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Research Article

# PEDAGOGY IS A METHOD OF IMPROVING THE EFFECTIVENESS OF THE EDUCATIONAL PROCESS IN HIGHER EDUCATIONAL INSTITUTIONS BASED ON INDIVIDUAL EDUCATIONAL TECHNOLOGIES

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## ABSTRACT

In the article, the most important parts of the development of the educational process based on individual educational technologies , the cycle of organizing the educational process and their research were conducted. On the example of the study of the computer support course, the author of the article identified the forms and tools used for the implementation of individual educational technologies for teaching.

## KEYWORDS

Individual educational technologies, individual approach, differentiated education, homogeneous group, ID - instructional design, Blended Mobile Learning , SAMR, Kirkpatrick model.

## INTRODUCTION

The main part. Researches in the field of organization of the educational process on the basis of individual educational technologies in pedagogic higher educational institutions are necessary for the formation of the educational system and the education of the next generation. As a result of such research, methods and approaches are identified that can make education more effective and adapt to the needs of students . The main results of the research conducted on the organization of the educational process in higher educational institutions of teacher training based on the existing educational technology include the following aspects:

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- the presence of a clearly selected and diagnostically structured goal and the means chosen to achieve this goal;
- methods of its implementation based on diagnostic methods;
- defining the tasks and stages of acquiring professional competencies;
- providing information using the latest tools and methods of information acquisition and processing;
- introducing modeling simulation programs that help embed students in their future professional context [1] .

These processes represent the most important parts of the development of the educational process based on individual educational technologies. This technology helps to determine the individual needs and developmental stages of the student.

The process of organizing the educational process is an important aspect in the field of education, which ensures the effective learning and development of students, and we can give them in the form of the following cycle


**Figure 1. Cycle of educational process organization**

Stage 1. It consists in determining the intended goal and the sum of the methods and means of its implementation.

Stage 2. It is a generally recognized method of assessing the level of knowledge and skills of students, a process that allows checking the level of knowledge in a certain direction.

Stage 3. The process of practical implementation of the educational program developed at the stage of implementation of the educational project. During the implementation of the educational project, the performance of the tasks and the achievement of the goals are monitored.

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Step 4. It consists of conducting current, intermediate and final controls on the progress of the implementation of the set goal, that is, providing regular feedback and processing information.

In the 1st stage of organizing the educational process in pedagogical higher education institutions on the basis of individual educational technologies , we plan educational activities, that is, according to modern technological approaches to the educational process, educational content is taught. is the main part of lim technology. The design of educational content can be considered at the level of the curriculum and syllabus. The content of the academic subject as a subject of alternating activities is created based on a number of requirements: it is necessary to form textual information, take into account the laws of knowledge acquisition, include the scientific foundations of the subject, and reflect the professional activity of the future specialist. At this stage, we planned to develop the curriculum and syllabus of the subject, including learning outcomes, subject content, teaching and learning methods, and student assessment, and developed course materials.

The main principle used in the design of the environment of individual educational technologies is the pedagogical design (ID-instructional design). With the complexity of the pedagogical process, especially as a result of the use of technology, pedagogical design is becoming more and more important.

"Pedagogical design" system of procedures is developed to ensure pedagogical effectiveness of educational materials, including using new information technologies. A. Yu. Uvarov, one of the researchers of educational design, emphasized this concept as "design, development, evaluation and use of effective educational materials in the process of systematic use of knowledge" [2].

Instructional design (ID - instructional design) is the process of analyzing learning goals and needs, systematically developing learning activities, materials, and assessment strategies, and ensuring that students achieve the specified learning outcomes. The Association for Educational Communications and Technologies (AECT) defines the concept of "Pedagogical Design" as follows: "Pedagogical design is the theory and practice of designing, developing, using, managing, evaluating processes and resources for education"[3 ]. According to George Siemens, "Pedagogical design is the integration of technology and education, and often the greatest role of the educator is to 'bridge' between these two concepts"[4].

The use of pedagogical design in the educational process helps to involve students in the learning process through the principles of educational design. will give. Pedagogical design as a process can be defined as a planned and systematic process that goes through the following five stages in designing:

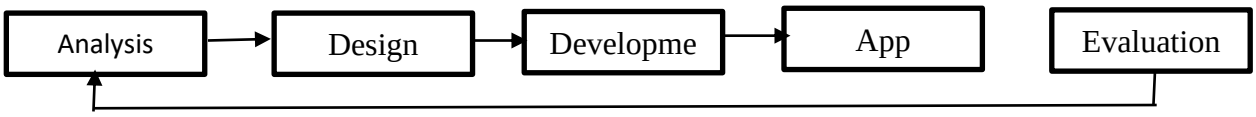


**Figure 2. Stages of designing pedagogical design**

In the 2nd stage, which is called knowledge verification based on individual education technology, the process of analyzing the acquired knowledge and skills of students and checking the level of knowledge on each subject was determined in the mobile education technology.

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So, at this stage, with the help of Individual Study (a mobile educational application for improving the educational process based on individual educational technologies), students are assigned individual educational trajectories with the help of an entrance test that analyzes the knowledge based on the curriculum of the subject "Computer support". structured test questions are answered. Based on the results of the entrance test, we divided the students into passive, standard-style and research student categories according to the research of NPGuzik, the author of the construction technology of the educational system. It considers the differentiation of teaching in the classroom according to the level of "composite technology of the teaching system" and the development of periodicity in the lessons.

In this case, the teacher organizes differentiation work according to the results of the control tasks of the students. This work is carried out by providing new material, strengthening and repeating it, controlling knowledge, skills and abilities.

In order to ensure the implementation of the order No. 01-20 of the Rector of Chirchik State Pedagogical University dated February 2, 2023 "On the implementation of technologies of individual approach to the university education process", from the academic year 2022-2023 all students to create a positive emotional attitude towards their work, to inform students not only about the subject but also about the organization of educational activities at the beginning of the lesson , from the technologies that allow students to choose the type and form of educational material (verbal, graphic, conditional-figurative) organization of the educational process on the basis of a new approach, such as using, using problematic creative tasks, encouraging students to choose and independently use different ways of completing tasks, was emphasized.

At Chirchik State Pedagogical University, the "Students' Academy" was established under each department, and the road map of the "Students' Academy", i.e., the educational trajectory, was developed. As a result of diagnosis, the competence, that is, the abilities of the student is determined in the laboratories of diagnosis of the person operating under the existing departments . Based on the research of NPGuzik, the author of the construction technology of the teaching system, according to the competence of the student, students are divided into 3 differential groups:

1. Active learner - "Research student";

2. Intermediate learner - "Standard style student";

3. Low learner - "Inactive student".

The 3rd stage of organization of the educational process in pedagogical higher education institutions based on individual education technology is the implementation of the educational project. Implementation of an educational project is a key part of creating and developing educational programs or initiatives . At this stage, individual educational forms, educational methods and educational tools used in the organization of educational activities were determined. In our scientific research work, we organize lecture classes through the "Differential Education" model of "Blended Mobile Learning" technologies and individual education, which integrates the activities of subjects of the educational process .

Blended Mobile Learning - Blended mobile learning technology aims to create a flexible and integrated learning environment that combines the benefits of online, traditional and mobile learning to provide a more effective and convenient learning experience. provides [5].

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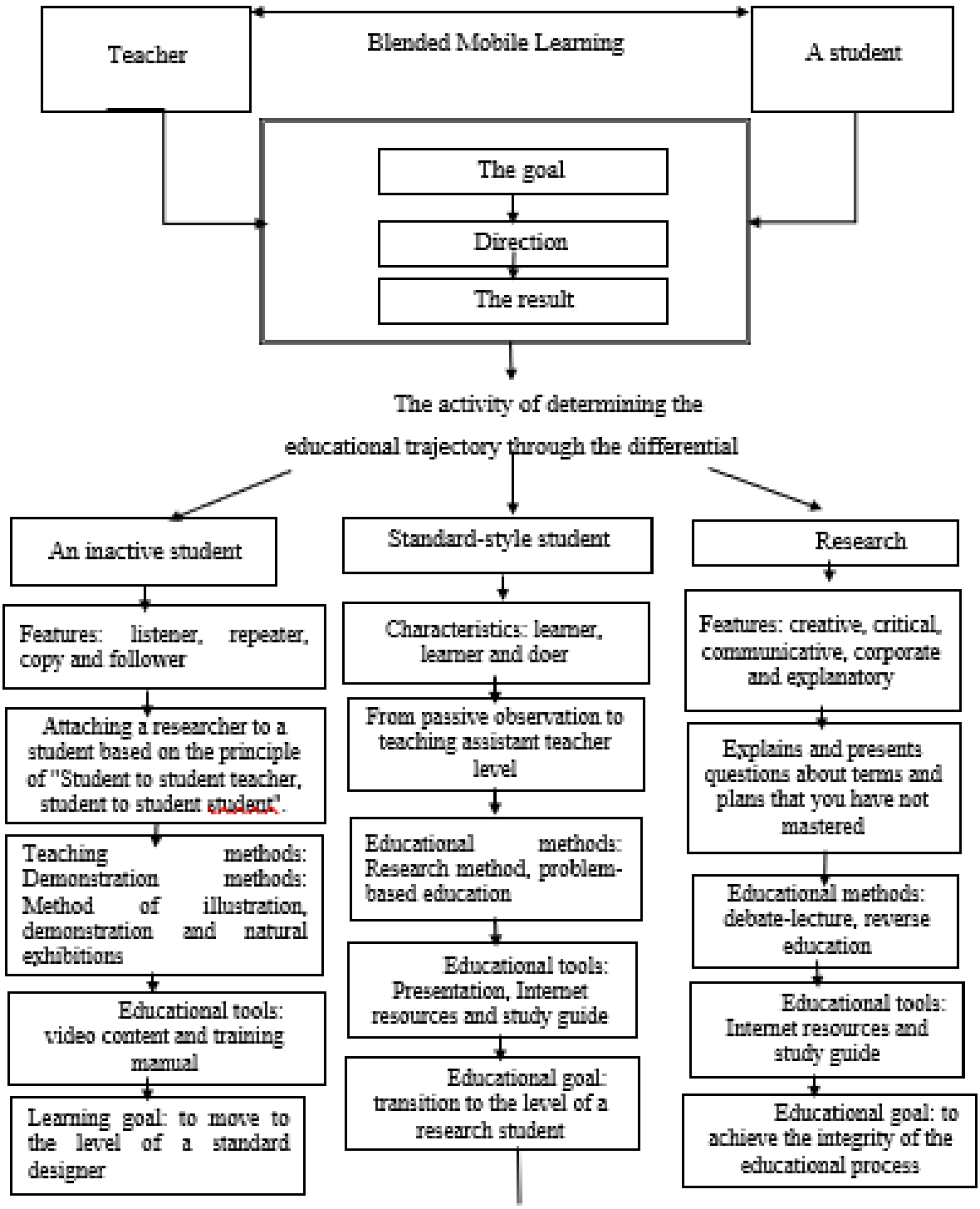

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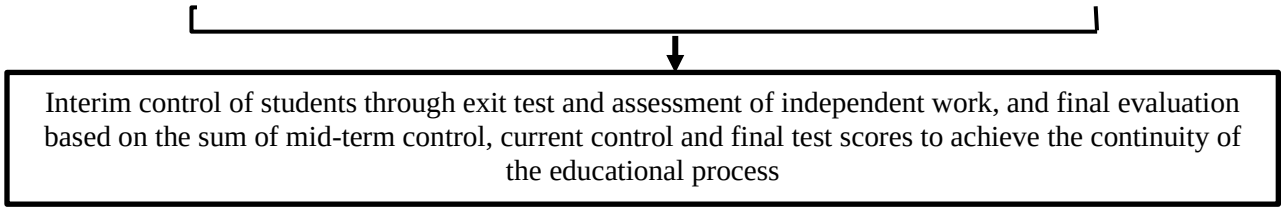


**Figure 3. The "Differential Education" model of the "Blended Mobile Learning" technology is an educational project**

The differential education model consists of the provision of content, tools and forms that enable the realization of the didactic purpose of a certain part of the educational process. The advantages of this model are as follows:

- active and individual communication of the teacher with students is ensured: there is an opportunity to refer weak students, to pay attention to talented students;

- students' ability to strengthen their knowledge and professional skills increases.

- the interest of talented students to demonstrate their knowledge, and the interest of middle-level students to learn;

- students are interested and need lectures and practical training[6].

We design the didactic system of the "Computer Science" subject through the Differential Learning Model of the "blended mobile learning" technology, which integrates the activities of the subjects of the educational process, using interconnected electronic, audience and mobile application components. We expressed it as a cycle of "work before the audience - work in the audience - audience + mobile application" (Fig. 4).

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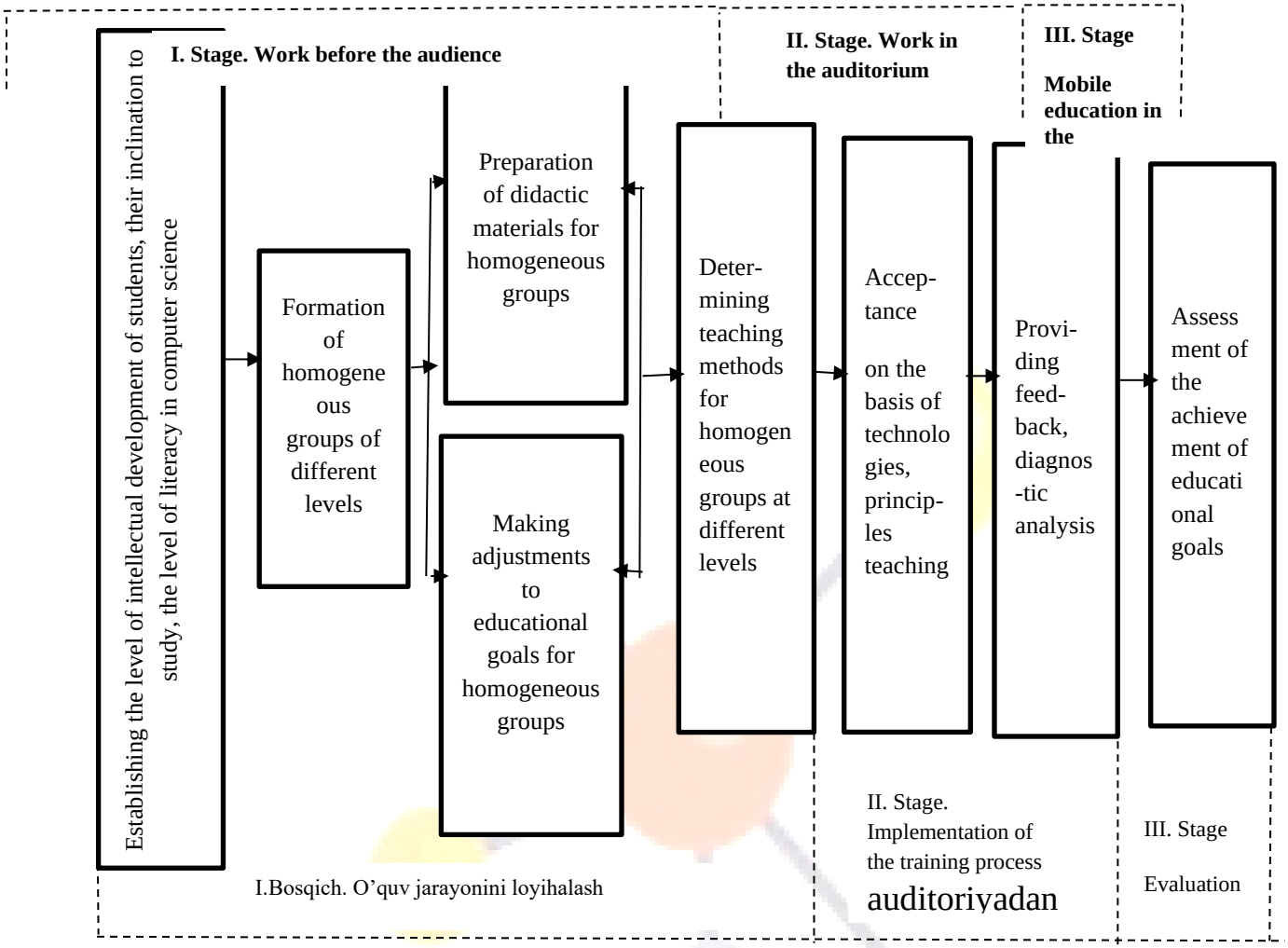


**Figure 4. Technological scheme of the model of differential education**

We have implemented the practical training of the subject "Computer supply" through the "SAMR" model of individual education and blended mobile learning technology, which integrates the activities of subjects of the educational process.

The SAMR model was created by Dr. Ruben Puentedura, founder and current president of the educational consulting firm Hippasus and a member of the Maine Learning Technology Initiative support team. The SAMR model helps teachers determine the level of technology integration in the learning environment. A teacher must first decide whether to incorporate technology into the planned curriculum and then determine whether the technology will enhance learning. The goal is to introduce technological tools that redefine the educational landscape, ultimately replacing traditional teaching methods with alternative learning environments that are relatively effective.

The SAMR model consists of four stages (Substitution, Augmentation, Modification, Redefinition) in which innovation becomes part of education. The SAMR model compares activities performed using

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technologies to the everyday activities they replace (eg, reading an e-book rather than a paper book) and asks what technology use adds to the learning experience [7].

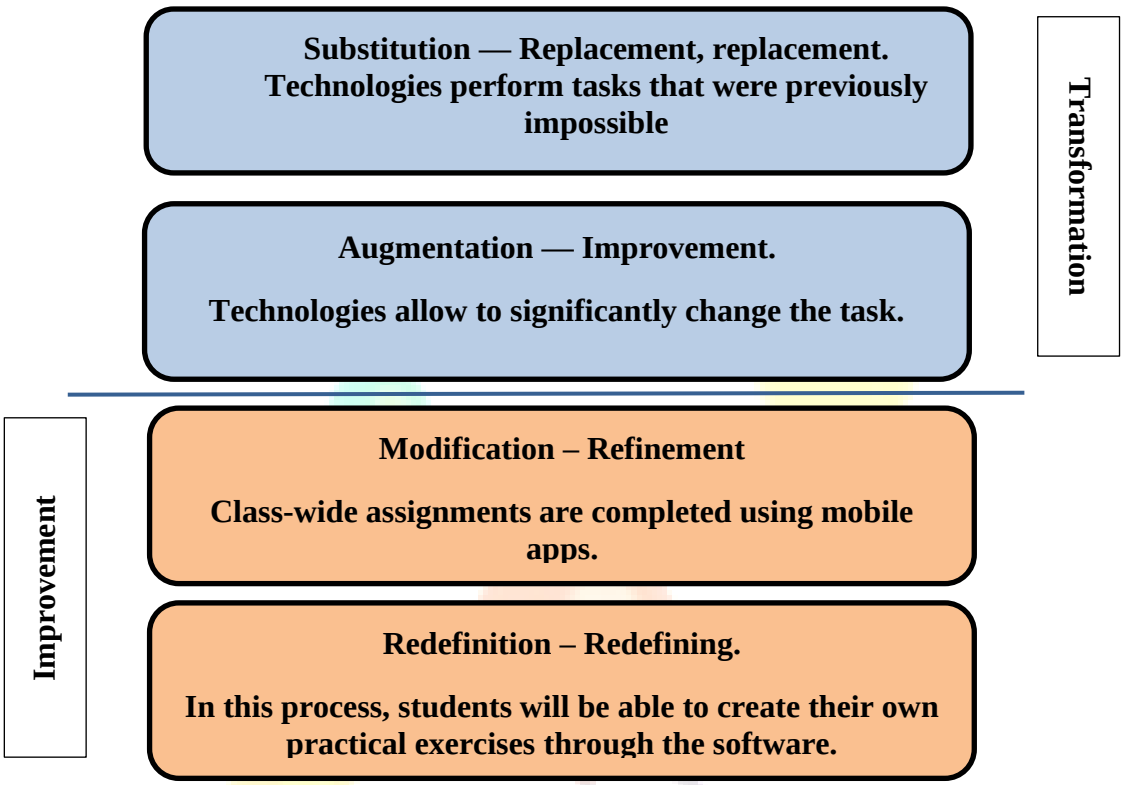


**Figure 5. Technological scheme of the SAMR model**

RRPuentedura offers four activity levels: Exchange (Substitution) : In the teaching of computer science practical training subjects, the previously used pedagogical tools and tools will be replaced by the educational mobile application "Individual study" and the traditional classroom method. The function of the pedagogical process does not change. Augmentation: At this stage, the effectiveness of the educational process is achieved using several technologies. In this, the function of the pedagogical process is improved. In the course of teaching the "Computer supply" specialty subject, animation and video clips (video instructions for performing practical training tasks), as well as video lectures, are enriched. In addition to reading the e-book, students will be able to watch animated (video) videos, review video instructions in a special mobile application before doing practical exercises. A mobile application offers an effective tool for common tasks in this situation. Modification (Modification) : In this case, students perform pre-created ready-made virtual practical tasks using software tools in specialized subjects, and the completed tasks are automatically evaluated in a mobile application. This is another step away from the traditional way of teaching. Paper or oral assignments in the auditorium are performed using mobile devices. Redefinition : In this process, through special pedagogical software, students themselves will be

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able to create a report of practical work during the lesson.

From a practical perspective, RRPuentedura argues that the model should be seen as a spectrum of activities in the classroom and suggests that to truly transform learning, technology-enabled activities aim to redefine learning rather than simply replace one activity with another. [14]. Any innovation in the classroom can affect all students to a greater or lesser extent. Therefore, it is critical that teachers have the skills and knowledge to use new technologies appropriately and effectively to best support student success.

The 4th stage of organizing the educational process in pedagogical higher education institutions on the basis of individual educational technologies is control and evaluation.

The Kirkpatrick model is an internationally recognized tool for evaluating and analyzing the results of education, training and curriculum. It consists of four levels of assessment: reaction, learning, behavior and results. Each successive level of the model represents a more precise measure of the effectiveness of the training program.

In 2016, James and Wendy revised and refined the original theory and presented the New World Kirkpatrick Model in their book The Four Levels of Educational Assessment. One of the main additions is the emphasis on the importance of adapting educational activities based on the criteria of students' knowledge acquisition. According to Kirkpatrick, four levels define the learning assessment sequence. He writes: “Each level is important and affects the next level.

Kirkpatrick's four-level model is a popular model for evaluating teaching effectiveness and curriculum development. It consists of four levels of assessment:

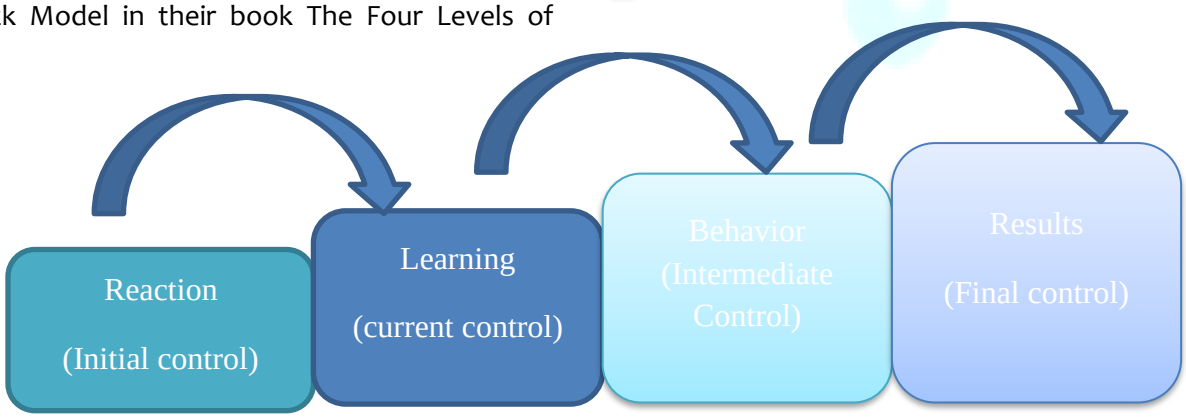
Level 1: Reaction – evaluation of satisfaction and response of the participants of the learning process.

Level 2: Learning – assessing the level of knowledge and skills acquired by students.

Level 3: Behavior - evaluation of changes in behavior, that is, the application of new knowledge and skills in real practice.

Level 4: Outcomes - evaluation of final outcomes and impact on learning processes and objectives[8].

We used Kirkpatrick's 4-level evaluation level, which determines the effectiveness of the educational process, to improve the effectiveness of the educational process based on individual educational technologies. An objective assessment of training sessions was achieved based on a targeted approach.



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## 6 . Application of the Kirkpatrick Model to Individualized Learning Technologies

Kirkpatrick's model can be applied to individualized learning technologies such as online courses, learning via mobile apps, or individualized learning plans. In our scientific work, we introduced the application of the Kirkpatrick Model to individual educational technologies. The reason for this is to determine the results of achieving the effectiveness of the educational process in individual educational technologies and to develop an educational trajectory towards these results. These levels determine the quality of training and the degree to which it acquires knowledge and skills that can be applied in practice . These measurements are primarily useful for determining the quality of the curriculum developed and for the teaching function.

Level 1: Reaction: Level 1 of Kirkpatrick's model, assessing students' reactions to the learning process, is an important step in improving the effectiveness of individual learning technologies. This level of evaluation helps to understand how satisfied the participants are with the technology. Assessing students' engagement in educational mobile technology use by applying Kirkpatrick's Level 1 response model to individualized learning technologies. For example, we can analyze how much time they spend on the system, how many tasks they perform and how often they access the mobile application.

Level 2: Learning: is the process of determining the level of mastery of the acquired knowledge by means of tests, assignments, simulations, the knowledge and experience gained by the student in the curriculum. It was created in the form of test tasks in an educational mobile application created by us in level checking. In the analysis of the changes in the knowledge and skills acquired by the students through technology, we organized by comparing the results of the "Input Test" taken at the beginning of each subject and the "Exit Test" in the reinforcement part of the subject. The results of the answers to the questions of the exit test and the evaluation of the independent work for the completion of independent educational tasks constitute the "Interim control" score. The effectiveness of the second level can be determined by comparing the differences in the acquired knowledge "before" and "after" the educational activity. ("input" and "exit" test in the mobile application)

Level 3: Behavior: This level of evaluation of the effectiveness of the educational process is behavioral assessment, which is evaluated by testing students' knowledge to determine their practical application. The assessment for the completion of tasks given in practical and laboratory training is the "Current control" score. We have set the following practical and laboratory exercises in Computer Science for the third level assessment.

Level 4: Results: The main factors that reveal the effectiveness of education represent the changes caused by the training of students (increased work productivity, improved quality of education). It is important to know the exact data of these indicators before training sessions. Results include only changes that occurred after student training.

At the end of the computer maintenance course, in order to quickly determine the acquired knowledge of students, a total of 20 final test tasks are recommended. The sum of the final test tasks, midterm control and current control scores constitutes the "Final control" score of the student's educational results. Below are the final computer science quizzes.

Applying the Kirkpatrick model to individual educational technologies helps not only to measure

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and evaluate their effectiveness, but also to improve the educational process, as well as to adapt educational programs to the needs of students. This model can be a useful tool for developers and educators seeking to optimize educational technologies.

In conclusion, we note that:

- The mechanism of organizing the educational process on the basis of individual educational technologies was determined to give priority to the individual trajectory of the students' educational activities at such stages as planning educational activities, checking knowledge, implementing the educational project, monitoring and evaluating;
- The model of improving the effectiveness of the educational process in pedagogical higher education institutions based on individual education was improved based on the adaptation of educational resources with illustrative design to the educational process and prognostic assessment using the Individual Study mobile application that automatically tests the individual educational trajectory of the student;
- The didactic system of teaching the subject " Computer maintenance " is based on the principles of individualization, personalization, and differentiation. improved based on models.

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