Grouping online resources by the level of their impact on the development of creativity in students, taking into account the Cycle of D. Kolb

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Abstract. With the introduction of compulsory distance learning in connection with the spread of the *COVID-19* virus infection, the popularity of online platforms that allow creating interactive tasks has increased dramatically. *Miro, Kahoot, Factile, Educaplay, Quizizz* and others have opened up new opportunities for introducing them into the educational process, including for the development of creativity in students. Their strength was easier interactive interaction and the achievement of a high level of student involvement in the online educational process. The article discusses new online tools for the development of creativity. The use of D. Kolb's cycle in the formation of the educational process allows to achieve high results of students.

Keywords: creativity, creative environment, online education, distance learning, online services, D. Kolb's cycle.

With the introduction of compulsory distance education during the pandemic, not only the teaching methodology for higher professional education programs (bachelor's, master's and postgraduate studies) has undergone changes, but also for additional professional education programs - MBA, advanced training, retraining, and so on. **The model of learning and development of adults - D. Kolb's Cycle** - has reached a new level of relevance, with the help of which it is possible to improve the learning process of people of this age category. D. Kolb's model is a cycle of experience accumulation, reflection and action (see tab. 1).

Table 1.

Scientific Model - D. Kolb's Cycle

Cycle stage		Stage description
1	Direct experience	Each individual has experience in a particular area that he wants to learn.
2	Observation and reflection	Consideration and analysis of existing experience and knowledge is carried out.
3	Formation of abstract concepts and	Models are built that describe the knowledge and

	models	experience gained, ideas are created.
4	Active experimentation	Experimentation and validation of the created model or concept. The result is a new experience. Then comes stage 1 again - "Direct experience".

Source: Kleinman P. [1]

D. Kolb in his model describes the possibility of accumulating experience, which in turn is formed in the concept, and then used when choosing new situations to build up practical experience. The stages of D. Kolb's cycle prove that for effective learning it is necessary to be not only an observer of the process, but also its participant, i.e. a transition from participation to the formation of an objective view is required. This method of constructing the educational process implies the equality of the participants in the educational process.

To apply D. Kolb's method, it is necessary to transform the existing curriculum, in which students will have the opportunity to maximize their potential, which is close to the requirements for creating a creative environment. Followers of the scientific model of D. Kolb have developed a test to identify the preferred learning style for a particular individual (P. Honey, A. Mumford «*Honey Mumford Preferred Learning Style Test*). [3] P. Honey and A. Mumford distinguish **four types of personality according to their preferred learning style**: activists (direct experience), thinkers (observation and reflection), theorists (model formation), pragmatists (active experimentation). [4]

The analysis carried out by the author made it possible to identify and group online resources according to the level of their impact on the development of students' creativity (see tab. 5).

Table 5.

Online resources by the level of their impact on the development of creativity

Impact on the development of creativity	Resource type	Resource name
Low impact	Podcasting, crossword services, polls and tests	*SoundCloud, Au, Audacity, Google Podcasts, Spotify, CastBox,Crossword Factory, Cross*
Medium impact	Timeline creation services,	*Timeline JS, Sutori, myHistro*
High impact	Sharing boards, *VR*, quiz and interactive assignment services	*Miro, Conceptboard, GroupBoard, Artefact, Thinglink, Adventr, Sparkol, Kahoot, Factile, Educaplay, ProProfs,*

		Quizlet, Flippity, Quizizz

Source: compiled by the author.

The author identified three levels depending on the level of exposure: red (high), orange (medium) and yellow (low).

The red level - high level of impact - includes sharing boards, services with augmented reality technology, services for creating quizzes and interactive tasks. For example, while working in the Miro application, the student needs to create his own project on a white board in a team or independently, using the maximum of imagination and knowledge, which contributes to the development of creativity. Augmented reality applications maximize the use of the student's imagination, which also effectively affects the development of the competence in question.

The orange level with a medium impact on the development of creativity includes services for creating timelines, which allows you to visually display the course of historical events, allowing the use of video and photographic materials.

The yellow level, with a low impact on the development of creativity, includes services for creating crossword puzzles, creating tests and surveys, and podcasting platforms. These services allow you to control the level of student knowledge, transfer additional audio training materials. When using these services, the student is a consumer of the interactive content already created for him.

When using electronic resources in the educational process, it is recommended to combine tasks by the type of impact on the components of creativity: imagination, critical thinking, intuition, etc. The most effective combination is to use resources from each level (red, orange, yellow) of influence on the level of creativity. Excessive use of resources from the red level in one lesson can quickly tire a student, which will lead to a decrease in concentration of attention and a decrease in students' working capacity.

Let's consider the possible combinations of applications with the greatest efficiency, helping to optimize the educational process during distance learning for students and adults. In fig. 2 shows possible combinations of using electronic resources with the most effective impact on the development of creativity.

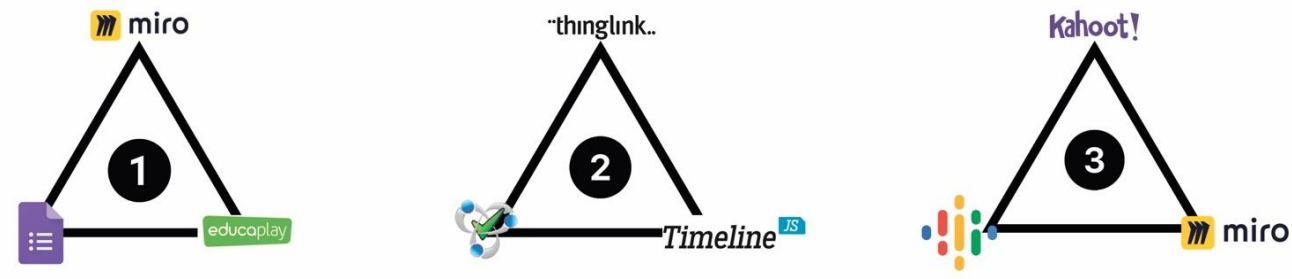

Fig. 2. Combinations of application use to optimize distance learning for the development of creativity

Source: compiled by the author.

The presented combinations make it possible to increase the effectiveness of distance learning and the level of creativity development among students, both technical and creative carts.

Triangle 1 includes a bundle: a *Miro* sharing board plus a service for creating surveys and educational tests *Google forms* and a multifunctional platform for creating quizzes, word clouds, etc., for example, *Educaplay*.

Triangle 2 includes a bunch of services that are most suitable for use in the educational process of creative specializations: *Thinglink* in conjunction with *Timeline JS* and *Online Test Pad*.

Triangle 3 Includes: a rich platform for creating quizzes, word clouds, and more, such as *Kahoot*, a platform for publishing additional audio content from *Google Podcasts*, and the *Miro* sharing board.

The effectiveness of distance learning is due to the following factors**:**

- high concentration and self-organization of students;
- professional development of teachers;
- improving teaching methods;
- increasing the computer literacy of teachers and students;
- technical equipment of teachers.

Distance learning allows you to introduce into the educational process innovative creative teaching techniques based on the use of multimedia online technologies.

Conclusions:

Distance learning allows you to create unique conditions for gaining knowledge, depending on the needs of each student. An important condition for the implementation of digital resources is the structuring of the educational process with clear timing.

The combination of electronic resources makes it possible to achieve the highest efficiency of distance learning with high rates of creativity development among participants in the educational process. Also, combining resources allows you to adhere to B. Bloom's taxonomy of goals. [2]

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