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Foreign Experiences In Developing Students' Logical And Critical Thinking Through Digital Technologies

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Abstract: This article analyzes the introduction of digital technologies into the educational process, their role in the development of logical and critical thinking. The study covers the historical stages of the Uzbek education system - the Jadid period, Soviet education and the process of forming a culture of thinking during the post-independence reforms. International experiences, in particular, the use of digital tools in advanced education systems such as the USA, Finland, Singapore, and Japan, as well as teacher training and assessment systems, are analyzed. In addition, the problems that arise in the development of digital education are also considered. The article substantiates the possibilities and limitations of applying foreign experiences in the conditions of Uzbekistan and provides practical recommendations for the development of critical thinking through digital technologies.

Keywords: Digital technologies, Jadid movement, Soviet era, communist ideology, innovative teaching methods, Task assessment method, tripartite partnership model, digital competence.

Introduction: The penetration of digital technologies into the educational process creates new opportunities for the development of logical and critical thinking. Modern pedagogical research shows that purposefully selected and used digital tools significantly improve the cognitive abilities of students. Therefore, the study and analysis of the experience of advanced foreign countries is of particular importance in the context of the modernization of the education system of Uzbekistan.

The Jadid movement, which emerged at the beginning of the 20th century, was aimed not only at national revival, but also at renewing the content of education. Jadids criticized the teaching methods based on memorization and repetition in traditional schools and put forward methods that encouraged the development of students' thinking and independent decision-making. For example, Abdulla Avloni, in his work "Turkish Rose or Morality," emphasizes the need to awaken students' minds and activate their thinking through questions and answers [1]. In Jadid schools, students' conscious thinking was stimulated through problematic questions, logical stories, and texts related to social life. This period was important as the first attempt to form social activity, a sense of justice, and the ability to make independent decisions in students.

During the Soviet era, the main goal of education was to impart knowledge and instill communist ideology. Nevertheless, attention was paid to the development of scientifically based logical thinking. In particular, there was a strong focus on increasing the intellectual potential of students through mathematics, physics, and technical sciences. For example, in the 1960s and 1970s, methods such as problem-based learning, heuristic conversation, and creative tasks were recommended. Also, psychologists and educators such as V.V. Davidov [2] and P.Ya. Galperin [3] developed effective methodologies for developing cognitive processes, stages of mental activity, and students' thinking.

Although logical and critical thinking during this period was developed based on a more structural approach, irregularity, and discipline, the stages of thinking were analyzed in depth.

Since 1991, the education reform in Uzbekistan has focused on a person-centered approach, critical thinking, creative thinking, and innovative teaching methods. The Law "On Education" [4] and the National Curriculum set the formation of life skills, independent thinking, assessment, and analysis skills in students as an important goal. The "Concept for the Development of the Continuous Education System until 2030" recognizes critical thinking as an integral element of modern competencies. [5].

Experiences in the formation of logical and critical thinking in secondary schools in Uzbekistan have a solid historical foundation. The principles of free thinking that began during the Jadid period, the scientifically based methods of the Soviet era, and the person-oriented and competency-based approaches of the years of independence have complemented each other. Today, based on historical practical experiences, it is possible to further improve the content of modern education.

In foreign experiences, the effectiveness of developing logical and critical thinking through digital technologies largely depends on the training and qualifications of teachers. Developed countries pay great attention to the teacher training system [6].

In Finland, all teachers are required to have a master's degree and undergo in-depth theoretical and practical training at university level. The University of Helsinki and the University of Turku pay special attention to digital pedagogy, computational thinking, and critical thinking in their teacher training [7]. Teachers are required to undergo at least 40 hours of in-service training annually, and these courses are fully funded by the state.

In Singapore, the National Institute of Education (NIE) is considered one of the best institutions in the world for training teachers [8]. Here, teachers are deeply trained not only in pedagogical theory, but also in modern technologies and innovative methods. NIE has included modules in its programs developed in collaboration with MIT Media Lab, Stanford University and other prestigious universities.

In the United States, there are Google for Education Certified Trainer and Microsoft Innovative Educator programs that provide teachers with skills in the effective use of digital tools [9]. These certificates are recognized worldwide and play an important role in the professional development of teachers. In the experience of foreign countries, various methods of assessing logical and critical thinking are used. Typically, these methods are aimed at assessing the ability of students to apply their knowledge in real-world situations, unlike traditional tests [10].

The Cambridge Assessment Critical Thinking assessment program used in the UK consists of two parts: a written test and a practical project [11]. The written test measures students' ability to analyze evidence, evaluate arguments, and draw conclusions. The practical project assesses their ability to apply critical thinking to solving real-world problems.

The Performance Task assessment method used in Singapore asks students to complete complex, multi-step tasks [12]. For example, students are required to analyze a specific social problem, gather information from various sources, propose solutions, and justify their proposals. This method allows for the assessment of not only the outcome, but also the process.

The table below presents the main assessment methods used in the practice of foreign countries and their characteristics:

Methods and characteristics of assessing logical and critical thinking

Assessment Method	Key features	Applicable countries
Portfolio Assessment	Collect student work and track progress	USA, UK, Canada, Australia
Performance Task	Assess application of skills in real-world situations	Singapore, Finland, Japan

Assessment Method	Key features	Applicable countries
Rubric-Based Assessment	Determine quality levels based on clear criteria	All developed countries
Peer Assessment	Evaluate and provide feedback to students on each other's work	Finland, Netherlands, Denmark
Numerical Assessment Tools	Automatic assessment and analysis via online platforms	South Korea, Singapore, Estonia
Formative Assessment	Regular feedback and guidance throughout the learning process	UK, Australia, New Zealand

In foreign experience, an important aspect of developing logical and critical thinking through digital technologies is the existence of an effective system of cooperation between various stakeholders. The concept of an educational ecosystem implies interaction and cooperation between educational institutions, government agencies, technology companies, scientific institutions and civil society [13].

The Public-Private Partnership model, widely used in the United States, helps accelerate innovation in education. Large technology companies such as Google, Microsoft, Apple, and Adobe collaborate with educational institutions to develop specialized educational programs, platforms, and software [14]. For example, under the Google for Education program, the company provides schools with free or subsidized technology solutions and funds teacher training programs.

A tripartite partnership model (university - school - technology companies) is widespread in Finland [15]. In this model, universities develop scientific research and innovative methods, schools test them in practice, and technology companies provide the necessary technical solutions. The University of Helsinki and Aalto University have signed long-term partnership agreements with many schools and are implementing joint research projects.

In Singapore, the government-established EdTech Hub serves as a national innovation hub [16]. It conducts research on educational technology, tests new solutions, and disseminates successful experiences to all schools.

The success of developing logical and critical thinking through digital technologies largely depends on the availability of financial resources. Developed countries invest heavily in the education sector, particularly in digital technologies. However, a number of difficulties and problems have also been identified in the process of studying some foreign experiences.

Firstly, the digital divide is still a problem in many countries.

Secondly, teachers lack digital competence. Although teacher training systems in developed countries are well-established, many teachers still struggle to use digital technologies effectively [17].

Thirdly, screen time (the amount of time a person spends in front of a digital device screen) and health problems are also a concern for many researchers [18]. Prolonged use of digital devices can negatively affect students' vision, physical activity, and psychological well-being.

Fourth, the state and problem of personal data should be given special attention. Digital platforms and

providers collect large amounts of data about their users and the collection of this data [19]. While the European Union has adopted the General Data Protection Regulation (GDPR), many other countries have less developed mechanisms for protecting personal data.

In order to apply foreign experiences in the Uzbek education system, it is necessary to take into account a number of factors. First of all, the availability of economic opportunities and resources is important. As a developing country, Uzbekistan has limited ability to make large-scale investments in digital technologies. Therefore, it is necessary to choose the most effective and cost-effective solutions.

Secondly, it is necessary to take into account the cultural and pedagogical context. The Uzbek education system has its own characteristics, and mechanical transfer of foreign approaches will not yield effective results. For example, when introducing a student-centered education approach, it is necessary to take into account local pedagogical traditions and the level of training of teachers.

Third, it is advisable to take a phased approach. Instead of implementing large-scale changes in all schools at once, it is more effective to gain experience through pilot projects and gradually expand successful practices. For example, a pilot program on developing logical and critical thinking through digital technologies could be implemented in several selected schools in Tashkent, the results could be analyzed, and then distributed to other regions.

Fourth, the use of open and free educational resources is especially important for Uzbekistan. Platforms such as Khan Academy, Scratch, Code.org provide free access and can be adapted to the Uzbek language. This makes it possible to introduce digital education without significant costs [20].

Fifth, strengthening the system of teacher training and professional development is a priority. Based on the experience of Finland, Singapore and other developed countries, it is necessary to develop special programs for teachers in Uzbekistan on digital pedagogy, computational thinking and critical thinking teaching methods. These programs should be aimed at developing not only theoretical knowledge, but also practical skills.

The following conclusions can be drawn from these experiences:

Digital technologies are an effective tool for developing logical and critical thinking. Research shows that purposefully used digital tools significantly improve students' problem-solving, analytical, and critical evaluation skills.

The key to success lies in an integrated approach. It is not enough to introduce technologies alone - this process must be accompanied by training qualified personnel, applying appropriate pedagogical methods, improving the assessment system, and ensuring cooperation between all stakeholders.

It is necessary to take into account the specific context and capabilities of each country. Rather than mechanically copying the experience of developed countries, it is more effective to develop solutions adapted to local conditions.

The following recommendations can be made as solutions to these problems in our country: the use of open educational resources, attention to teacher training, development of public-private partnerships, modernization of the assessment system and creation of a national digital education platform. If these recommendations are implemented step by step, significant progress can be achieved in the development of logical and critical thinking through digital technologies in the Uzbek education system.

Analysis of international experience shows that the development of logical and critical thinking is most effective when it is implemented not as a separate subject, but as an integrated part of all subjects. It is important to introduce this approach into the Uzbek education system and learn from foreign experience, taking into account national characteristics.

In the future, it is necessary to continue research in this area, develop practical guides for teachers, and create modern diagnostic tools for assessing students' logical and critical thinking skills.

CONCLUSION

The results of the study show that the formation of logical and critical thinking is becoming one of the main tasks of modern secondary schools. In this regard, educational practices and pedagogical approaches developed in foreign countries - the USA, Finland, Japan

and Singapore - deserve in-depth study and adaptation to local conditions. In these countries, activating students' thinking through problem situations, personalizing the learning process through practical tasks and project activities, teaching them to justify their opinions on the basis of discussion and reflection, etc., lead to the successful formation of critical thinking.

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