

**PEHPP 2019****Pedagogical Education: History, Present Time, Perspectives****ADAPTIVELY INNOVATIVE METHODS FOR ASSESSING THE  
ACHIEVEMENTS OF SECONDARY SCHOOL STUDENTS**

Yu. V. Daneykin (a), O. A. Kazarova (b)\*, N. V. Daneikina (c)

\*Corresponding author

(a) Yaroslav-the-Wise Novgorod State University, Velikiy Novgorod, Russia, Yury.Daneykin@novsu.ru

(b) Yaroslav-the-Wise Novgorod State University, Velikiy Novgorod, Russia, olganov2010@yandex.ru

(c) Yaroslav-the-Wise Novgorod State University, Velikiy Novgorod, Russia, Natalya.Daneykina@novsu.ru

*Abstract*

The article discusses the possibility of updating the school control and assessment system, taking into account the guidelines of the federal state educational standards of new generation general education. The uniqueness of the paths for updating the school control and evaluation system chosen by the authors is determined by the mechanisms that ensure its dynamic nature. Methods and tools for assessing students' achievements in these conditions cannot be developed by theory without taking into account continuously changing practice, and at the same time they cannot be "transplanted" into practice in an unadapted form. The advantage of adaptive-innovative assessment methods and tools is that they provide an interactive mode that allows controlling and adjusting the educational process, and, as a result, creating conditions for the intensification and individualization of schoolchildren's learning. The "Interactive platform" model is of practical importance, the principles of which are considered in the article: adequacy, isomorphism, generalization, autonomy, structurality. "Interactive platform" is, on the one hand, an electronic database - a bank of adaptive-innovative assessment methods and tools, and, on the other hand, an electronic (constantly updated) training manual used to master adaptive-innovative mechanisms and design methods. The methodological support of the "Interactive platform" creates the conditions for individual, group and collective online design of adaptively innovative methods and assessment tools in the interaction of subjects of the educational process in a synchronous exchange of information in real time.

2357-1330 © 2020 Published by European Publisher.

**Keywords:** Adaptation-innovation, adaptive-innovative methods and tools of assessment, adaptation-innovation mechanisms, control and evaluation independence.



## 1. Introduction

In the context of implementation of the federal state educational standards of a new generation of general education, considerable attention is paid to the control and evaluation independence of students – a complex, multifaceted process that requires psychological and pedagogical support and a comprehensive assessment of the factors ensuring its development.

Analysis of theoretical sources (Asmolov, 2010; Vorontsov, 2002; Vorovschikov & Novozhilova, 2007; Zuckerman & Polivanova, 2003) allows creating some kind of reference idea about the system of methods and tools for assessing, which corresponds to modern psychological and pedagogical requirements for the organization of educational process according to several criteria:

- adequacy and complexity of the mechanisms that ensure the diagnosis of cognitive, operational, orientational (value-motivational) aspects of students' activities and performing motivational and developmental functions;
- dynamism determined by the specific conditions of educational process;
- "vertical" (school – university) and "horizontal" (between educational institutions of the same rank) continuity.

Adaptively innovative methods and assessment tools, characterized by the flexibility of microstructures (substantive and procedural components), which is provided through a local update of their inherent elements, correspond to the above criteria (Semenova & Kazarova, 2018).

Adaptively innovative assessment methods and tools have significant developmental, educational, and resource-saving potential, which actualizes the need for their theoretical justification, development of methodological and psychological-pedagogical support for their use in educational practice (Jacobson, Levin, & Kapur, 2019).

Improvement of the school control and evaluation system can be carried out by creating an “Interactive platform” - an electronic database of adaptive-innovative methods and tools for assessing students' achievements with online design capabilities in the interaction of subjects of the educational process.

## 2. Problem Statement

Changes in approaches to the control and assessment system, orientation of the school toward self-control and self-assessment of students, verification of their individual, creative activity, identification of the level of formation of universal educational actions (UEA) and key competencies identified the need to update methods and tools for assessing students' achievements (Corcoran, Cheung, Kim, & Xie, 2018; Klassen & Kim, 2019).

A wide range of opportunities for updating the school control and evaluation system is provided by adaptive innovative pedagogical technologies characterized by:

- compliance with the social order presented to education system;
- dependence on the specifics of educational process;
- preservation of methodological requirements for educational technology;
- achievement of high sustainable results with optimal costs of resource support ;
- presence of novelty elements that have the prospect of development in technologies of a hierarchically subordinate level and/or in methods and tools for assessing students' activities (Kazarova, 2014).

The system of adaptive-innovative assessment methods and tools provides an interactive mode that allows controlling and adjusting educational process, and, as a result, creating the conditions for intensification and individualization of secondary school students learning. At the same time, being stable over a certain range of time, the system of adaptive-innovative methods and assessment tools is at the same time dynamic and open to changes due to personal needs, social needs and educational system's ability to satisfy them. The dynamism of the system of adaptive-innovative methods and assessment tools is ensured through specially designed (adaptive-innovative) mechanisms.

### **3. Research Questions**

- 3.1. Identify mechanisms for updating methods and tools for assessing secondary school students' achievement.
- 3.2. Develop a classification system for adaptively innovative methods and assessment tools.
- 3.3. Create opportunities for online design of the school control and assessment system in the interaction of subjects of the educational process.

### **4. Purpose of the Study**

The article presents a system for updating methods and tools for assessing the achievements of schoolchildren. The article is of interest to the leaders of educational organizations at various levels, methodologists, teachers and students.

### **5. Research Methods**

The main research methods are the following: the study of theoretical sources, the analysis of pedagogical experience, the analysis of the products of activity, conversation and theoretical modeling.

We studied theoretical sources for improving the control and assessment system, including non-mark-based training (Asmolov, 2010; Panfilova, 2009; Vorontsov, 2002; Vorovschikov & Novozhilova, 2007; Zuckerman & Polivanova, 2003) and scientific works on the development and application of adaptively innovative pedagogical technologies in the context of school practice in order to determine the mechanisms for updating the methods and tools for assessing the achievements of secondary school students (Kazarova, 2014).

The analysis of pedagogical experience, activity products in the form of control and assessment materials revealed the relationships between the functional features of adaptive-innovative mechanisms and

the improvement of the school control and assessment system (White, Hockley, Van der Horst Jansen, & Laughner, 2008; Zuykova, Bushma, Lipovka, & Cherkasova, 2018).

Analysis of the products of the activity – the best adaptive-innovative methodological developments submitted to competitions at the regional, national and international levels in Veliky Novgorod in 2016-2019 – I Regional Competition of adaptive-innovative methodological developments, II Regional Competition of adaptive-innovative methodological developments, I All-Russian Competition of adaptive-innovative methodological developments, II All-Russian competition of adaptive-innovative methodological developments, I International Competition of adaptive-innovative methodological developments “Adaptively Innovative Educational Programs”, II International Competition of adaptive-innovative methodological developments “Adaptive-Innovative Pedagogical Technologies”, III International Competition of adaptively innovative methodological developments "Adaptively Innovative Methods and Tools for Assessing Students' Achievements", allowed identifying adaptively innovative methods and tools for assessing the achievements of secondary school students that meet specified criteria (a standardized method of verification, a wide coverage of the content of the control, a practice-oriented orientation of the control, openness and transparency of the assessment system).

All adaptive-innovative methods and tools for assessing the achievements of secondary school students were analyzed by experts from among scientists involved in the development of innovative phenomena in pedagogy (O. A. Kazarova, E. A. Pchelina, M. P. Endzin) and brought into the system with various reasons for their classification.

At TED conferences with international participation organized in Veliky Novgorod “Mentoring Practices 10:0”-2018 and “Mentoring Practices 10:0”-2019 adaptive-innovative assessment methods and tools that perform not only diagnostic, but also motivational, developing functions, were analyzed by experts: heads of educational systems at different levels, scientists and teachers.

The organizers of TED conferences decided on the need to popularize innovative experience by creating an electronic database of adaptively innovative methods and assessment tools.

The basic principles of creating an electronic database were determined during the conversation with the leaders of educational systems at various levels, teachers and students, which formed the basis of the Interactive Platform model of adaptive-innovative methods and tools for assessing secondary school students' achievements.

## **6. Findings**

Carrying out the selection of innovative phenomena related to the improvement of the control and evaluation system, and analyzing adaptive innovative pedagogical technologies with their own methods and tools for assessment, we focused on the following criteria:

- standardized verification method;
- wide scope of verification content;
- practice-oriented focus of verification;
- openness and transparency of the assessment system.

The main mechanisms for updating assessment methods and tools were identified in the process of analyzing theoretical sources, which received the general name “adaptive-innovative” (in accordance with the pedagogical technologies from which they were borrowed). In the classification of adaptive-innovative assessment methods and tools, approaches were used that are applied to systematize adaptive-innovative pedagogical technologies with their characteristic mechanisms: modification, transformational and combination.

The modification mechanism is associated with a change in the classification parameters and improvement, rationalization, application of the methods and tools for assessing UEA and competencies in the new conditions.

Transformational - characterized by element-by-element representation of UEA and competencies.

The combination mechanism is characterized by a combination of assessment methods and tools inherent in various pedagogical technologies.

The analysis of pedagogical experience, products of activity in the form of control and evaluation materials has revealed the relationship between the functional features of adaptive-innovative mechanisms and the improvement of the school control and evaluation system.

The standardized method of verification is provided, first of all, by using the transformational mechanism of adaptation-innovation through the element-by-element representation of the UEA and competencies to be mastered, and the formation of generalized groups on their basis that reflect knowledge of concepts, facts, scientific problems, theories, rules and laws, methods and procedures, etc.

For example:

1. Knowledge of concepts:

1.1. recognition and definition of concepts (comparison of a term and definitions, construction of definitions and concepts);

1.2. disclosure of the scope of concepts (characterization of the nomenclature of objects and phenomena generalized by the concept, and their classification);

1.3. disclosure of the content of the concept (characteristic of the essential features of objects or phenomena reflected by the concept);

1.4. the establishment of the logic of the relationships between concepts in a conceptual system (allocation of hierarchical and associative relationships between concepts, construction of logically ordered terminological systems);

1.5. characterization of actions arising from the content of the concept (description of possible practical and intellectual decisions made on the basis of the content of the concept).

At the same time, the openness and transparency of the assessment system is ensured with the help of a specially designed “express form” – a table, the analysis of which allows us to trace the dynamics of mastering the UEA and competencies of each student (Table 01).

**Table 01.** Application of control methods taking into account the dynamics of the development of concepts

Method	Ciphers of UEA elements, competencies	Full development of the UEA element, competence	Partial development of the UEA element, competence	Lack of indicators of the development of UEA element, competence
Test	1.1. 1.2. 1.3. 1.4. 1.5.	1.1. 1.2. 1.3.	1.4.	1.5.
Writtentask	1.4. 1.5.	1.4.	1.5.	
Oral task	1.5.	1.5.		

A wide coverage of the content of the control and at the same time a practice-oriented orientation of the control is ensured by the system of training situations (TS), which is a special unit of the educational process in which the student independently or on the basis of consultations discovers the subject of his action, transforms it as a result of identification, generalization, abstraction and application of regular relationships and dependencies through the inclusion in the process of partially search, research, creative activity of means of indirect management, as well as TS classifications.

The reasons for the development of classifications of TS can be external factors - the time boundaries of the situations in question (TS-retro, TS-perspective), software requirements (TS, related to the orientation of students in the field of moral and ethical relations; TS, determining the planning and organization of activity, its self-control and self-assessment; TS, built on the basis of cognitive research activities; TS, aimed at the implementation of interpersonal communication and cooperation) and internal - the social situation of the development of educators (training and games, educational and informative, educational and communication, educational and professional situations), levels of cognitive activity (TS, defining a factual, evidence-based operational, conceptual and creative cognitive activity levels).

In some cases, binary nomenclature is used when the name of the TS consists of two paired terms. The convenience of the binary nomenclature is that, while listing the basic techniques for creating TS, it also indicates their constituent elements, for example, TS-retro, determining the conceptual level of cognitive activity or TS-perspective, determining the creative level of cognitive activity.

The development of TS of various types, based on the transformational, modification and combination mechanisms of adaptation-innovation, provides variability in the diagnosis of personal, regulatory, cognitive and communicative universal actions of students taking into account the specifics of mastering various school disciplines. At the same time, the species diversity of TS provided by adaptive-innovative mechanisms makes it possible to get away from the “sterility” of the system of scientific concepts and methods of activity that make up the content of curricula to the paradigm of including the content of training in the context of solving life problems, presented in the form of a cluster of TS.

The advantages of adaptive-innovative methods and tools of assessment are manifested in:

- the conscious position of the subjects of the educational process in their choice, which corresponds to their functional purpose, and the achievement on this basis of qualitatively new results;
- the adequacy of mechanisms and methods of adaptation-innovation, which allow considering the content of training in the context of practice-oriented situations;
- a variety of grounds for classification, including the use of binary nomenclature, when the name of a method or tool consists of two paired terms;
- systematic and comprehensive application, providing preparation for the exam and presentation of individual projects.

We developed a model of the “Interactive platform” in order to disseminate innovative experience in improving the school control and evaluation system through adaptive innovative mechanisms.

The main advantage of the “Interactive platform” is the opportunity for interaction between the subjects of the educational process, teachers-mentors and students – future teachers in the framework of online design of adaptive and innovative assessment methods and tools, including simulators in the form of PowerPoint-presentations aimed at the formation of UEA (“Learning to plan”, “ Learning to observe”, “Learning to experiment”, “Learning to interact in a group”, simulators-lite with hypertexts that ensure the effectiveness of the tasks, and simulators using modern means of presenting achievements – SMS-portfolio and MMS-portfolio), electronic games-portfolios and corresponding electronic applications that allow tracking the individual development trajectory of students.

## 7. Conclusion

The aim of the study was to identify the possibilities of updating the school control and assessment system through adaptive-innovative mechanisms.

An analysis of theoretical sources was carried out, which allowed determining the mechanisms for updating methods and tools for assessing the achievements of students. Based on the revealed mechanisms of modification, transformation, and combination types, a classification system for adaptive-innovative methods and assessment tools, a binary nomenclature that indicates their constituent elements, and methodological recommendations for teachers and students on mastering adaptive-innovative mechanisms and design methods were developed. At the same time, special attention was paid to the practice-oriented component of the organization of monitoring the achievements of students through a system of learning situations (TS), which are developed taking into account external factors (program requirements, time boundaries of the situations considered) and internal ones - the social situation of the development of students (educational-game, educational cognitive, educational, communicative, educational and professional situations), levels of cognitive activity (TS, defining factual, operational evidence, concepts and creative cognitive activity levels). The developed terminological system and classifications were the methodological basis for creating an electronic database of adaptively innovative methods and tools for assessment and the model of the “Interactive platform”, which ensures their design and application in school practice.

During the conversation with the leaders of educational systems at various levels, teachers and students, the basic principles of the “Interactive platform” were determined, the implementation of which helps to improve the school control and assessment system:

- principle of adequacy –conceptual understanding of the essence of adaptations-innovations and the trajectories of their development;
- principle of isomorphism – a methodically sound definition of adaptive-innovative mechanisms;
- principle of generalization – the integrated use of adaptive-innovative mechanisms in the organization of monitoring and evaluation of students' achievements;
- the principle of autonomy – the availability of online design of assessment methods and tools (for teachers and students);
- structural principle – a variety of models of interaction between representatives of the pedagogical community, students and opportunities for the exchange of experience.

## Acknowledgments

The authors are grateful to Irina Vladimirovna Semenova, Head of the regional innovation platform, Headmaster of the secondary school No.13 with in-depth study of subjects (Veliky Novgorod) for assistance in the research and Olga Kalpinskaya, Deputy Vice-Rector for Academic Affairs of Yaroslav-the-Wise Novgorod State University for supporting creative initiatives related to the development of adaptively innovative pedagogical technologies.

## References

- Asmolov, A. G. (Ed.) (2010). *Formation of universal educational actions in a primary school: from action to thought. The system of tasks: Manual for the teacher*. Moscow: Prosveshchenije. [in Russ].
- Corcoran, R. P., Cheung, A. C. K., Kim, E., & Xie, Ch. (2018). Effective universal school-based social and emotional learning programs for improving academic achievement: A systematic review and meta-analysis of 50 years of research. *Educational Research Review*, 25, 56-72. <https://doi.org/10.1016/j.edurev.2017.12.001>
- Jacobson, M. J., Levin, J. A., & Kapur, M. (2019). Education as a Complex System: Conceptual and Methodological Implications. *Educational Researcher*, 48(2), 112-119. <https://doi.org/10.3102/0013189X19826958>
- Kazarova, O. A. (2014). *System of adaptive-innovative pedagogical technologies in high school and secondary school*. Velikiy Novgorod: NovSU. [in Russ].
- Klassen, R. M., & Kim, L. E. (2019). Selecting teachers and prospective teachers: A meta-analysis. *Educational Research Review*, 26, 32-51. <https://doi.org/10.1016/j.edurev.2018.12.003>
- Panfilova, A. P. (2009). *Innovative pedagogical technologies: Active learning: Textbook for students of higher education institutions*. Moscow: Publishing Center “Academy”. [in Russ].
- Semenova, I. V., & Kazarova, O. A. (2018). Control, monitoring and assessment of the quality of education in the “School of balance of soul and verb”. *Management of the quality of education: theory and practice of effective administration*, 5, 24-33. [in Russ].
- Vorontsov, A. B. (2002). *Pedagogical technology for monitoring and evaluating educational activities (system of D.B. Elkonin - V.V. Davydov)*. Moscow: Publisher Rasskazov A. I. [in Russ].
- Vorovschikov, S. G., & Novozhilova, M. M. (2007). *The school should teach to think, design, and research: The managerial aspect*. Moscow: 5 for knowledge. [in Russ].

- White, R., Hockley, A., van der Horst Jansen, J., & Laughner, M. (2008). *From teacher to manager: managing language teaching organizations*. Cambridge: Cambridge University Press.
- Zuckerman, G. A., & Polivanova, K. N. (2003). *Introduction to school life. The program of adaptation of children to school* (2nd ed.). Moscow: Genesis. [in Russ].
- Zuykova, E. G., Bushma, T. V., Lipovka, A. Y., & Cherkasova, A. V. (2018). The usage of modular rating technology in the educational process of physical culture. *The European Proceedings of Social & Behavioural Sciences*, 51, 127-133. <https://doi.org/10.15405/epsbs.2018.12.02.14>