant feedback.
- **Development of creativity:** digital tools stimulate creative thinking and the search for non-standard solutions.
- **Motivation:** modern technologies make learning more exciting and effective.

The main components of digitalization of education include not only the use of technical means, but also the development of digital educational materials, the development of electronic platforms and educational programs, as well as training teachers to use digital technologies in their work.

Based on domestic and foreign experience, Yarullina L.R. applies cognitive and personality-developmental approaches in her work to analyze the psychological aspects of digital learning in higher education. The author points out potential threats associated with the transformation of the educational process, including the deformation of the value system, the decline in communicative competence and the emergence of new psychological problems among students [4].

Digital technologies open up new opportunities for interactive learning. When students do not just read or listen, but actively interact with digital materials, complete practical tasks, the effectiveness of learning increases significantly. Research confirms that active participation in the educational process allows you to remember up to 90% of the material studied. Modern interactive learning is designed to form an independent, creative and critically thinking personality. A student must not only absorb information, but also be able to apply it in practice, generate new ideas and work in a team. A comfortable and stimulating learning environment contributes to the comprehensive development of the individual.

Research results. The modern world requires specialists to be able to work in a global information environment, use a variety of digital tools and effectively interact with colleagues from different countries. In technical fields, there is often a need to collaborate with representatives of other disciplines, which requires developed communication skills. To create new technologies and products, it is necessary to be able to generate ideas, find information and effectively convey it. The digitalization of education encounters several key challenges:

1. **Ensuring Access to Technology and Education for All Students:** Many students, especially in underserved communities, may lack access to the necessary devices, stable internet connections, or even reliable power sources, which creates a digital divide and limits equal educational opportunities.

2. Quality of Digital Educational Resources: Digital resources must meet high standards of educational quality, with accurate, engaging, and pedagogically sound content. However, it can be challenging to maintain consistent quality across diverse online platforms and resources.

3. Data Privacy and Protection: With the increased use of online platforms, protecting students' personal data is essential. Schools and institutions must ensure compliance with privacy regulations and take measures to safeguard sensitive information from breaches.

4. Teacher Training in Technology Use: Teachers need proper training to effectively integrate digital tools into their teaching. This includes understanding how to use technology for instructional design, engaging students, and assessing learning outcomes. Teacher support and ongoing professional development are crucial for adapting to digital tools effectively.

Addressing these challenges requires coordinated efforts from educational institutions, governments, and tech providers to create a more equitable and secure digital learning environment [5, 14, 15]. At the same time, digitalization of education also provides such benefits as expanding access to education, increasing motivation and activity of students, individualization of learning, and the development of new skills necessary for successful adaptation to the digital age [6, 13, 16].

The solution to the problem of digitalization of education requires a comprehensive approach, including technical, pedagogical, cultural and social aspects. It is necessary to develop strategies and programs aimed at developing infrastructure, training teaching staff, creating high-quality content, and eliminating socio-cultural barriers [7, 8].

In solving the problems of digital education, we propose using the following methods:

Table-1

Ways to develop digitalization of education

| Name of the methodology | Description of the methodology |
|-----------------------------------|---|
| Infrastructure development | It is essential to ensure the availability of the required technical infrastructure, including computers, internet access, software, and so on. [3]. This includes expanding Internet access in schools and universities, creating computer labs and laboratories. |
| Pedagogical training | Teachers must be prepared to effectively use digital technologies in the educational process. Educational programs and training in digital skills, the use of digital tools and digital content development methodology will enable teachers to become more experienced in the digital environment [9]. |



| | |
|---|--|
| Development of digital educational resources | The development and customization of high-quality digital learning materials and resources that align with the curriculum and address student needs are crucial to the digitalization of education. This can involve creating interactive textbooks, online courses, and educational resource web portals. |
| Inclusiveness and convenience | Digital education should be open and inclusive for all participants in the educational process. All students should have equal access to digital technologies and resources, regardless of their economic, physical or social status. The process includes the development of special programs and resources, as well as support for students with disabilities. |
| Cooperation and partnership | Addressing the challenges of digitalization in education requires collaboration between educational institutions, government agencies, industry, and other stakeholders. Partnerships can help share experiences, resources, and knowledge, and develop and implement digital solutions in education. |
| Evaluation and analysis of results | In order to determine the effectiveness of the technologies and methods used, identify problems and adjust the strategy for the development of digital education, it is necessary to systematically evaluate and analyze the results of the digitalization of education. |

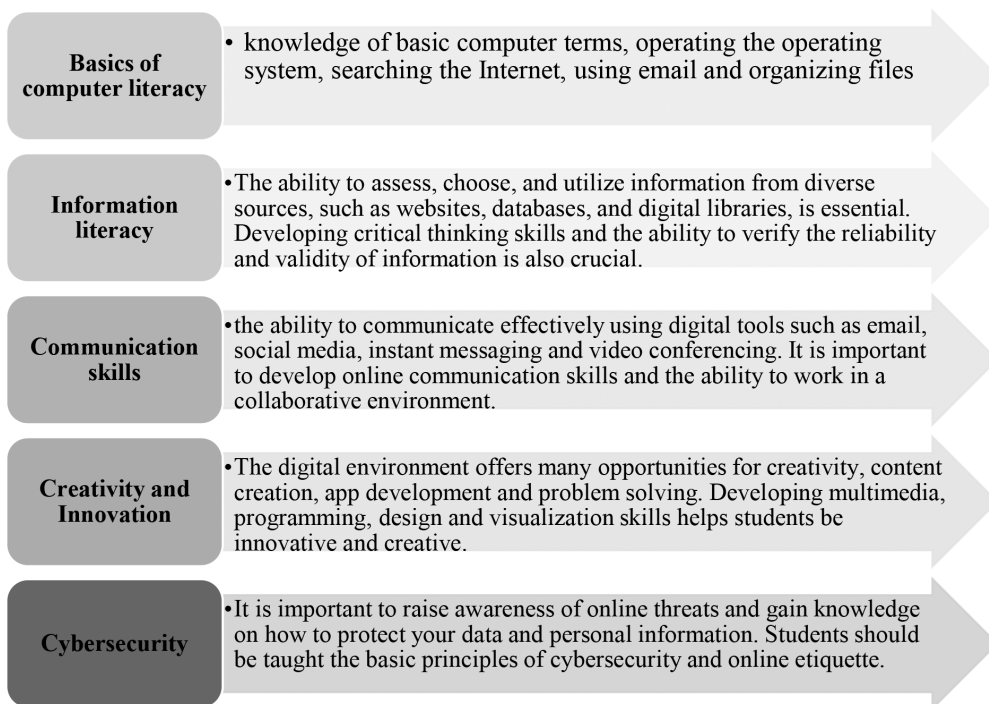


Figure 1. The key aspects of digital skills development

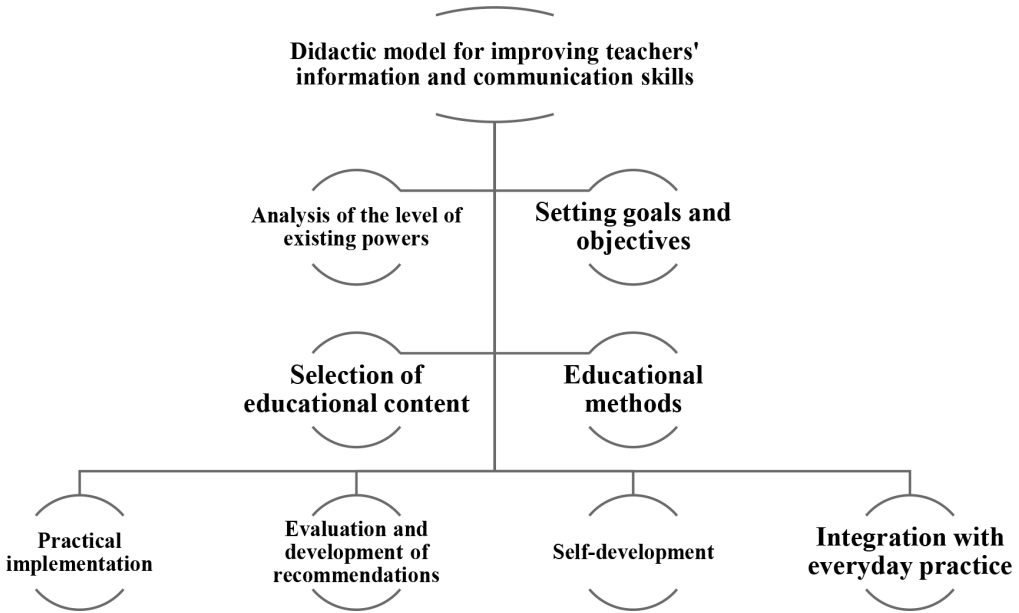


Figure 2. The didactic model for the development of information and communication competence in students of technical universities

Based on the above ways to overcome the problems of digitalization, we studied the range of digital skills necessary for the effective use of digital technologies. The development of digital skills is becoming increasingly important in the modern information society. Digital skills encompass a broad spectrum of abilities required for the efficient use of digital technologies and resources [9, 10]. When fostering digital skills, several key factors must be considered (Fig. 1):

There are various approaches to developing digital skills, such as integrating digital technologies into the educational process, using specialized curricula and online courses, engaging in practical exercises and projects with digital tools, mastering new technologies and techniques, as well as providing training and support for students [11, 12].

The didactic model for improving students' information and communication skills that we have developed includes a number of stages and methods for effective training and development of not only technical skills, but also effective communication skills (Fig. 2).

Illustrated in the diagram above, which highlights the growth in various categories, showcasing the impact of the didactic model on the learning process (Fig. 3).

Each category shows the percentage increase in the positive impact of the model on teachers' ICT knowledge, teaching methods, student achievement, student engagement and overall satisfaction since the programme was implemented,

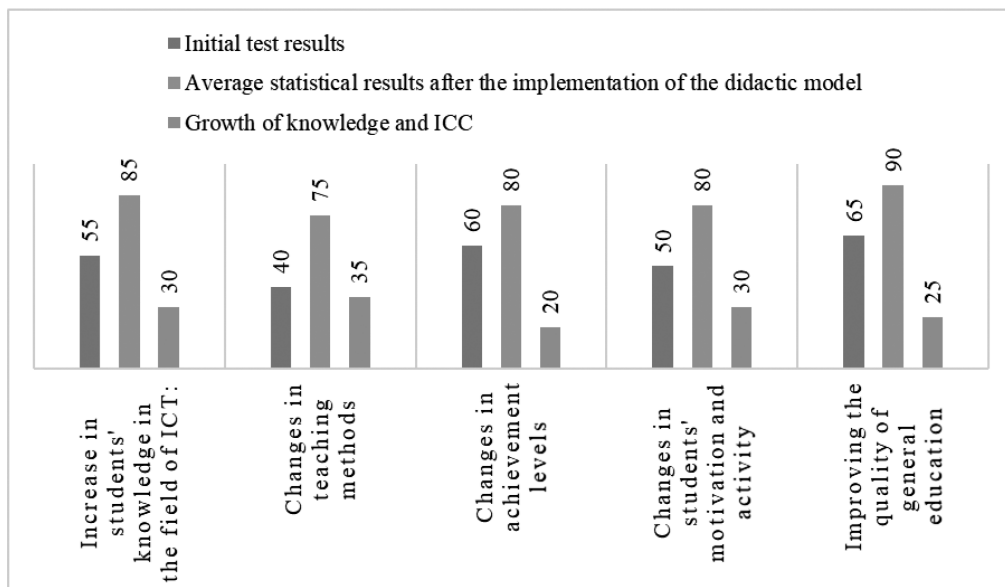


Figure 3. The influence of the didactic model on the educational process

indicating that it has been demonstrated. These results clearly demonstrate the effectiveness of the didactic model and highlight it as an important tool for improving the educational process. These results demonstrate the importance of the didactic model in developing information and communication competencies in students of technical universities.

Conclusion. In the context of digital transformation, the development of information and communication competence in students at technical universities is a crucial element of preparing specialists who are ready to work effectively in real-world production processes. The use of interactive technologies in the educational process, alongside traditional teaching methods, enhances the depth of knowledge acquisition and the development of professional skills. The findings confirm that integrating new interactive approaches into education not only improves the quality of learning and boosts students' readiness for professional activities but also fosters critical thinking and prepares students for real-world production challenges. In our study, a mixed methodology was used to evaluate the effectiveness of a didactic model aimed at developing information and communication competencies in students of technical universities. The results confirmed that this didactic model had a positive impact on students' knowledge of ICT and teaching methods, as well as on the level of skill and motivation of students.

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