DEVELOPING DIGITAL COMPETENCIES AND INFORMATION CULTURE OF ACADEMIC LYCEUM STUDENTS IN THE CONTEXT OF DIGITAL TRANSFORMATION

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Abstract: This article analyzes the issues of developing digital competencies among academic lyceum students. In the context of rapidly changing technologies, it highlights ways to introduce international standards into educational practice, as well as methods to enhance students' information literacy, independent, and critical thinking skills.

Аннотация: В данной статье анализируются вопросы формирования цифровых компетенций учащихся академических лицеев. В условиях стремительного изменения технологий освещаются пути внедрения международных стандартов в образовательную практику, а также способы развития у учащихся навыков работы с информацией, самостоятельного и критического мышления.

Keywords / Ключевые слова
1. Digital Transformation — Цифровая трансформация
2. Information Culture — Информационная культура
3. Digital Competence — Цифровая компетенция
4. Media Literacy — Медиаграмотность
5. Academic Lyceum — Академический лицей
6. Advanced International Experience — Передовой международный опыт
7. Educational Integration — Образовательная интеграция
8. Cybersecurity — Кибербезопасность

INTRODUCTION

Today, the educational system is charged not only with imparting knowledge but also with preparing students for an ever-changing digital world. As the academic lyceum serves as an intermediate bridge to higher education, digital competence in this setting extends far beyond basic computer literacy: it encompasses data analysis, adherence to cybersecurity rules, and creative problem-solving [2, 3, 4].

Since lyceum students will soon become university students, it is essential to foster their ability to filter information streams, work with cloud services, and observe ethical norms in online environments from this stage forward. The experience of Finland and Estonia demonstrates that Information and Communications Technology (ICT) is not merely an auxiliary tool in education, but a driving force that shapes the very content of the learning process [6]. Drawing upon these international practices, this paper analyzes pathways for enhancing lyceum students' digital skills in accordance with global standards.

MAIN DIRECTIONS OF DIGITAL COMPETENCE

According to modern approaches and international standards (including the European Union's DigComp 2.2 framework), an academic lyceum graduate should be proficient in the following key directions [3, 4]:

1. Information and Data Literacy: Searching for required information, filtering and verifying its authenticity, recognizing fake news, and adhering to information hygiene.
2. Communication and Collaboration: Participating in group projects via digital platforms and following online etiquette (netiquette).
3. Digital Content Creation: Producing and editing text, graphics, and video for educational purposes, while respecting copyright laws.
4. Digital Problem Solving: Independently troubleshooting minor technical issues and understanding the fundamentals of algorithmic and logical thinking.
5. Cybersecurity and Cyberethics: Ensuring personal data privacy, password security, protecting against phishing and cyberattacks, and building immunity against cyberbullying.

ADVANCED INTERNATIONAL EXPERIENCE

In developing digital education, a number of countries have created distinctive successful models:

1. Estonia ("Tiigrihüpe" / ProgeTiiger): Within the framework of the "ProgeTiiger" program, programming and robotics elements are integrated across various subjects. Lessons are not limited to theory but are based on working on real projects (project-based learning).
2. Finland: Digital and media literacy are taught not as separate subjects, but through an interdisciplinary approach. For example, history lessons involve working with digital archives, while mathematics lessons utilize data visualization.
3. South Korea (Smart Education): In this system, education is personalized for each student: artificial intelligence evaluates the level of comprehension and recommends matching learning resources.
4. Singapore (1:1 Personal Learning Device): Every student is provided with a personal technical device, and educational curricula are fully integrated into a unified digital platform.

To enhance digital competencies in the context of Uzbekistan, it is advisable to take the following steps [1, 5, 7]:

1. Strengthening the STEM/STEAM Approach: Enriching computer science lessons with languages like Python and JavaScript, as well as the fundamentals of artificial intelligence.
2. Teacher Digital Qualifications: Introducing the concept of "pedagogical digital competence" [8]. Teachers should not be limited to using projectors; they need to work fluently within Learning Management Systems (LMS) such as Moodle or Google Classroom.
3. Cloud Technologies: Regularly utilizing tools like Google Workspace or Microsoft 365 for collaborative work within the educational process.

ANALYSIS OF EXISTING PROBLEMS AND THEIR SOLUTIONS

In the process of developing digital competencies within academic lyceums, several challenges have been observed. To overcome these barriers, it is advisable to implement the following practical solutions:

Existing Problem	Proposed Solution
Inadequacy of the material and technical infrastructure in regional lyceums: Outdated computer equipment in some regions and a lack of high-speed internet networks.	Cloud computing: Running complex programming and modeling processes even on low-spec computers via cloud platforms (Google Colab, Replit).
Teachers' digital resistance and skill gaps: Hesitation among experienced teachers to use modern EdTech tools or their preference for traditional methods.	"Reverse Mentoring": Implementing a system where young specialists and digitally literate students teach experienced educators how to use modern platforms.
Information security and in-class distractions: Non-educational, aimless use of internet resources by students during class and exposure to cyber threats.	Cyber hygiene and content filtering: Blocking harmful and distracting sites on lyceum networks, as well as instituting classes on cybersecurity and time management (digital wellbeing).
Gap between theory and practice: Computer science and digital technology classes being restricted strictly to theoretical rules in textbooks.	Project-Based Learning: Assigning students group projects aimed at solving real-world problems (such as creating websites or developing applications).

CONCLUSION

In conclusion, fostering digital skills in academic lyceums is a task much broader than simply teaching how to operate a computer: it prepares students for future life. Developing the digital competencies of academic lyceum students is a key factor in training modern and competitive personnel. International experience (Estonia, Finland, South Korea, Singapore) demonstrates that digital education should not be limited to imparting theoretical knowledge, but must rely on real-world projects and interdisciplinary integration. By introducing the STEM/STEAM approach in Uzbekistan's academic lyceums, enhancing teachers' pedagogical digital proficiency, and integrating the fundamentals of AI and cybersecurity into education, students' independent, critical, and creative abilities can be significantly strengthened. International experience shows that technology should not merely remain a part of the lesson process, but become its integral medium. Once students learn to search for information correctly, collaborate in teams using digital tools, and use the internet safely, they will successfully secure their place both at the university level and in their subsequent professional activities.

REFERENCES

1. Decree of the President of the Republic of Uzbekistan. (2020). On measures for approval and effective implementation of the "Digital Uzbekistan — 2030" Strategy (No. UP-6079, October 5, 2020).
2. Resolution of the Cabinet of Ministers of the Republic of Uzbekistan. (2021). On measures to further improve the activities of academic lyceums (No. 460, July 19, 2021).
3. Carretero, S., Vuorikari, R., & Punie, Y. (2017). DigComp 2.1: The Digital Competence Framework for Citizens with eight proficiency levels and examples of use. Publications Office of the European Union.
4. Ferrari, A. (2013). DIGCOMP: A Framework for Developing and Understanding Digital Competence in Europe. European Commission, Joint Research Centre.
5. Ismoilova, M. N. (2022). Pedagogical foundations of using digital technologies in the educational system [Scientific and methodological guide]. Tashkent.
6. Kozma, R. B. (2011). ICT, Education Reform, and Economic Growth: A Conceptual Framework. Intel Education.
7. Zokirova, F. M. (2023). Problems and prospects of forming digital competencies in modern education. National University of Uzbekistan Bulletin (ÖzMU Xabarlari).
8. UNESCO. (2018). UNESCO ICT Competency Framework for Teachers. UNESCO Publishing.