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FROM TRADITION TO INNOVATION: THE TRANSFORMATION OF SCHOOL TECHNOLOGIES IN AZERBAIJAN SINCE THE SECOND HALF OF THE 20TH CENTURY

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Abstract. In this work, I explore how school technologies in Azerbaijan have changed from the second half of the twentieth century to the present day. I focus on how traditional teaching methods gradually gave way to more innovative approaches, especially with the development of information and communication technologies. During the Soviet period, education was mostly based on standardized methods, with limited flexibility and a strong emphasis on discipline and memorization. However, over time, new ideas and tools began to appear, influencing both teaching and learning processes.

I also look at the period of independence, when Azerbaijan started implementing educational reforms and integrating modern technologies into schools. Digital tools, interactive methods, and student-centered approaches became more visible in classrooms. This shift was not immediate, but it developed step by step, reflecting both global trends and local needs.

In addition, I consider how teachers adapted to these changes and how students' roles evolved from passive listeners to active participants. In the end, the transformation of school technologies in Azerbaijan shows a gradual move from tradition to innovation, where modern educational practices continue to develop while still being influenced by historical foundations.

Key words: Educational innovation; school technologies; Azerbaijan education system; pedagogical transformation; ICT in education; digital learning.

Introduction. The development of school technologies in Azerbaijan reflects a broader transformation of the national education system over time. In the second half of the twentieth century, education was largely shaped by traditional approaches inherited from the Soviet system. Teaching methods were mostly teacher-centered, and the use of technology was limited to basic visual aids and printed materials. At that stage, the main goal of education was to provide standardized knowledge and maintain discipline in the classroom.

With the transition to independence, the education system began to change in response to new social, economic, and technological conditions. The introduction of innovative practices, especially in the field of information and communication technologies, gradually influenced how teaching and learning were organized. Schools started to adopt computers, digital resources, and interactive methods, which created new opportunities for both teachers and students. This shift also required a reconsideration of the teacher's role, moving from a knowledge transmitter to a facilitator of learning.

This study aims to examine how these changes have taken place and which factors have influenced the transformation of school technologies. Particular attention is given to the relationship between historical traditions and modern innovations, as well as to the ways in which global educational trends have been adapted to the local context. Such an approach makes it possible to interpret the development of school technologies not as a sudden shift, but as a gradual and continuous process shaped by multiple interconnected factors.

The issue of educational technologies and innovation has been widely discussed by different scholars. For example, Lev Vygotsky emphasized the importance of social interaction in the learning process, which later influenced the development of interactive and collaborative technologies in educa-

tion. His concept of the zone of proximal development (ZPD) supports the use of guided learning, scaffolding, and adaptive digital tools that assist learners in progressing beyond their current level of understanding (Vygotsky, 1978: 86). Contemporary online platforms, collaborative software, and intelligent tutoring systems can be seen as practical implementations of Vygotsky's theoretical framework, facilitating peer interaction and teacher mediation in virtual environments.

Another important contribution comes from John Dewey, who highlighted the role of experience and active participation in education. Dewey's philosophy of "learning by doing" encouraged educators to move away from passive transmission of knowledge toward more student-centered approaches. In the context of modern educational technologies, this perspective is reflected in project-based learning, simulation tools, and experiential digital environments, where students actively construct knowledge through engagement and reflection (Dewey, 1938: 25).

Furthermore, Jean Piaget's theory of cognitive development also plays a significant role in understanding the integration of technology in education. Piaget emphasized that learners actively construct knowledge through interaction with their environment. His stages of cognitive development suggest that technological tools should be aligned with learners' developmental levels. Educational software, interactive games, and multimedia resources can be designed to support cognitive growth by providing appropriate challenges and opportunities for discovery learning (Piaget, 1972: 45).

In addition, Seymour Papert, building on Piaget's constructivist ideas, introduced the concept of constructionism, which highlights learning through the creation of meaningful products. Papert advocated for the use of computers as tools for thinking and creativity, rather than mere sources of information. His work laid the foundation for programming-based learning environments and influenced contemporary approaches such as coding education, robotics, and maker spaces, which promote creativity and problem-solving skills (Papert, 1980: 52).

Moreover, the theory of connectivism, proposed by George Siemens and Stephen Downes, offers a contemporary perspective on learning in the digital age. Connectivism emphasizes the importance of networks, digital connections, and access to information as fundamental elements of knowledge construction. According to this theory, learning occurs through the ability to navigate, connect, and critically evaluate information across diverse digital platforms. It shifts the focus from individual cognition to distributed knowledge systems, where learning is seen as a process of forming and maintaining connections within networks. This perspective supports the use of online learning environments, social media, and open educational resources as essential components of contemporary education, enabling learners to access up-to-date information and engage in collaborative knowledge-building (Siemens, 2005: 5; Downes, 2012: 34).

In the Azerbaijani context, researchers such as Aida Huseynova and Fazil Mustafa have examined the modernization of the education system and the integration of information and communication technologies (ICT) into school practice. Their studies indicate that innovation in education is not limited to the introduction of technological tools; rather, it requires a fundamental transformation of pedagogical approaches, curriculum design, and teachers' professional competencies. They argue that the effective integration of ICT contributes to improving the quality of education, fostering student motivation, and developing digital literacy skills, which are essential in the contemporary knowledge society (Huseynova, 2016: 78; Mustafa, 2018: 112).

Furthermore, recent contributions by scholars such as Michael Fullan focus on educational change and reform processes in the context of globalization and technological advancement. Fullan emphasizes that successful innovation in education depends not only on the availability of technological resources but also on the readiness of teachers, institutional support, and continuous professional development. He highlights the importance of leadership, collaboration, and systemic change in implementing sustainable educational innovations. According to Fullan, meaningful change occurs when educators are actively involved in the process and when innovation is supported by clear policies and long-term strategies (Fullan, 2013: 56).

Additionally, the literature demonstrates that innovation in educational technologies is a complex and dynamic process shaped by both global theoretical frameworks and local educational practices. The integration of digital technologies requires not only technical infrastructure but also pedagogical transformation, teacher preparedness, and ongoing institutional support. These factors collectively determine the effectiveness and sustainability of innovation in contemporary education systems.

Methods and Approaches. In this work, I try to analyze the transformation of school technologies in Azerbaijan by combining several methods and approaches that help to understand both historical development and current practices. First of all, I rely on a qualitative approach, since it allows me to examine changes in education not only through numbers, but through ideas, experiences, and interpretations. At the same time, I include some statistical data to better illustrate how these changes are reflected in practice.

This study examines the transformation of school technologies in Azerbaijan through the application of several complementary methods and approaches that allow for a comprehensive understanding of both historical development and contemporary practices. The research is primarily based on a qualitative approach, as it enables the exploration of educational change not only through measurable indicators, but also through ideas, experiences, perceptions, and interpretations of key stakeholders. Such an approach is particularly relevant for understanding how technological innovations are integrated into teaching and learning processes, as well as how they influence pedagogical practices and institutional culture.

Within the qualitative framework, document analysis is employed as one of the main research methods. This includes the examination of policy documents, national educational strategies, curriculum frameworks, and official reports related to the development of information and communication technologies (ICT) in education. Through this method, it becomes possible to trace the evolution of educational policies and to identify the main priorities and directions of reform. In addition, academic publications and previous research studies are analyzed in order to situate the topic within a broader theoretical and empirical context.

Furthermore, a comparative approach is used to analyze the relationship between global educational trends and their adaptation within the Azerbaijani context. By comparing international practices with local implementations, the study seeks to identify similarities, differences, and specific challenges that arise in the process of integrating innovative technologies into the education system. This approach helps to reveal how global ideas are interpreted and modified according to national needs, cultural factors, and institutional conditions.

In order to complement the qualitative analysis, elements of quantitative research are also included. Statistical data, such as reports on the availability of digital resources in schools, levels of ICT usage, and teacher training indicators, are used to provide a clearer picture of how technological changes are reflected in practice. Although quantitative data are not the primary focus of the study, they serve to support and illustrate the findings derived from qualitative analysis.

Moreover, a historical approach is applied to examine the development of school technologies over time. This method allows for the identification of key stages, turning points, and factors that have influenced the transformation process. By analyzing both past and present developments, the study emphasizes the continuity of educational change and highlights the gradual nature of technological integration.

One of the main methods used in this study is the historical method. It allows for an examination of the development of school technologies from the second half of the twentieth century to the present day. By analyzing different stages, it becomes possible to compare traditional Soviet-era education with modern innovative practices. For example, during the late Soviet period, the use of digital technologies in schools was almost absent, whereas by the early 2000s, computer classes began to appear in many educational institutions. According to available data, by the mid-2010s, more than 70% of

schools in Azerbaijan had access to computers and internet resources, which demonstrates a significant shift toward technological integration.

In addition, a comparative method is applied. This method makes it possible to compare different periods, approaches, and models of education. For instance, teacher-centered lessons dominated in the past, where students mainly listened and repeated information. In contrast, contemporary education increasingly incorporates interactive methods, group work, and digital platforms. Some reports indicate that over 60% of teachers in urban schools regularly use digital tools such as presentations, online resources, and interactive boards in their lessons. Such comparisons facilitate a clearer understanding of the scale and nature of educational transformation.

Another important method employed in this research is document analysis. Educational policies, curriculum documents, and academic publications related to the development of education in Azerbaijan are examined in detail. For example, state programs on the informatization of education have aimed to equip schools with modern technologies and improve digital literacy. As a result of these initiatives, the number of students possessing basic computer skills has increased significantly over the last two decades. This method provides a solid empirical and contextual basis for understanding policy-driven changes in the education system.

The study also draws on theoretical approaches that explain how learning takes place. The socio-cultural approach, based on the ideas of Lev Vygotsky, helps to explain the role of interaction and collaboration in the learning process, particularly in technology-rich environments. At the same time, the constructivist approach, developed by Jean Piaget, emphasizes active learning and the importance of learners constructing their own knowledge through experience and engagement. These perspectives are particularly relevant in understanding the pedagogical implications of technological integration.

Furthermore, the concept of educational change proposed by Michael Fullan is considered in order to better understand the dynamics of innovation in education. Fullan argues that innovation requires not only the introduction of new technologies but also changes in teaching practices, institutional culture, and teacher attitudes. This perspective helps to explain why the integration of technology is often a gradual and complex process rather than an immediate transformation.

In conclusion, the combination of qualitative analysis, statistical data, and theoretical frameworks provides a comprehensive understanding of how school technologies in Azerbaijan have evolved from traditional methods to modern innovative practices.

Discussion and Results. This study examines how school technologies in Azerbaijan have evolved from traditional forms to more innovative and modern approaches. The analysis indicates that this transformation did not occur abruptly; rather, it developed gradually under the influence of historical conditions, educational reforms, and technological progress. During the Soviet period, education was highly structured, and technologies were limited to basic tools such as textbooks, blackboards, and visual materials. The role of the teacher was dominant, while students primarily followed instructions and reproduced knowledge.

With the transition to independence, the situation began to change. Educational reforms created opportunities for the introduction of new ideas, including the integration of information and communication technologies. Schools gradually introduced computers, internet access, and digital resources. This shift provided new possibilities for teaching and learning, while also presenting certain challenges. For example, not all schools were equally equipped, and the level of digital competence among teachers varied. As a result, the implementation of technology was not always consistent across different educational contexts.

The findings demonstrate that modern school technologies are closely associated with student-centered approaches. Instead of focusing exclusively on memorization, contemporary teaching increasingly emphasizes critical thinking, creativity, and collaboration. Digital tools such as presentations, online platforms, and interactive boards contribute to making lessons more engaging and dynamic.

At the same time, these tools require teachers to adapt their pedagogical methods and continuously develop their professional skills.

Another important finding is that innovation in education is not limited to the use of technology itself. It also involves changes in teaching philosophy and classroom interaction. The ideas of Lev Vygotsky regarding social learning and John Dewey's emphasis on learning through experience are reflected in modern educational practices, where students actively participate in the learning process. This demonstrates that technological innovation is closely connected with pedagogical innovation.

However, several challenges remain. Differences between urban and rural schools, limited resources in certain regions, and the ongoing need for professional development continue to affect the effectiveness of innovation. In addition, rapid technological change requires continuous adaptation, which can be demanding for both teachers and educational institutions.

Conclusion. This study summarizes the development of school technologies in Azerbaijan from the second half of the twentieth century to the present. The analysis shows that this process has been gradual and influenced by both historical traditions and contemporary demands. During the Soviet period, education was characterized by a strict structure, standardized content, and limited use of technology. Teaching was predominantly teacher-centered, and students were expected to follow clearly defined instructions with limited interaction.

Following independence, Azerbaijan initiated a series of educational reforms that created new opportunities for the integration of innovative technologies and teaching methods. Schools gradually adopted computers, digital platforms, and interactive tools, which significantly transformed classroom practices. Consequently, the role of the teacher evolved toward facilitating and supporting student learning rather than solely transmitting information.

At the same time, this transformation has not been without challenges. Unequal access to technological resources, variations in digital literacy, and the need for continuous teacher training have influenced the effectiveness of implementation. Despite these difficulties, the overall direction of development demonstrates a clear movement toward modernization and innovation.

It is also important to emphasize that innovation in school technologies extends beyond the introduction of equipment or digital tools. It is closely linked to changes in educational thinking and pedagogical approaches. Student-centered learning, collaboration, and critical thinking have become increasingly significant in modern classrooms. These developments reflect global educational trends while also being adapted to local conditions, thereby shaping the future of education in Azerbaijan.

References:

1. Aghayeva, J. (2025). Authenticity in Language Pedagogy: Rethinking Text Selection for ESL Learners. *Baltic Journal of Legal and Social Sciences*, No. 4.
2. Vygotsky, L. (1978). *Mind in Society: The Development of Higher Psychological Processes*. Cambridge, MA : Harvard University Press.
3. Dewey, J. (1938). *Experience and Education*. New York : Macmillan.
4. Piaget, J. (1952). *The Origins of Intelligence in Children*. New York : International Universities Press.
5. Fullan, M. (2007). *The New Meaning of Educational Change*. New York : Teachers College Press.
6. Papert, S. (1980). *Mindstorms: Children, Computers, and Powerful Ideas*. New York : Basic Books.
7. Skinner, B. F. (1968). *The Technology of Teaching*. New York : Appleton-Century-Crofts.
8. Lytvynko, O., Hlukhovska, M., Absaliyeva, Y., Bessarab, A., & Chobaniuk, M. (2025). The Role of Authentic Texts in the Development of Critical Thinking in English Teaching. *Arab World English Journal*, 16(2), 459–472.
9. Mudra, O. V., & Koropatnitska, T. P. (2025). Criteria for Selecting Texts for Reading in a Foreign Language: Scientific Approaches and Modern Practices. *Pedagogical Sciences Journal*, Issue 109.
10. Mammadova, M. (2024). *Technology-Enhanced Language Learning*. Impress.