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ADAPTIVELY INNOVATIVE PEDAGOGICAL TECHNOLOGIES IN THE SYSTEM OF GENERAL EDUCATION

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Abstract

The article discusses modern trends in the development of education and substantiates the need to take into account their impact on the development of pedagogical technologies and their systems. A feature of the authors' approach is the definition and justification of various ways of updating pedagogical technologies by improving their microstructures: adaptive and adaptive-innovative. At the same time, special attention is paid to the adaptively innovative transformation of technological microstructures, which is distinguished by the elements of novelty, “local invention”, aimed at achieving high sustainable results with optimal costs of resource provision. In the process of analyzing theoretical sources and pedagogical experience, the authors identified the “driving forces” of adaptive-innovative evolutionary improvement of pedagogical technologies in the form of mechanisms and methods to achieve the planned results, determined the essential features of adaptive-innovative mechanisms of modification, transformational and combination types, taking into account their functional purpose and structural features of the implementation, on the basis of which criteria-based descriptions were developed that ensure the identification of adaptive-innovative pedagogical technologies and open up prospects for applied work. Adaptation-innovation mechanisms allow to trace the development path of pedagogical technology, identifying it as adaptive-innovative. The article substantiates the methodological feasibility of a new form of popularizing unique experience –TED-conference with international participation, which contributes to the disclosure of the adaptive and innovative potential of pedagogical technologies used in school practice.

Keywords: Adaptation-innovation, adaptive-innovative pedagogical technologies, adaptation-innovation mechanisms, competences, universal educational actions.

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1. Introduction

One of the ways to maintain the competitiveness of the school in the rapidly changing conditions of modern life and dynamically developing innovative education is to update the content and methodological support of the educational process and achieve, on this basis, a new quality of results - mastery of universal educational activities and competencies. Competency is formed and developed not only through the assimilation of the content of curricula, but also, to a large extent, thanks to the environment of the educational organization and applied pedagogical technologies.

The theory and practice of education are distinguished, on the one hand, by the variety of pedagogical technologies that are developed in accordance with the needs of the country and the requirements of the federal state educational standard of general education, and, on the other hand, by the absence of well-known mechanisms for adapting technological microstructures that are applied taking into account the concept of educational organization, student request and methodological potential of the teaching staff (Latchem & Khanolainen, 2017; Obraztsov, Uman, & Fedorova, 2018). Adaptations of this kind are usually associated with the introduction of elements of novelty, “local invention”, which is reflected in the choice of the appropriate term - “adaptation-innovation” (Kazarova, 2013; Kazarova, 2016). Accordingly, the term “adaptive-innovative” has been fixed for pedagogical technologies that differ in this kind of changes (Kazarova, 2013; Kazarova, 2016). This distinguishing feature, in fact, determines their theoretical and practical significance, relevance in school education (Dudin, Bezbakh, Frolova, & Galkina, 2018; Kerekes, 2018).

2. Problem Statement

The term “adaptive-innovative” with respect to pedagogical technologies first appeared in 1998. The need arose to define pedagogical technologies, which, ensuring the achievement of high sustainable results at the optimal cost of resource provision, included elements of novelty, “local invention”, authorship at conferences and meetings of student scientific associations in Yaroslav-the-Wise Novgorod State University. It would not be entirely correct to call them innovative, since the technologies, adapted from basic microstructures characteristic of the already known pedagogical technologies - project training, development of critical thinking, pedagogical workshop and others, were not distinguished by socio-historical uniqueness. Only various ways of optimizing activities in different, sometimes radically unlike conditions were innovative, for example, in urban and rural schools, innovative technical equipment of the educational process and insufficient technical support, advanced (based on the ideas of innovative teachers) and traditional methodological support of training programs. The methods of optimizing the activities of the subjects of educational process analyzed in this context, in fact, performing the adaptive function for known technological microstructures, could be considered as an innovative phenomenon, respectively, pedagogical technologies, including elements of local updates, could be defined as “adaptive-innovative”. The novelty of such technologies was relative both personally and temporarily (historically), since innovation, being born in specific conditions, progressively solving the tasks of a certain stage of the development of education, sometimes became the norm, generally accepted mass practice, or became obsolete. At the same time, the introduction of these innovations (“adaptations-innovations”) not only

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contributed to the expansion of the range of pedagogical technologies in various conditions of the modern educational process, resource, including time, limitations, but also determined the development of pedagogical technologies along various paths of evolutionary improvement, providing achievement of planned results (Rogach, Frolova, & Ryabova, 2019).

Awareness of the functional significance of adaptations-innovations in the context of developing education, the need for their active application determined the need to identify their essential characteristics, mechanisms and methods for implementing, generalizing, systematizing and popularizing unique experience.

3. Research Questions

3.1. Identify mechanisms and methods of adaptation-innovation.

3.2. Identify the classification parameters of adaptive-innovative pedagogical technologies in order to systematize them.

3.3. Develop and test new forms of popularization of adaptively innovative pedagogical technologies.

4. Purpose of the Study

The aim of the article is to determine adaptive-innovative mechanisms and methods for the evolutionary improvement of microstructures characteristic of pedagogical technologies, and to study the possibilities of popularizing unique experience. The article is of interest to scientists who are engaged in the analysis of innovative phenomena in pedagogy, the leaders of educational organizations and methodologists who track the development paths of pedagogical technologies taking into account the concept of educational organization, the request of students and the methodological potential of the teaching staff, and teachers interested in developing new methods.

5. Research Methods

The main research methods included: study of theoretical sources, analysis of pedagogical experience, analysis of activity products and conversation.

The study of theoretical sources accompanied the entire course of scientific research, during which the relevance of the problem was substantiated, supportive ideas for its solution were determined, a conceptual dictionary was compiled based on a comparison of different points of view, the establishment of a general, typical and special (Habil, 2017; Paulino & Lopes da Silva, 2016)

Considerable attention was paid to the analysis of innovative phenomena related to pedagogical technologies, their terminological justification, and classification characteristics in determining the names of adaptation-innovation mechanisms.

The methods characteristic of adaptation-innovation mechanisms were identified in the course of analysis and generalization of adaptive and innovative pedagogical experience of teachers of Municipal autonomous general education institution “Gymnasium No. 2”, Veliky Novgorod, from 1998 to 2006 and Municipal autonomous general education institution “Secondary school No. 13 with in-depth study of

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subjects",Veliky Novgorod, from 2007 to 2019 and the best adaptive and innovative methodological developments submitted to competitions at the regional, national and international levels from 2016 to 2019.

In the framework of conferences at the regional, national and international levels related to the presentation of adaptively innovative methodological "products" (I Regional Scientific and Practical Conference "Adaptively Innovative Pedagogical Technologies in the Implementation of a Competency-based Approach in Education" (Veliky Novgorod, 2016), I All-Russian Scientific and Practical Conference "The Use of Adaptively Innovative Pedagogical Technologies in the Organization of a Virtual Museum in the Conditions of School Practice" (Veliky Novgorod, 2017), II All-Russian scientific-practical conference "Adaptive-innovative approach in education: development and implementation of adaptive-innovative programs" (Veliky Novgorod, 2018), TED-conference with international participation "Mentoring practices 10:0" (Veliky Novgorod, 2019), TED-conferences with international participation "Mentoring Practices 10:10" (Veliky Novgorod, 2019), methodological developments with their adaptations and innovations were systematized, a nomenclature of objects and phenomena generalized by the concepts "modification" , "transformational" and "combination". Criteria-based descriptions have been developed to ensure the identification of adaptive-innovative pedagogical technologies based on the essential features of adaptations, innovations of the modification, transformation and combinational types.

A variety of pedagogical technologies, characterized by adaptations and innovations, necessitates the selection of appropriate organizational forms that provide the conditions for their presentation, methodological analysis, expert assessment and popularization of unique experience. Experts identified the most effective, from their point of view, organizational forms that meet specified conditions in the process of conversation with students representing adaptive-innovative pedagogical technologies at conferences and competitions.

6. Findings

The groups of "polydidactic" or "combined" technologies (Selevko, 1998), "radical" innovations, "combinatorial" and "modifying" innovative approaches (Panfilova, 2009), innovative phenomena based on a combination of traditional and new technologies (Moreva, 2008; Mukhina, 2013), the main types of innovations that are characteristic of foreign experience: innovations-modernizations, which are aimed at achieving guaranteed results in the framework of traditional reproductive orientation of educational process, and innovation-transformations that transform the traditional educational process in the direction of ensuring its research character, organizing search educational cognitive activity were analyzed when working with theoretical sources (Clarin, 1995). Hierarchical relationships between the concepts were identified, logically ordered terminological systems were constructed, the characteristics of the essential features reflected by the concepts of "combination" ("combined"), "modification" ("modifying", "modernization") and "transformational" ("transformation") were determined based on the analysis of innovative phenomena related to pedagogical technologies.

The main ways (directions) of updating the microstructures of pedagogical technologies were also identified in the analysis of theoretical sources:

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- adaptive path is a path that is characterized by the transformation of technological microstructures through adaptations;
- adaptive-innovative one-stage path is a path that is characterized by the transformation of technological microstructures through adaptations-innovations;
- adaptive-innovative two-stage path is a path that is characterized by the consistent transformation of technological microstructures through adaptations and adaptations-innovations (Kazarova, 2016).

Since the subject of our study is adaptive-innovative phenomena in pedagogy, including adaptation-innovations of technological microstructures, we needed to identify the “driving forces” of the evolutionary improvement of pedagogical technologies, characterize the appropriate mechanisms and methods, establish the logic of the relationships between concepts in a conceptual system, building terminological system of adaptations-innovations.

Three main adaptive-innovative mechanisms: modifying, transformational and combinational were selected as the "reference points" in the construction of terminological system of adaptations-innovations.

The modification mechanism of adaptation-innovation is associated with the improvement, rationalization of individual microstructures of pedagogical technology.

Modification adaptations-innovations are mainly associated with organizational and technical methodological techniques and are manifested primarily in the procedural part of pedagogical technology, including methods and tools for assessing students' achievements. Moreover, the features of adaptations-innovations of a modification type are often reflected in the names of technologies (for example, direct, reverse, shadow, individual, combined, etc. brainstorming).

As ways of implementing adaptations, innovations of a modification type, we can consider the following:

- use of a method, methodological technique, means in new conditions through changing the technical conditions for their implementation, expanding their functional characteristics or retro-introduction associated with the development of something long forgotten and abolished;
- updating the classification parameters of the element (s) of an individual microstructure of pedagogical technology;
- comprehensive presentation of individual elements of microstructures of pedagogical technology in the form of a technological map providing variability in the activities of subjects of the educational process;
- change in organizational form, educational environment (space), etc.

The transformational mechanism of adaptation-innovation is characterized by the transformation of individual microstructures of pedagogical technology through their element-by-element representation and the creation of a new (due to change) combination on this basis.

The main way to implement adaptations-innovations of a transformational type is the element-by-element representation of universal educational actions and competencies to be mastered, and the formation on their basis of generalized groups that reflect knowledge of concepts, facts, scientific issues, theories, rules and laws, methods and procedures, etc.

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For example, knowledge of the rules and patterns may be reflected by the following elements:

1. Knowledge of rules and patterns (in practice, a generalized system of over-subject indicators is translated into subject):

- recognition of the rule, patterns (correlation with the context of the studied material);
- formulation of rules, patterns;
- disclosure of the content of the rule, pattern (characteristic of the nature, conditions and boundaries of manifestation, application);
- characteristics of actions related to the application of the rule, patterns.
- self-analysis of the results of actions.

Generalized groups of indicators of universal educational actions and competencies are a guideline for the transformation of information - the content of educational texts and related control tasks.

The starting points for the transformation are also represented by the algorithmization of activities i.e. the disclosure of methods and techniques: determining the composition and sequence of training actions, exercises in their implementation in new situations. At the same time, additional opportunities for "disclosing methods and techniques" are provided through hypertexts - information transformation based on the establishment of the composition and sequence of training actions, for example, in the form of definitions of concepts, nomenclature of objects generalized by the concept, their classification, algorithms of operations for performing specific actions in the structure of skills (Macfadyen, Roche, & Doff, 2004). The essential features of transformational adaptations-innovations determine their main function, which consists in "streamlining" the content of educational material, which ensures its assimilation.

Thus, adaptation-innovations of a transformational type are mainly carried out on the basis of the content of pedagogical technology and, as a result, are reflected in the implementation of logical, organizational and technical techniques. At the same time, the essential features of transformational adaptations-innovations are taken into account when choosing methods and tools for assessing students' achievements.

The combination mechanism of adaptation-innovation is distinguished by the combination of individual microstructures of various pedagogical technologies and the creation of a new combination of known elements or a known combination with the inclusion of a new element on their basis.

The main ways of implementing adaptations-innovations of a combination type include:

- a combination of microstructural elements of various pedagogical technologies in the integration of the stages of joint activity of subjects of the educational process;
- inclusion of a new element or elements in the microstructure of pedagogical technology (in the form of a "methodological constructor"), characteristic of another pedagogical technology.

Adaptations-innovations of a combination type are associated with logical, organizational and technical techniques and are carried out on the basis of the substantive and procedural components of pedagogical technology. At the same time, the essence of combinational adaptations-innovations, as a rule, is reflected in its name (business game with elements of environmental and psychological training), organization principles, target orientations and, accordingly, methods and tools for assessing students' achievements. Therefore, a significant difference between adaptations and innovations of a combination

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type is their focus on optimizing the activities of subjects of the educational process in achieving updated target orientations of pedagogical technologies.

In view of the above adaptation-innovation mechanisms, the main groups of adaptive-innovative pedagogical technologies are distinguished: modification, transformational and combination.

The application of the above mechanisms in relation to technologies of methodological, strategic and tactical levels determines the allocation of the corresponding groups:

- groups of methodological adaptive-innovative pedagogical technologies (at the level of pedagogical theories, concepts, approaches), which act as integrated circuits for the implementation of technologies of a hierarchically subordinate level;
- groups of strategic adaptive-innovative pedagogical technologies (at the level of the totality of content, means, methods, organizational form of interaction of subjects of the educational process), focused on achieving specific educational goals;
- groups of tactical adaptive-innovative pedagogical technologies (at the method, reception level), which are a way to achieve the goal within the framework of a certain strategic technology.

One of the most effective forms of presentation of adaptive innovative pedagogical technologies is the TED conference with international participation. According to students and experts, the various scenarios of TED conferences provide conditions for the analysis and criteria-based assessment of adaptation-innovation, exchange of experience between students and tutors, between Russian teachers and educators working abroad. Therefore, in essence, TED conferences with international participation are organizational forms characterized by adaptations and innovations, which ensures their attractiveness for popularizing unique experience and achieving planned results.

7. Conclusion

The aim of the study was to determine adaptive-innovative mechanisms and methods for the evolutionary improvement of microstructures characteristic of pedagogical technologies. The study of theoretical sources and the analysis of pedagogical experience made it possible to identify adaptive-innovative mechanisms of the modification, transformational and combination types. Adaptation-innovation methods were identified that are associated with the logical, organizational and technical techniques inherent in the substantive and procedural components of pedagogical technology through the analysis of methodological developments and generalization of pedagogical experience.

The terminological system of adaptation-innovation mechanisms was the basis for the classification of pedagogical technologies that differ in the elements of “local invention”, and the criteria descriptions developed on the basis of the essential features of adaptation-innovations were a tool for their identification.

In a conversation with people interested in the popularization of adaptive innovative pedagogical technologies, the main criteria for choosing organizational forms that ensure the translation of unique experience are identified:

- conditions for analysis and criteria-based assessment of achievements;
- opportunities for the exchange of experience;
- features of the structural organization, substantive aspects, characterized by adaptations-innovations.

These criteria correspond to TED-conferences with international participation, the testing of which allowed revealing the adaptive and innovative potential of pedagogical technologies used in school practice.

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