

DOI: <https://doi.org/10.57125/FED/2022.10.11.16>

How to cite: Tsekhmister, Y. (2021). The problem of pedagogical innovations and trends in the development of the educational environment. *Futurity Education*, 1(2). 26–34.
<https://doi.org/10.57125/FED/2022.10.11.16>

The Problem of Pedagogical Innovations and Trends in the Development of the Educational Environment

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Received: October 22, 2021 | **Accepted:** December 1, 2021 | **Published:** December 25, 2021.

Abstract: Pedagogical innovations are an important component of the educational environment both in the period of its sustainable development and in times of change and transformation. Characteristic features of new ideas of educational and pedagogical space are their dynamism and continuity. If the educational system has its fundamental stages of development (approval, functioning, transformation), the practically oriented cluster of pedagogy is always focused on progress in the form of changes, improvements, and transformations. The purpose of scientific exploration is to structure and systematize pedagogical innovations in the main segments of the educational environment. The article aims to determine the differences between the declarative elements of innovative educational strategies and the practical implementation of pedagogical innovations demanded by time and reality. The methodological basis for scientific research is concentrated around general scientific, scientific-pedagogical, and philosophical-scientific segments. Prospective directions of pedagogical innovations research is to determine the role in the development of the educational environment and to develop mechanisms to overcome the problems associated with pedagogical innovations in the education system. So, the range of problematic issues on pedagogical innovations concerns the following moments: the mismatch between the needs of the educational environment and innovative manifestations; risks

caused by the aggressiveness of innovation and its negative impact on the fundamental educational principles; socio-cultural realities that do not allow the implementation of educational innovation in different dimensions (global, regional, professional).

Keywords: education transformation, education perspectives, educational strategies, pedagogical innovations, education development.

Introduction

The implementation of pedagogical innovations is a complex multilevel process that covers all segments of the education system. At the same time, a distinction should be made between potential transformations in education and the actual implementation of innovations in the educational process. Educational strategies are quite popular on a global educational scale as well as in regional, interstate, or national frameworks.

Research Problem

Usually, educational strategies are a manifestation of rather wishful thinking on the development of education. At the same time, realities dictate the requirements for transformations in the world, depending on specific socio-cultural processes and phenomena. Such transformations concern the real sector of the educational system and most fully set forth the content and form of pedagogical innovation.

Research Focus

A promising area of research of this type is the development of guidelines that determine the effectiveness of pedagogical innovations and prevent possible risks of transformation for education or socio-cultural space.

Research Aim and Research Questions

The purpose of the research article is to clearly structure the positive and negative aspects that are a manifestation or consequence of innovation activity in the educational system. The task of exploration is to identify the problems associated with the implementation of pedagogical innovations that are already recorded or potentially relevant to the educational environment.

Research Methodology

The most effective methodological arsenal for the study of pedagogical innovations in the education system is a combination of general scientific, scientific-pedagogical, and philosophical methods. With the help of systemic and comparative analysis, it is possible to identify the segments of the educational environment that require innovation or to understand the effectiveness of the changes that have already been implemented. The classification method allows structuring transformational changes in education (practically educational, methodological, organizational). Empirical methods of scientific and pedagogical sense (pedagogical experiment, pedagogical observation) form the data necessary to analyze the feasibility and effectiveness of pedagogical innovations. Research perspective-oriented methodology, with the help of modeling and forecasting, determines the priorities of further transformations in the scientific and pedagogical discourse and innovations in the practically educational system. One of the progressive scientific and pedagogical methods that objectively assess the effectiveness of innovation is risk modeling (Howard et al., 2018). This approach allows assessing

the risks associated with the departure of the traditional pedagogical model of learning and the use of innovation. The results obtained are used to adjust the intensity of pedagogical innovation.

Synergetic methodological precepts should not be ignored, which demonstrate a high level of effectiveness in all spheres of social activity. Education also requires using the principles of transdisciplinarity as one of the key methodological techniques in implementing pedagogical innovations in the traditional system of education. Education is quite conservative, so an interdisciplinary approach provides the proper adaptation of the educational system to innovative transformations. The self-organization model allows for full implementation of pedagogical innovations because under such conditions education does not depend on other factors and can plan transformations purely in its local environment, which greatly increases their effectiveness.

Literature review

Analysis of scientific and pedagogical discourse in the segment of innovation can be divided into two groups of studies:

- scientific research that highlights the principles, mechanisms, and target aspects of implemented pedagogical innovations;
- problem points arising among the participants of the educational space in the context of the practical application of pedagogical innovations.

The bulk of research on pedagogical innovation focuses on the processes of digitalization of the teaching and learning process (Sysoieva, 2021); adaptation to the digital environment in which pedagogical innovation is implemented (Pettersson, 2021); the latest technological-digital processes (Garzón et al., 2020).

Lee and Tan's (2018) research focuses on the future outcomes of pedagogical innovation and the factors that prevent appropriate and progressive pedagogical competencies from being fully established. Pedagogical innovations in the humanities are reflected in Sunley et al. (2019). General trends in the sociocultural dimension of the twenty-first century affecting the implementation of pedagogical innovation are indicated in the work (Susanto et al., 2020).

Research Results

An important element in the process of pedagogical innovation is its intensity (Halász, 2018). It is necessary to distinguish between the qualitative and quantitative intensity of pedagogical innovation application. This indicator immediately reveals the gap between the traditional format of the educational system and the attempts at innovative transformations. Based on the intensity of the application of pedagogical modernization, we talk about three models of the relationship between traditional and innovative policies in the pedagogical cluster of education (see Tab. 1).

Table 1

The ratio of traditional and innovative elements in the pedagogical educational cluster

Pedagogical innovation as an alternative to the traditional pedagogical model	Innovative pedagogical tools are applied in parallel with the traditional system without conflicting. The model of educational strategy is determined by the principle of “different pedagogical approaches - one educational goal”.
Pedagogical innovation as a replacement of traditional pedagogical elements in the education system	Pedagogical innovations fully or partially replace traditional pedagogical tools. Sociocultural and educational realities indicate the ineffectiveness of education and the non-competitiveness of knowledge and skills obtained through the classical educational process, as well as the inability to organize a complete educational process.
Pedagogical innovation in interaction and inner transformation with traditional pedagogical formats	The perspective model acting on synergetic principles of self-organization and interdisciplinarity. In the process of educational transformation, the traditional model agrees with the innovative model. In turn, innovation is fully integrated into the existing education system. Thus, traditional education is modernized, and innovative models become generally accepted in the educational environment, as well as in the social and worldview consciousness.

Source: author own development

The key purpose of pedagogical innovation is to simplify the format of the educational system and improve the logistics of the educational environment (Butler-Henderson & Crawford, 2020). If we analyze the educational strategies of developed countries, the key elements are openness, accessibility, mobility, and inclusiveness. The provision of these attitudes is quite difficult to organize within the traditional educational model. Logistical features of organizing an effective educational process imply mechanisms for the rapid and voluminous translation of educational content, organizational educational components.

“The introduction of educational practices that promote digital competencies is closely tied to several educational projects and the vision of the 21st-century education aspirant as a member of a networked society. Accordingly, the teacher must be a catalyst and manage the teaching/learning process. One example of pedagogical innovation is the functioning of the Microsoft Teams educational cluster, a mechanism through which the development of digital competencies and literacy, as well as the implementation of the process of the digital transition of the classroom in the modernization of the school system, occurs” (Costa et al., 2021).

Pedagogical innovation models often aim to integrate education. In particular, STEM education involves strengthening the influence of scientific, technological engineering, and mathematical clusters on the pedagogical process using appropriate methodologies. The goal of the STEM format is to create real-world experiences for education applicants (Gardner & Tillotson, 2019). The integration

component specifically in the pedagogical dimension refers to the combination of fundamental professional skills with soft-skills and digital-skills. Pedagogical innovations are focused on the transformation of teaching and learning and organizational capacity to strengthen the synergistic effect of the science and technology dimension.

One of the key tasks of education in today's pragmatic world is the training of highly qualified specialists in the relevant industries. Consequently, the synergy between education, science, economy, and production is actualized. "University-industry collaboration is increasingly perceived as a means of enhancing innovation. Educational institutions are encouraged to create partnerships and multidisciplinary projects based on open real-world problems. Projects should benefit student learning, not just organizations looking for innovation." (Hero & Lindfors, 2019).

Therefore, the coordination of the positions and needs of all spheres of social activity is the key to both civilizational development and educational development. Pedagogical innovations that focus solely on the solution of educational problems are not yet relevant.

One manifestation of pedagogical innovation is the communicative and linguistic factor. Communication is relevant not only in terms of its information and technological dimension but also in terms of content. The globalization of the modern world needs mechanisms to ensure communication between socio- cultural subjects. Education should promptly respond to such needs and form the necessary educational and pedagogical resources for communicative skills. One striking example of pedagogical innovation in a communicative-linguistic manifestation is the CLIL paradigm, which significantly increases soft-skills as it focuses on increasing the educational aspirant's capabilities in the information environment (Cañado, 2018). At the same time, globalization and internationalization of education carries many risks for the educational system and creates problematic moments in the teaching and learning cluster.

In particular, information flows need fast and high-quality processing and broadcasting as educational content. The use of international and global information and communication systems (English, programming, etc.). These elements are used as the main component of pedagogical innovations of informational and communicative nature. A new sociolinguistic landscape is now taking shape (Rose et al., 2021).

Despite the complete dominance of technology and the digital world, the human dimension of pedagogical innovation should not be ignored. There are now enough examples of the implementation of humanities-scientific innovations in the educational sphere. In particular, a pedagogical methodology built on the principles of creative design is being actively implemented (Sunley et al., 2019).

The latest technological developments cannot bypass the educational and pedagogical segment. Artificial intelligence (AI) and deep learning (DL) methods have become some of the most sought-after innovative elements in modern education (Guan et al., 2020). Moreover, the pedagogical system has developed effective and promising approaches to organize the educational process in virtual or augmented reality (Garzón et al., 2020).

However, there are difficulties in this issue concerning the availability of the latest technology for the vast majority of educational systems. Implementing pedagogical innovations that rely on high-tech elements is costly enough that not all communities can afford these innovations from a purely economic

standpoint. In addition, not all states or communities have the appropriate infrastructure to fully implement complex technological systems in the educational system. Consequently, one of the main problems in the implementation of pedagogical high-tech innovations is their limited accessibility for the average subject of the educational environment.

Contemporary sociocultural realities form a number of barriers in the educational space (Diningrat et al., 2020). The COVID-19 pandemic has become the crowning glory of the problematic manifestations in the current educational system. The constraints that led to the introduction of distance learning and the transfer of educational activities into an online format actualized the processes of digitalization of education. Of course, digital technologies have been gradually introduced into the educational environment over the past decades. However, these processes, although innovative, did not violate the fundamentality of the traditional format of education. Digitalization was a process of improvement but by no means a substitute for classical education.

A completely different role of digitalization is envisaged today. Pedagogical innovations in the modern system of education radically transform the educational field both in the content dimension and in the formats of the educational process. Of course, this provokes a number of problems, as there is a need to adapt to new educational systems.

Civilization is now in the era of the digital revolution 4.0, which primarily actualizes the concept of digital literacy (Susanto et al., 2020). Along with classical literacy and other knowledge and skills that the educational process imparts, the definition of “digital literacy” is just as important in the educational system. This is evidenced by the separation of digital-skills from the soft- skills cluster into a separate segment. If we forecast the further development of education, science, and technology, the entry of digital-skills into the hard-skills system seems to be a promising process.

The problem of preparing new educational standards and programs that will provide the necessary educational, methodological and practical guidance for educational aspirants to obtain the appropriate level of digital literacy is obvious. An important point in the implementation of such attempts will be theoretical and practical guidelines: theoretical and worldview perception and understanding of the new digital educational world (Pettersson, 2021); practically oriented elements of digital-skills acquisition and their adaptation to the requirements of modern pedagogical competencies (Sysoieva, 2021).

Discussion

If we compare the level of use of digital potential in education and other spheres of social activity, it becomes obvious that electronic learning tools are no longer innovative in the minds of participants in the educational process, because in the everyday practical dimension digitalization already occupies a significant place in human life. Therefore, the problem of pedagogical innovation does not arise unambiguously in the plane of ignorance of the stakeholders of the educational space in technological and digital paradigms. The problematic issue is the feasibility of introducing an innovative element as an alternative or complete replacement of the traditional component of education.

However, as the history of the development of the educational sphere shows, transformations, always being a challenge, also become a new opportunity (Morreale et al., 2021). For example, online learning has been a kind of challenge for all participants in the educational process. At the same time,

distance and digital learning has helped to realize the progressive principles of modern educational strategies: mobility, accessibility, and openness. If we take into account the complex conditions under which the transition to online learning was implemented, then we get a real revolution in the education system. The question immediately arises - has the educational and pedagogical component of education responded appropriately to these transformations? Whereas in the organizational, personal (teachers, students), and attitudinal dimensions there was virtually no choice, and it was necessary to reorient oneself to the new educational models under any circumstances, in the pedagogical and methodological aspects teachers faced a dilemma: to adapt the traditional teaching arsenal to new conditions or to form new teaching and methodological orientations. Analysis of educational systems in recent years shows that the balance between traditional and innovative pedagogical principles. That is, we state that the new conditions still retained quite a significant share of the traditional educational model, adapted to the new technological, digital, and information and communication realities. The reasons for the preservation of classical pedagogical elements are:

- full or partial return of the educational space to the usual forms of learning, which do not require such massive use of innovative high-tech tools;
- inability of many countries (infrastructurally and economically) to maintain a high level of intensity of implementation of innovative pedagogical elements.
- unpreparedness at the worldview level to reorient the educational system to the synergetic principles of self-organization and interdisciplinarity, which are highly effective, but require high indicators of both personal and collective readiness for transformation.

The active use of technology in the educational and pedagogical space has led to the formation of a kind of technological approach in the educational system (Gaffarov, 2019). The purpose of this approach is the systematization and classification of pedagogical innovations of technological nature. In a more in-depth analysis, the structuring of pedagogical methods and means in accordance with the level of development of the education system is carried out. For example, some elements of the technological world is already difficult to refer to innovative models, so they are transferred to the cluster of traditional elements of the pedagogical process. At the same time, advanced technologies are often tested and tested before mass integration into the educational process.

The purpose of pedagogical innovations is focused mainly on the educational target component (acquisition of professional skills). However, it should be understood that the implementation of pedagogical innovations requires the necessary conditions of socio-cultural realities. Consequently, there is a conflict between the content of education and its form in the socio-cultural space in which this sphere is actualized. To solve the inconsistency, it is necessary to distinguish the definitions: educational innovations and innovations in education (Mykhailyshyn et al., 2018). If educational innovations are understood as a highly specialized pedagogical manifestation, innovations in education define the role and purpose of education in public activity. All components of public activity affect pedagogical processes in one way or another, as the outcomes and goals of education correlate without alternative with public demands. Consequently, pedagogical innovations cannot be conservative and guided by the principle "education for education". A more acceptable option is the "education for society" model, according to which pedagogical innovations are integrated into scientific and technological, infrastructural, socio-economic, and humanitarian elements of society development.

One of the important methodological approaches in contemporary scientific and pedagogical discourse is the principle of learning program analytics (Heileman et al., 2018). In this way, efforts are consolidated to understand the stages and mechanisms of pedagogical innovations, their relevance, feasibility, and effectiveness. The analysis also provides a manifestation of the problematic moments that will arise in the process of transformation.

Conclusions and Implications

So, let us highlight the key educational problems associated with the implementation of pedagogical innovations:

- mismatch between the needs of the educational environment and innovative manifestations;
- risks caused by the aggressiveness of innovation and its negative impact on the fundamental educational principles;
- socio-cultural realities that do not allow the implementation of pedagogical innovations in different dimensions (global, regional, professional).

Systematization of pedagogical innovations will provide orientation to the participants of the educational space in two dimensions: in educational strategies, where pedagogical innovations are declared and their implementation is predicted, and pedagogical practices, in which transformations are implemented at the practical level, correlating with modern principles of digitalization, technologization, informatization, and humanization.

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