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PEDAGOGICAL STRATEGIES FOR DEVELOPMENT OF COGNITIVE SKILLS IN A DIGITAL ENVIRONMENT

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ABSTRACT: One of the main tasks of modern education is to form in students the knowledge and competencies applicable in different fields, to increase their interest in learning, to form and develop their cognitive motivation. The variety of applied teaching methods has a strong motivating potential in this respect, with an emphasis on interactive teaching methods in a digital environment. This article presents some pedagogical strategies for development of various cognitive skills for learners. Different methodological approaches to learning through the application of innovative educational tools are discussed. The advantages they offer in the learning process are pointed out. In the research we focus on pedagogical approaches, which create conditions for provoking students' thinking, for free expression of opinions and defense of one's own position, for provoking creative thinking rather than reproduction of information.

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1. INTRODUCTION

The fast development of ICT changes at a global scale the model of teaching in searching for paths for achieving a better quality of teaching. New educational technologies and interactive didactic materials are means to increase the activity and motivation of

students. Through their application, skills for independent acquisition of new knowledge and their critical thinking are built. Modern educational systems relate only to those technologies that improve the learning process and make it more effective. The effectiveness of education depends on many factors. One of these is the involvement of the students in the related course activities. The interactive education provides an opportunity to develop skills in the students for independent literature research and activation of the cognitive activity [21]. On the other hand, the considered type of teaching gives the opportunity for the implementation of attractive educational materials in order to increase the motivation and the interest of the students. Also, there is a positive result in terms of the two-way interaction teacher – student and this type of education can be an immense communication, feedback and teamwork booster.

2. EDUCATIONAL TECHNOLOGIES – SOME DIDACTIC POSSIBILITIES

At the beginning of the 21st century, the interest in educational technologies is growing, changing the aspects of their consideration many times. Pedagogical technologies are beginning to be developed, in which the goals and activities of the learning process are directed not to teaching, but to learning.

Educational technology (ET) is a very wide field. Therefore, one can find many definitions [27]:

- ET is the use of technology to improve education. It is a systematic, iterative process for designing instruction or training used to improve performance;
- ET is the study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources.

ET according to International Technology Education Association [26]:

- Teaches with technology (uses technology as a tool);
- Primarily concerned with the narrow spectrum of information and communication technologies;
- Primary goal: To enhance the teaching and learning process.

Educational technology has a dynamic character. The process starts with certain conditions. With deviations in unwanted direction the following procedures, operations and steps are immediately corrected. Permanent control is needed, stable reverse connection and making competent decisions for managing the technological process. Furthermore, ET allows and suggests simultaneous usage of traditional and modern technologies.

According to a number of authors [2, 10, 18, 20, 25] the use of modern ICT forms a new learning strategy that allows the teacher to:

- Develop new methodological approaches;
- Change the organization of the learning process;
- Expand the base of knowledge and techniques for acquiring skills in the respective subject;
- Perform computer diagnostics, control and assessment of knowledge, skills and competencies of students.

Some of the new educational technologies are designed and modeled on the border of reality and abstraction – virtual reality, augmented reality, 3D modeling and others. Important in them is the use of technological elements of heuristics, opportunities for the development of imagination and creativity, attracting intuition, developing the ability to formulate hypotheses and more.

3. PEDAGOGICAL STRATEGIES FOR DEVELOPMENT OF COGNITIVE SKILLS IN A DIGITAL ENVIRONMENT

The use of digital educational environments is becoming increasingly important in modern education. Digital platforms and tools lead to the development of new strategies for teaching and learning, for assessment and self-assessment, for independent learning activities [17].

The natural differences in the opportunities for learning and the cognitive styles of the learners create a number of difficulties, lead to low efficiency and are the main reason for the emergence of adaptive learning systems. On the other hand, e-learning provides methods and tools for implementing the didactic principle of individualization and personalization in learning [24]. This principle is difficult to implement in the traditional classroom form of education. Today classroom educators employ diverse and sometimes highly creative methods involving specific strategies and tools.

We will present innovative teaching methods that can be applied in a digital environment and represent a High-Tech Approach to Learning – from devices like laptops and tablets to using the internet to connect students with information and people from around the world. In the high-tech approach to learning, teachers utilize many different types of technology to aid students in their classroom learning.

Flipped Classrooms – A flipped classroom is a type of blended learning where students are introduced to content at home and practice working through it at school. This is the reverse of the more common practice of introducing new content at school, then assigning homework and projects to completed by the students independently at home [28]. Skill practices are: In-person, face-to-face discussion with peers, debate, presentations, Lab experiments. peer assessment and review. This increases the opportunity for personalization and more precise guiding of learning. In the flipped classroom model, students practice under the guidance of the teacher, while accessing content on their own.

Inquiry-Based Learning – Rather than function as a sole authority figure, in inquiry-based learning teachers offer support and guidance as students work on projects that depend on them taking on a more active and participatory role in their own learning. Different students might participate in different projects, developing their own questions and then conducting research often using online resources and then demonstrate the results of their work through self-made videos, web pages or formal presentations [3, 4, 10, 29].

Personalized Learning – In personalized learning, teachers encourage students to follow personalized, self-directed learning plans that are inspired by their specific interests and skills. Since assessment is also tailored to the individual, students can advance at their own pace, moving forward or spending extra time as needed. Teachers offer some traditional instruction as well as online material, while also continually reviewing student progress and meeting with students to make any needed changes to their learning plans [5, 7, 15, 24].

Game-Based Learning – Students love games, and considerable progress has been made in the field of game-based learning, which requires students to be problem solvers. Games are used both as an environment for teaching learning content and for testing and assessment. For students, this approach blends targeted learning objectives with the fun of earning points. For teachers, planning this type of activity requires additional time and effort, so many rely on software to help students maximize the educational value they receive from within the gamified learning environment. Various studies confirm the fact that computer games have great potential in improving the educational

process. Their application in learning can be used not only to present knowledge in a fun way, but also to support the development of various cognitive skills [10, 11, 22].

When learning in a digital environment for the development of cognitive skills, the emphasis is on the design of a course, in the center of which is the student.

Student-Centered Approach to Learning – Teachers still serve as an authority figure, but may function more as a facilitator or "guide on the side", as students assume a much more active role in the learning process. In this method, students learn from and are continually assessed on such activities as group projects; flexible combination of individual and group forms of learning activities; Blended learning; student portfolios and class participation [1, 5, 19].

In the design of Student-Centered Approach to Learning the selection of didactic methods and strategies is aimed at organizing such a learning environment that stimulates the active acquisition of knowledge and skills. Priority is given to those methods that guarantee the independent search, analysis and interpretation of information. The activities of the teacher are more mediating, motivating and supportive.

Question Formulation Technique (QFT) is a process for Brainstorming questions, then improve those questions through discussion. According to the creating organization, the QFT "helps all people create, work with, and use their own questions – building skills for lifelong learning, self-advocacy, and democratic action." As a classroom tool for teaching and learning, the QFT is useful to promote inquiry, discussion, debate, project-based learning, promoting critical thinking, personalizing learning and more [29].

The creation of an adequate methodology for the development of cognitive skills is associated with two main problems: the use of pedagogical technology for planning an educational path and creating a complex model for student assessment – the nature of thought processes, performance, degree of cognitive and practical independence and activity, etc. Learning strategies refer to methods that students use to learn. This ranges from techniques for improved memory to better studying or test-taking strategies. Some learning strategies involve changes to the design of instruction.

The same goal in education can be reached in different ways, therefore there is a need to develop parallel procedures and steps for each educational technology. The teacher and the student have the right to choose. A characteristic feature of learning in an electronic environment is the ability for individualization and adaptability, as the most important and determining factor in them is the person with his intellect, creative abilities, needs, motives and interests.

We will present several pedagogical strategies for the development of various cog-

nitive skills that apply innovative methodological approaches.

1) Application of modern teaching methods and creation of a learning environment suitable for learning;

The variety of applied teaching methods has a strong motivating potential in this respect, but the emphasis is primarily on those methods that have gained popularity as interactive teaching methods. The essential feature of these methods is the intensive interaction between the participants in the learning process [20]. They create conditions for provoking students thinking, for free expression of opinions and defense of one's own position, for the predominance of creative thinking over reproduction. Theoretical generalizations are often reached independently through logical reasoning, as a result of a dispute and discussion on posed problems, by solving various problem situations.

Digital platforms and tools are leading to the development of new strategies for teaching and learning, for assessment and self-assessment, for independent learning [9, 13, 14, 17]. By modelling real-life situations in virtual environments and using dynamic simulation models, opportunities are created to provide practical effects within the boundaries of learning, motivate learners to make independent decisions, nurture emotions associated with the desire to overcome different levels of difficulty, etc. An important advantage is the opportunity for individualization and adaptability in training, for group learning and cooperation, and teamwork.

2) Development of cognitive motivation;

One of the main tasks of modern education is to form in students the knowledge and competencies applicable in different fields, to increase interest in learning, to form and develop the cognitive motivation of students [16]. Cognitive motives are formed by different means in the course of the learning process [2, 5]. Learning in a digital environment provides opportunities for the optimal combination of different tools that allow new knowledge to be presented to the student in the form of a problem. Motivation is the driving force towards achieving certain goals. It includes targeted behavior and requires a direct and timely link between targeted action and results achieved. Proper organization and management of the learning process favors the development of cognitive interests and building positive motives for learning. Discussing with pupils their priority goals is a process of forming, developing and stimulating the motivation to learn, which, if competently conducted, develops into self-motivation.

In the course of work in a digital environment and the Internet, the student has the opportunity to exchange information operatively, to access a large amount of diverse

didactic materials. The formation of knowledge, skills and competences for working with information, carrying out information search, its processing and application in different situations, as well as the development of algorithmic thinking [21].

3) Implementation of methods to support initiative and build a flexible individualized learning path;

Characteristics of the motives for an educational activity are the orientation of the knowledge as an immediate stimulus for activity. The activity here is seen as the ability of the individual to independently acquire new knowledge and skills. The realization of this principle is related to the presence of motivation to change their own behavior in accordance with the new environment, the presence of a minimum amount of knowledge and skills necessary for orientation in the new pedagogical environment and the development of adequate behavior.

When realizing independence and individualization, it is necessary to understand the active role in choosing a strategy and methods of work to achieve the pre-defined goals and objectives and the predictable learning outcomes [24]. The individual approach consists in studying and taking into account the individual characteristics of each student – the nature of the thought processes; the level of knowledge and skills of the learners, the personal working capacity and the level of cognitive and practical independence. This approach is best implemented through adaptive e-Learning systems [7, 12, 15].

Adaptive e-Learning as an approach for individualized learning can be divided into two main processes: a diagnostic process to assess learner characteristics (abilities, prior knowledge) and indicators of the set task (difficulty level, content structure, etc.); a prescriptive process optimizing the interaction between the learner and the task by systematically adapting the content and sequence of learning objects to the skills and recent achievements of the learners [19, 23, 24, 25].

4) Diagnostic control of the personalized training path and reflexive assessment;

Monitoring and evaluation have a motivating effect by various means: setting clear requirements, which is one of the necessary conditions for the evaluation to correspond to the efforts made; use of individual relative norms, variety in applied methods and strategies for testing and evaluation. Adaptive testing and assessment systems provide options for delivering learning content that changes depending on the learner's performance and the instructor's instruction; the ability to vary the type of learning materials offered and target a different learning style; adaptability of the difficulty of questions, etc. [13, 14].

At each stage of the training it is necessary to correlate the achieved results with the previously planned ones, evaluation and self-assessment of the achieved temporary results [9]. Self-assessment is an assessment of students for their own work. It allows the learner to critically evaluate their knowledge and actions, and to take corrective action [6, 23]. The creation of a model for assessing the cognitive qualities and abilities of a student is associated with a number of problems of technological nature [13]. From the point of view of pedagogical diagnostics, it is extremely important to determine the most accurate criteria for evaluating the achieved results.

There is a contradiction between the pursuit of better and deeper reflexive assessment and the underdeveloped mechanism of reflexive control [20]. The concept of reflective practice is widely used in e-learning for both learners and teachers. When students' self-study by applying reflective assessment, they think about how their work meets the established criteria; they analyze the effectiveness of their own efforts and plan for improvement. Reflection is related to elements that are essential for the full learning and cognitive development of students: the development of metacognitive knowledge and abilities – the opportunity for self-learning and self-assessment; improving the ability to think about their own achievements and rates of development; the development of critical thinking, problem-solving and decision-making skills, etc.

4. CONCLUSION

The development of thinking in the learning process is the formation and improvement of all types, forms and operations of thinking, as well as habits for the transfer of methods of intellectual activity from one field of knowledge to another. Proper organization and management of the learning process favors the development of cognitive interests, building positive motives for learning activities, which once formed, themselves become effective internal factors to improve its quality and increase its effectiveness.

Educational technology in a digital environment transform the learning environment, thus engaging learners and creating self-learning skills. Another feature of the lesson through the application of modern means is the increased emotional state, activation of interest and increase the motivation of students. An important element in the educational process is the creation of conditions for cooperation and joint training, implementation of differentiated and personalized training, development of virtual spaces for training, etc.

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