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Definition of Technologies: Interconnection between Information, Educational and Production Technologies

Rakhimov Oktyabr Dustkabilovich[1] & Salomova Marguba Mamatkulovna[2]
[1]Karshi State Technical University, Uzbekistan
[2]International Innovation University, Uzbekistan
sirojiddinmuradov0@gmail.com

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Abstract

This article examines the conceptual definitions of technology and clarifies related concepts, including technological cluster, technological park, and technology transfer. It further substantiates the distinction between bulk technology and nanotechnology and provides a substantive analysis of production, pedagogical, and information technologies. Drawing on theoretical analysis, the article reviews definitions of pedagogical technology proposed by foreign and local scholars and formulates an authorial definition of pedagogical technology. The findings establish fundamental interconnections among production, information, and pedagogical technologies, demonstrating that these domains are not isolated but mutually reinforcing within broader technological development. The article concludes that a clearer conceptual understanding of technology and its related categories is essential for explaining how different technological domains interact and contribute to educational, informational, and production processes. This study contributes to technology and education literature by systematizing key technological concepts and offering a theoretical basis for understanding the

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interrelationship between production, information, and pedagogical technologies.

Keywords: Technology; Technological Cluster; Technology Transfer; Pedagogical Technology; Information Technology

INTRODUCTION

The XXIst century, as an era of intellectual potential, thought, and spirituality, while opening new horizons for humanity, also brings forth acute problems we have not seen or encountered before. Educators today, in addition to providing young people with an education in the spirit of the times within this complex era, are also required to carry out educational work aimed at invoking goodness, justice, compassion, and tolerance in the youth, considering the future of humanity, our Motherland, and our people [1].

According to views established in the East regarding human intellect, the mind is of two types: natural and professional. Natural intellect is bestowed upon a person innately. Professional intellect, on the other hand, is acquired through reading, learning, and experience. This honorable and arduous task of shaping professional intellect is entrusted precisely to educators. In the chapter "The Time of Education" in Abdulla Avloni's book "Turkish Gulistan or Morality," there are the following sentences: "Now it has become clearly known that it is necessary to begin education from the day of birth, to strengthen our body, to enlighten our thoughts, to beautify our morals, and to sharpen our minds. The question arises: who provides education, and where is it provided? [2]. We can answer this question by saying: 'First – home education. This is the duty of the mother. Second – school and madrasah education, this is the duty of the father, teacher, professor, and the state.'" It is precisely this school and madrasah education that has been carried out by teachers-pedagogues both in the past and in the present.

The introduction of the modern education system in our country is yielding positive results today. Our task, as pedagogues, moving forward, should be to provide education and upbringing to our youth based on innovative educational technologies that meet the requirements in educational institutions equipped with modern technical facilities. For this, every pedagogue must work diligently on themselves, not lag behind the times, thoroughly master innovative teaching technologies, and implement them in their practice.

Currently, lessons conducted in the old, traditional style do not satisfy the needs of our youth; they are unwilling to listen to such lessons. This is because thinking and intellect are one thing, while acquiring knowledge in a specific subject is another. Thinking and intellect are the product of natural intelligence, whereas acquiring knowledge is the product of an educational institution and the pedagogue's activity. The thinking and intellect of our youth today are significantly higher and faster compared to the youth of 15-20 years ago. If a pedagogue does not think in step with the youth, if they are not quicker than the youth in adapting to modern innovations and demands, their activity in the field of education and upbringing will become ineffective. This is directly related to the issues of ensuring the interconnection of educational, information, and production technologies [3,4].

METHODS

In this research, methods such as bibliographic and semantic analysis, predictive, comparative and statistical analysis, as well as surveys, observations, open idea generation, and analysis of experimental test results were employed.

RESULTS AND DISCUSSION

What is Technology?

Technology is a complex of sequences of economically viable, designed processes aimed at achieving a specified goal and guaranteed outcome. The word "technology" is derived from the Latin "Thexnos" – meaning art, craft, field, and "Logos" – meaning science.

Technological Cluster – is an association of enterprises and organizations located within a single defined territory and interconnected through production links.

Technological Park (technopark, TP) – is a subject of innovation infrastructure, provided with highly qualified personnel and a sufficient information and experimental base, which creates conditions for the effective development of entrepreneurship in the scientific-technical sphere. A TP represents a territorial integration of science, education, and production, often in the form of an association of scientific organizations, design engineering bureaus, educational institutions, and manufacturing enterprises.

Technology Transfer – is the process of transitioning scientific ideas and research into the form of a product or commodity. It is considered a new type of activity manifested in forms such as "Innovation Management," "Commercialization of R&D," and "Implementation of Research into Practice" [This concept is foundational, though the specific citation is not listed in the provided text].

In 1958, at a conference of the American Physical Society, Professor R. Feynman (who was awarded the Nobel Prize in 1965) delivered his famous lecture. In his lecture, the scientist put forward the scientific conclusion that "The laws and principles of physics do not hinder manipulation of individual atoms to create various objects through them. Based on this, it can be said that humanity, in the near future, will step from the era of bulk technology into the era of nanotechnology" [5].

While in bulk technology, humanity fabricated objects by transferring entire aggregates of atoms, not individual ones, with nanotechnology, one can create any desired object by placing desired atoms in desired locations.

Nanotechnology began to enter our lives from the end of the 20th century, specifically from 1981-1985. Currently, nanotechnology has entered our lives as a science. In ancient divine books, it is stated that "Eve was created from the rib of Adam (peace be upon him)." At this point, the question arises: "How can a woman be created from a part of a man's body?" Modern secular science, namely nanotechnology, provides a positive answer to this question. The creation of a counterpart by making slight modifications to the program in the DNA extracted from any part of the Prophet Adam's body aligns precisely with the conclusions of modern genetic science.

In any case, all technologies serve to create necessary objects or food products to satisfy human needs, and these technologies are managed by humans. Therefore, it is required to know production technology and to improve it in parallel with the growth of needs. The development of science and secular knowledge plays an important role in the improvement of production technologies [6].

Production technology refers to a set of processes based on a specific sequence, enabling the economically efficient manufacture of quality products that meet modern requirements and secure a place in the global market. If the technical means employed in this sequence of processes—or, in other words, the technology—do not become morally obsolete, this technology remains unchanged for a certain period. This technology

represents the pre-planned design of production aimed at achieving a clear, predetermined goal and a guaranteed outcome.

Information technologies are a set of methods and means for collecting, storing, transmitting, and processing information.

The direct, correct, and effective implementation of production and information technologies into practice depends on the potential of the personnel. Currently, the role of digital technologies and artificial intelligence, based on information technologies, is increasing. Problems related to the use of artificial intelligence in education are emerging. Studying the positive and negative effects of digital technologies on the psychology of young people is becoming one of the pressing issues. However, alongside this, pedagogical technologies play a crucial role in training quality personnel. We can only prepare personnel capable of international competition based on pedagogical technologies that meet the demands of the time.

Pedagogical technology, on the other hand, is a set of processes for educating and upbringing a person, implemented based on scientific foundations, depending on human thought, i.e., the intellectual potential of both the educator and the learner. Pedagogical technology cannot be considered a permanently fixed process (even over a short period), that is, a pre-designed procedure. In short, pedagogical technology cannot be confined to a single mold or considered a specific, unchanging project. This is because, for each audience and each group, depending on the listeners' education, scientific potential, age, gender, and other indicators, a specific pedagogical approach and its technology are required—if necessary, even for each individual listener within a group. For example, a pedagogue is required to teach the same topic to school children using one technology, to university students using another, to engineering-technical staff in production using another, and to university pedagogues using yet another technology. Furthermore, even when teaching a predetermined group, the teaching technology that the pedagogue had pre-planned may change based on the audience's preparedness and the situations arising from questions and answers during the session. Only then can the pedagogue achieve the clearly intended result—that is, convey their knowledge to the listeners' minds and awaken active, developmental activity within them. In my opinion, the purpose of teaching is not to teach the listener something definite and pre-existing, but to teach them how to learn. Because the technical means, especially information and communication system equipment, that we

teach students today quickly become morally obsolete. Therefore, a graduate must be able to study independently, learn the secrets of working with new technical equipment, and develop practical skills for doing so [7, 8].

There are hundreds of definitions of pedagogical technology, including:

"Pedagogical technology is a project of the process of forming a student's personality that guarantees pedagogical success regardless of the teacher's skill" (V.P. Bespalko).

"Pedagogical technology is a system of ordered actions that lead to pre-planned results and must be implemented" (V.M. Monakhov).

"Pedagogical technology is the design of the educational process based on a technological approach to it, proceeding from predetermined goal indicators" (M.V. Klarin).

"Pedagogical technology expresses a defined goal that is reliably comprehended through learning outcomes reflected in the students' actions" (I.Ya. Lerner).

"Pedagogical technology is the process of a teacher (educator) influencing students (learners) using teaching (upbringing) tools under specific conditions, and as a product of this activity, the intensive formation of predetermined personality qualities in them" (N. Saydakhmedov, A. Ochilov).

"Pedagogical technology is a new approach to the educational process; it is an expression of socio-engineering consciousness in pedagogy. It is a social phenomenon associated with standardizing the pedagogical process based on technical capabilities and human thought, and developing its optimal project" (B.L. Farberman).

"Pedagogical technology is the introduction of a systematic way of thinking into pedagogy; in other words, it is bringing the pedagogical process into a specific system" (T. Sakomoto).

Pedagogical technology is a set of pedagogical-psychological methods and techniques aimed at solving issues of teaching, upbringing, and personal development of the student, implemented on the basis of a specific sequence.

It is an innovative project that develops and updates depending on innovations in the technical support of the educational process, student thought, socio-economic relations in society, state policy in the field of education, the information space of society

("Internet") and access to it, the spiritual world and material security level of educators and learners (author's definition) [2].

Pedagogical technology is the activity of exerting educational and upbringing influence on a person according to a predetermined goal. However, it is necessary to distinguish between pedagogical technology and teaching methodology.

Teaching methodology is aimed at implementing the regularities of teaching a specific academic subject and educational work.

At present, the development and improvement of pedagogical and production technologies occur directly on the basis of information technologies.

It should be noted that one of the main tasks in the education system is to develop the integration of science, education, and production. In solving this issue, interconnection, compatibility, and complementarity between information, pedagogical, and production technologies are required. Today, every pedagogue or production employee is required to thoroughly master the complex of information communication technologies and technical systems [9, 10, 11]. Alongside this, the pedagogue must be an active participant in production, and the production specialist, in turn, must fulfill the role of a pedagogue. Furthermore, the development of science depends on the activities of scientists in higher education institutions and research institutes, their cooperation with production, and the implementation of scientific achievements into production.

CONCLUSION

The application of innovative pedagogical technologies and digital technologies in educational institutions significantly impacts the quality of personnel training. The development of innovative pedagogical technologies is directly determined by the advancement of information technologies and the level of proficiency in using them among educators and learners. Consequently, the development of pedagogical technologies influences the quality of personnel training, and the quality of personnel, in turn, influences the improvement of production technologies. Therefore, pedagogical and production technologies must evolve in close interconnection with each other, based on the development of digital technologies, and the information space must be continuously enriched with educational and production data.

REFERENCES

1. Rakhimov, O. D. (2024). *Methodology of using innovative pedagogical technologies in higher education* [Monograph]. Ilm-Fan-Ma'naviyat Publishing House.
2. Rakhimov, O. D. (2015). *Education quality–life quality*. Karshi Branch of Tashkent University of Information Technologies.
3. Rakhimov, O. D., Murodov, M. O., & Ruziev, Kh. J. (2016). *Quality of education and innovative technologies*. Fan va Texnologiyalar Publishing House.
4. Rakhimov, O. D. (2016). Requirements and technology for creating electronic educational resources. *Modern Education (Uzbekistan)*, (2), 45–50. https://cyberleninka.ru/article/n/elektron-talim-resurslarini-yaratish-talablari-va-tehnologiyasi
5. Rakhimov, O. D., et al. (2013). *Modern educational technologies*. Fan va Tekhnologiya Publishing House.
6. Raximov, O. D. (2013). *Innovatsion pedagogik texnologiyalar: Loyihalar uslubi ta'lim sifatini oshiruvchi texnologiya sifatida*. TATU Qarshi filiali.
7. Rakhimov, O. D. (2021). Innovative technologies in teaching directors and specialists of industrial enterprises on labor protection. *O'zbekiston Respublikasi Favqulodda Vaziyatlar Vazirligi Akademiyasi Axborotnomasi*, 108.
8. Rakhimov, O. D., Khuzhakulov, A. Kh., Shomurodov, B. B., & Rakhimova, D. O. (2021). Unused opportunities: Distance education in Uzbekistan. *Scientific Journal*, (3[58]), 72–75. https://scientificmagazine.ru/images/PDF/2021/58/Nauchnyj-zhurnal-3-58-.pdf
9. Rakhimov, O. D., & Rakhimova, D. O. (2021). Educational quality in the era of globalization. *Problemy Nauki*, (1[60]), 36–39. https://scienceproblems.ru/educational-quality-in.html
10. Rakhimov, O., Ehsev, S., Latipov, S., & Rakhimov, J. (2022). Positive and negative aspects of digitalization of higher education in Uzbekistan. *AIP Conference Proceedings, 2432*(1), Article 030067. https://doi.org/10.1063/5.0089690
11. Rakhimov, O. D., Nazarov, B. F., & Sapaev, M. S. (2012). *Modern lectures in higher education*. TATU Karshi Branch.