

DEVELOPING STUDENTS DIGITAL COMPETENCE IN USING STATE ELECTRONIC SYSTEMS THROUGH THE IMPROVEMENT OF SOFTWARE AND METHODOLOGICAL SUPPORT.

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Abstract. The development of digital competence among students is becoming an important condition for effective participation in the modern digital society. The widespread introduction of state electronic systems requires users to possess not only general digital literacy but also specific knowledge and practical skills for working with electronic public services, digital identification systems, electronic document management platforms, and state information resources. This article examines the possibilities of developing students' digital competence in using state electronic systems through the improvement of software and methodological support.

Keywords: digital competence, students, state electronic systems, software support, methodological support, digital literacy, electronic public services, information technology, digital education, information security.

DASTURIY VA METODIK TA'MINOTNI TAKOMILLASHTIRISH ASOSIDA TALABALARNING DAVLAT ELEKTRON TIZIMLARIDAN FOYDALANISH BO'YICHA RAQAMLI KOMPETENSIYASINI RIVOJLANTIRISH

Annotatsiya. Ushbu tadqiqot dasturiy va metodik ta'minotni takomillashtirish orqali o'quvchilarning davlat elektron tizimlaridan foydalanish bo'yicha raqamli kompetensiyasini rivojlantirishga bag'ishlangan. Unda zamonaviy raqamli vositalar, samarali metodlar va amaliy yondashuvlar orqali o'quvchilarning raqamli ko'nikmalarini oshirish masalalari yoritiladi.

Kalit so'zlar: raqamli kompetentlik, talabalar, davlat elektron tizimlari, dasturiy ta'minot, metodik ta'minot, raqamli savodxonlik, elektron davlat xizmatlari, axborot texnologiyalari, raqamli ta'lim, axborot xavfsizligi.

РАЗВИТИЕ ЦИФРОВОЙ КОМПЕТЕНТНОСТИ СТУДЕНТОВ В ИСПОЛЬЗОВАНИИ ГОСУДАРСТВЕННЫХ ЭЛЕКТРОННЫХ СИСТЕМ ПОСРЕДСТВОМ СОВЕРШЕНСТВОВАНИЯ ПРОГРАММНОГО И МЕТОДИЧЕСКОГО ОБЕСПЕЧЕНИЯ

Аннотация. Данное исследование посвящено развитию цифровой компетентности учащихся при использовании государственных электронных систем посредством совершенствования программного и методического обеспечения. Рассматриваются современные цифровые инструменты, эффективные методы и практические подходы, направленные на повышение цифровых навыков учащихся.

Ключевые слова: цифровая компетентность, студенты, государственные электронные системы, программное обеспечение, методическое обеспечение, цифровая грамотность, электронные государственные услуги, информационные технологии, цифровое образование, информационная безопасность.

Introduction. The rapid development of information and communication technologies has significantly changed the requirements for education, employment, and social interaction. Digital technologies are increasingly integrated into public administration, education, healthcare, finance, and other areas of social life. As a result, citizens need to possess sufficient digital competence to interact effectively with electronic information resources and public services. State electronic systems have become an important component of modern public administration. They provide opportunities for citizens to access public services, submit electronic applications, receive information, use electronic identification, manage documents, and communicate with government institutions remotely. The effective use of such systems requires users to understand both their functional capabilities and the principles of responsible and secure digital behavior. Digital competence should be understood as an integrated ability that includes knowledge, practical skills, attitudes, and responsible behavior in a digital environment. It involves the ability to find, evaluate, process, create, and exchange digital information, as well as to use digital technologies safely and effectively. However, the development of students' digital competence cannot be achieved solely through theoretical instruction. The relevance of the research is determined by the need to strengthen students' readiness to

use state electronic systems independently, efficiently, and securely. The development of appropriate software and methodological support can create favorable conditions for systematic formation and assessment of students' digital competence.

The purpose of this study is to develop a methodological approach to improving students' digital competence in using state electronic systems through the improvement of software and methodological support. The research objectives are:

- to clarify the theoretical content of students' digital competence in the context of state electronic systems;
- to identify the main components of digital competence required for effective use of electronic state services;
- to determine the pedagogical and technological conditions for developing students' competence;
- to develop a structure of software and methodological support;
- to identify effective methods for assessing students' digital competence.

Materials and methods. The research was conducted using theoretical and empirical methods. The theoretical basis of the study included scientific works on digital competence, digital education, information technologies, electronic government, and competency-based education.

The following research methods were applied: analysis and synthesis of scientific literature, comparison, generalization, systematization, pedagogical observation, questionnaire-based assessment, and analysis of students' practical activities.

A competency-based approach was used as the methodological basis of the research. According to this approach, students' competence is considered not merely as a set of theoretical knowledge but as the ability to apply knowledge and skills effectively in real-life situations.

A system approach was also applied to examine software and methodological support as an integrated structure consisting of technological, informational, pedagogical, and assessment components.

The proposed methodological model includes four main stages:

Diagnostic stage. Students' initial level of digital competence is determined through questionnaires, practical tasks, and diagnostic tests.

Theoretical preparation stage. Students acquire knowledge about the structure and functions of state electronic systems, digital identification, electronic services, information security, and responsible use of digital resources.

Practical training stage. Students perform practical tasks involving simulated or available electronic state services, electronic applications, digital documents, information searches, authentication procedures, and data protection practices.

Assessment and reflection stage. Students' acquired knowledge and practical skills are assessed using tests, practical assignments, rubrics, and self-assessment tools.

The software and methodological support proposed in the study includes:

- electronic educational materials;
- interactive presentations;
- video tutorials;
- practical guidelines;
- electronic tests;
- simulated practical tasks;
- digital assessment tools;
- methodological recommendations for teachers;
- instructions for students;
- electronic information resources.

The assessment of digital competence is based on four principal criteria: information literacy, technical and operational skills, communication and service-use skills, and information security awareness.

The competence levels were classified as follows:

Level	Characteristics
Low	The student has limited knowledge of state electronic systems and requires continuous assistance.
Medium	The student can perform basic operations independently but may experience difficulties with complex procedures.
High	The student can independently use electronic systems, solve practical problems, evaluate information, and follow security requirements.

This methodological structure makes it possible to combine theoretical learning with practical experience and continuous assessment.

Results. The analysis showed that the development of students' digital competence requires systematic integration of software and methodological support into the educational process.

The first result concerns the structure of digital competence. It was established that competence in using state electronic systems should include several interconnected components: cognitive, operational, informational, communicative, and security-related components.

The cognitive component includes knowledge of the purpose, structure, functions, and principles of state electronic

systems. Students should understand the role of electronic public services and the basic principles of digital government.

The operational component reflects the ability to perform practical activities in electronic systems. These activities may include registration, authentication, information search, electronic application submission, document management, and use of digital services.

The communicative component includes the ability to interact with institutions and other users through digital channels, follow electronic communication standards, and use digital services appropriately.

The security component reflects students' ability to protect personal information, use authentication mechanisms responsibly, recognize potential digital risks, and follow basic cybersecurity principles.

The second result is related to the structure of software and methodological support. The study showed that the most effective support system should combine technological tools with methodological materials.

The proposed structure can be represented as follows:

Software tools provide the technological environment for learning. Educational content provides theoretical knowledge. Practical tasks enable students to apply this knowledge. Assessment determines the level of competence, while feedback helps students identify and correct deficiencies.

The third result concerns the role of practical training. Students demonstrate a higher level of understanding when theoretical knowledge is accompanied by practical activities. Therefore, practical exercises should occupy a significant place in the educational process.

Examples of practical tasks include:

- identifying appropriate electronic state services for specific situations;
- navigating electronic service interfaces;
- completing electronic forms;
- analyzing information obtained from state electronic resources;
- practicing secure authentication procedures;
- evaluating the reliability of digital information.

The fourth result concerns the importance of methodological materials. Clear and logically structured methodological guidelines reduce students' dependence on direct teacher assistance. Step-by-step instructions, screenshots, video tutorials, frequently asked questions, and practical examples can make the learning process more accessible.

The fifth result demonstrates the importance of continuous assessment. Digital competence should not be assessed only through theoretical tests. Practical performance, problem-solving ability, information evaluation, and security awareness should also be considered.

The proposed assessment structure is presented below:

Competence component	Assessment method	Expected result
Cognitive	Test and questionnaire	Understanding of electronic systems
Operational	Practical assignment	Independent system use
Informational	Information-analysis task	Critical evaluation of digital information
Communicative	Practical scenario	Effective digital interaction
Security	Situational task	Safe digital behavior

The results suggest that the systematic use of software and methodological support can create favorable conditions for increasing students' independence, practical skills, and confidence when interacting with state electronic systems.

Discussion. The findings confirm that digital competence is a multidimensional educational outcome that cannot be reduced to basic computer literacy. A student may possess general computer skills but still experience difficulties when using electronic public services, completing digital procedures, or protecting personal information.

Therefore, higher education institutions should develop students' digital competence in a context that reflects actual social and professional requirements. State electronic systems provide a relevant practical environment for achieving this objective.

An important aspect of the proposed approach is the integration of software and methodological support. Software alone cannot guarantee effective learning. Students need clear methodological explanations, practical examples, instructions, and opportunities for independent practice.

At the same time, methodological materials should not remain static. State electronic systems and their interfaces may change due to technological development, legislative amendments, or organizational reforms. Consequently, educational resources should be reviewed and updated periodically.

Another important issue is information security. Students frequently use digital platforms to exchange personal information and access electronic services. Therefore, digital competence development should include practical knowledge of password protection, authentication, privacy, phishing prevention, responsible information sharing, and safe use of digital resources.

The results also indicate the importance of learner-centered education. Students should have opportunities to perform practical tasks independently, make decisions, identify errors, and receive feedback. Such an approach contributes to the development of not only technical skills but also digital responsibility and problem-solving abilities.

The proposed model can therefore be considered a combination of technological and pedagogical measures. Its effectiveness depends on several conditions:

- availability of appropriate digital infrastructure;
- accessibility of methodological materials;
- regular updating of educational content;
- sufficient digital competence of teachers;
- organization of practical training;
- continuous assessment and feedback;
- attention to information security.

The study has several practical implications for higher education institutions. First, digital competence related to state electronic systems can be incorporated into relevant courses and independent learning activities. Second, institutions can develop electronic methodological manuals and practical training modules. Third, teachers can use competency-based assessment tools to measure students' progress.

The approach can also contribute to the broader objectives of digital transformation. Students who acquire practical experience with state electronic systems during their university education are better prepared to interact with digital public services in their future professional and social lives.

Conclusion. The study demonstrates that improving software and methodological support is an important condition for developing students' digital competence in using state electronic systems. Digital competence should be formed as an integrated combination of theoretical knowledge, practical skills, information literacy, digital communication abilities, and information security awareness.

The proposed methodological approach combines diagnostic assessment, theoretical preparation, practical training, and final evaluation. Its main advantage is the integration of software tools, electronic educational resources, methodological instructions, practical assignments, and assessment mechanisms into a unified educational process.

The analysis confirms that practical training should occupy a central position in the development of students' competence. Students need opportunities to work with realistic situations, perform digital procedures, analyze information, solve problems, and apply security principles.

The effectiveness of the proposed approach also depends on the continuous updating of software and methodological materials. As state electronic systems develop, educational content should be adapted to new technological and organizational requirements.

In conclusion, the systematic improvement of software and methodological support can contribute to increasing students' digital independence, improving their ability to use state electronic systems, strengthening information security awareness, and preparing them for active participation in a digitally transformed society.

Future research may focus on the experimental verification of the proposed methodology, development of quantitative assessment indicators, and creation of specialized digital learning platforms for training students to use state electronic systems.

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