THE ORGANIZATION OF E-LEARNING IN THE CONTEXT OF THE LEADING IDEAS OF CONSTRUCTIVISM, COGNITIVISM AND THE REALIZATION OF INDEPENDENCE, SELF-REGULATED AND SELF-EFFICACY

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Abstract: The article discloses the theoretical and empirical results of research on the organization of e-learning. Based on the analysis of scientific works, the organization of e-learning is represented in such theories as: 1) constructivism (the process of active construction by students of their own understanding of new information, which is carried out on the basis of the guiding actions of the lecturer in the direction of the formation of objective knowledge by students on the basis of operating with facts and reflective thinking about previously acquired educational (professional, life) experience); 2) cognitivism (organization of e-learning with an emphasis on students setting their own goals, promoting their self-efficacy and self-regulation in the learning process). Scientific data on students' manifestations of independence, self-regulated and self-efficacy during e-learning and lecturer's actions contributing to these manifestations are also summarized. Self-efficacy is considered as an important component of success in e-learning, and self-regulated as a prerequisite for this success. Self-efficacy was analyzed in the context of direct and indirect interaction and interaction of students with e-learning content. The pedagogical experiment was implemented in order to clarify the educational requests of students on the content of independent work during e-learning; determining the types of tasks that, according to students, are the most effective during e-learning; summarizing data on the methods of independent work during e-learning, which students prefer. Students studying at Borys Grinchenko Kyiv University and Dragomanov Ukrainian State University on full-time and part-time forms of education took part in the pedagogical experiment. According to the results of experimental work, it was established that tasks for independent work in e-learning should provide a level of complexity sufficient for professional and personal development, take into account the experience of students, contribute to the formation of an intellectual difficulty that students will want to overcome. And also, be characterized by creativity, ensure consistency between intellectual and time costs, take into account technical capabilities and ensure the variability of educational tasks. It was established that students prefer such ways of performing independent work during e-learning, such as: a differentiated way of performing independent work; work in groups chosen by students; work in groups, the members of which are determined taking into account the complexity of the task; independent work with feedback from the lecturer.

Keywords: e-learning; constructivism and cognitivism; independence; independent work; self-efficacy; self-regulation; self-regulated e-learning; students; lecturers.

1 Introduction

Comparing e-learning with traditional learning, it is necessary to point out the minimization of restrictions on time, space, pace of learning, instead, attention is focused on processes, the basis of which is based on independence and on the constant self-improvement of oneself as an education seeker, one's personal qualities, one's cognitive actions.

2 Materials and Methods

Our research consisted of theoretical and experimental parts. The theoretical part of the research was aimed at performing the following tasks:

1. Summarize scientific data about the leading ideas of constructivism and cognitivism, which are significant for the design of modern e-learning.
2. To reveal the essence of independence, its types and peculiarities of manifestation in e-learning.
3. Summarize scientific data on the structure and peculiarities of the organization of self-regulated e-learning.
4. Summarize scientific data on the sources of self-efficacy development in e-learning.

5. To reveal the essence of self-efficacy through the prism of various types of interaction in e-learning.

The experimental part of the study included the following tasks:

1. To find out the educational requests of students on the content of independent work during e-learning.
2. Determine the types of tasks that, according to students, are the most effective during e-learning.
3. Summarize the data on the ways of independent work during e-learning, which students prefer.

The research used theoretical methods (analysis, arrangement, systematization, generalization) and empirical methods (observation in the conditions of e-learning, conversations, questionnaires). Students of Borys Grinchenko Kyiv University and Dragomanov Ukrainian State University were involved in the pedagogical experiment. Dear The total number of participants in the experiment was 272 full-time and part-time students.

3 Results and Discussion

Leading ideas of constructivism and cognitivism for designing of modern e-learning

S. Bada, S. Olusegun [4] characterize the theory of constructivism as based on the belief that individuals create their own understanding and information about the environment through facts, their experience and reflection this experience.

Constructivism provides learning practices that:

- help the student in the process of acquiring knowledge in active actions and on the basis of integration of new information with previously acquired knowledge [9];
- take into account the subjectivity of students' mental representations, since they actively construct their subjective representations and understanding of reality and constantly guide the process of forming objective knowledge and constructing new ideas [22; 23];
- provide training among students [27];
- support independent learning, not passive acquisition of information [32];
- involve perception of problems, evaluation of alternatives [10];
- direct students to manage their ability to organize the duration of self-study, data processing, planning, practical selection of necessary knowledge and their use [1].

T. Duffyand, D. Jonassen [17] note that constructivism leads to a modification of the lecturer's role. The lecturer helps the student construct knowledge, not just reproduce facts. It provides tools (practices for solving problems, using inquiries to obtain additional information, using e-learning materials to generate and test ideas, draw conclusions and communicate this information to other students), motivates to evaluate activities to understand how they are performed, involves in formulating questions that are aimed at oneself and are the basis for self-motivation [1].

Technological progress has affected the change in the ways of practical implementation of constructivism, such as:

- 1993 – organization of situational learning, cognitive learning and social negotiations [19].
- 1996 – organization of learning with the use of information resources for communication, cooperation, social or contextual support [22].
- 2008 - VR-based learning organization [31; 46]. According to cognitivism, acquiring knowledge is a mental activity

that consists of internal coding and structuring by the student [48].

Cognitivism provides the following leading ideas of learning practice:

- Determination by students of their own goals and self-motivation to study;
- Activity aimed at adapting new information to the existing body of knowledge;
- Taking into account the relatively stable features of cognitive processes, in particular the features of thinking, and how information is perceived, organized, stored and retrieved by the mind.

Technological progress affected the change in the methods of practical implementation of cognitivism:

- 1986 – the organization of learning in a created environment that encourages the discovery and assimilation or adaptation of knowledge [48].
- 1993 – organization of learning on the use of cognitive strategies, such as schematic organization, analogical reasoning and algorithmic problem solving, modeling [19].
- 2008 – organization of learning on the use of digital media, including VR-based learning [15].
- 2009 – the organization of e-learning taking into account the fact that students can remain easily lost or socially isolated in the process of e-learning, if self-efficacy and self-regulated are not formed [38].

Independence in e-learning: essence, types, manifestations

Unlike traditional classroom learning, e-learning is focused on the student, who must make a lot of independent efforts to achieve success in learning [3].

Independence is a strong-willed quality of an individual [42], which consists in the ability to set goals on one's own initiative, to find ways to achieve them without outside help, and to implement the decisions made.

According to I. Pavlov [39], the stimulus to an independent form of behavior is various obstacles, without overcoming which it would not be possible to continue life. The scientist called the phenomenon of independent overcoming of obstacles a "reflex of freedom". The basis of this reflex is the "what is this?" reflex, which, in turn, manifests itself in curiosity, facilitates orientation in space, and ensures self-preservation.

Independence as a willful quality of an individual is characterized by three factors [25]: 1) A set of means – knowledge, abilities and skills that he possesses; 2) The attitude of the individual to the process of activity, its results and conditions of implementation; 3) Connections with other people that appear in the process of activity.

Independence is associated with the active work of thought, feelings and will, which is a necessary prerequisite for independent judgments and actions [45]. In addition, independence includes judgments and actions that are formed in the process of independent activity, strengthen and form the ability to perform consciously motivated actions, and to achieve the successful implementation of decisions made despite possible difficulties.

Independence is characterized as the ability to act relatively independently, isolated from others, without external help, maintaining one's position and regardless of changing conditions [33]. Independence presupposes conscious motivation of actions and their conditioning, not subjecting to other influences and suggestions.

The essence of cognitive independence is revealed [33] in the readiness, ability and desire to carry out cognitive activities on one's own, to independently search for new ones, to improve knowledge and skills regarding the independent acquisition of

new knowledge and their use in further practical activities, to develop independent evaluations judgment.

Cognitive independence is based [8] on internal stimuli and internal self-regulation of a person, it is manifested in aspirations and abilities to independently solve specific problems and practical tasks. Cognitive independence presupposes awareness of the essence of the assigned task, the ability to distinguish the main thing in it, to properly solve problems.

Cognitive independence is manifested in the need and ability to think independently, in the ability to orient oneself in a new situation, to see the question, the task and find an approach to their solution. Cognitive independence is manifested [13], in the ability to approach the analysis of problems, tasks, and problems in one's own way and solve them without outside help.

Independence in educational activities is manifested in the ability to navigate in a new situation, to be critical when evaluating new facts and phenomena [11], to strive to master various ways of learning, to mobilize willpower to overcome difficulties in learning and achieve the set goal [24].

During e-learning, independence manifests itself:

- In the ability to independently organize one's learning at one's own pace, without time and space restrictions, in a self-determined order of studying the educational material, with the possibility of independently determining the need for several one-time processing of the educational material [35].
- Independently manage one's own learning process and independently control one's own learning, independently search for information for professional and personal development, independently work with information in printed or electronic format, independently separate main and secondary information in the text [37].
- Independently make decisions about solving technical problems, in case they arise during e-learning [43].

Scientific works also indicate that the features of e-learning organization are:

- Development of methodological support to support students' independent work [36].
- Preventing the emergence of a feeling of fatigue, which is enhanced by experiencing states of dissatisfaction and depression in the case of informing students about tasks for independent performance, which they perceive as voluminous, complex, uninteresting and as having no practical significance [34].
- Taking into account that the key components of success in e-learning is self-efficacy (belief in one's abilities to organize and perform actions necessary to obtain these achievements [5] and activity in self-regulated learning [40; 41].

Self-regulated e-learning: structure, organizational features

Self-regulated learning is an active, constructive process in which students independently set learning goals for themselves, and then try to monitor, regulate, and control their behavior, guided and limited by their goals and contextual features of the environment [40].

Self-regulated e-learning is a behavior that moves people toward their goals [30].

The basis of self-regulation is the motivation and learning strategies that students use to achieve their learning goals [5].

Self-regulated learning involves different processes. This [52]:

- metacognitive (presupposes the ability of students to plan, schedule and evaluate their progress in learning);
- motivational (indicate that students are self-motivated and ready to take responsibility for their successes or failures);

- behavioral (refer to the characteristics of strategies that students use to optimize learning).

P. Pintrich [40] singled out in self-regulated learning:

- 7 phases (forethought, planning, activation, monitoring, control, reaction, reflection).
- 4 areas of self-regulation (cognition, motivation, behavior, context).

In the context of cognitivism, V. Zimmerman [52] developed a three-phase model taking into account the development of self-regulated learning skills.

The first phase is thoughtfulness. These are strategic processes that precede effective learning. The phase includes the formulation of goals and internal motivation, which is aimed at completing the educational task. The phase usually take place before the student enters the learning process.

The second phase – performance control, takes place during the learning process. The phase includes monitoring learning, attention, and task meaning. Self-observation and self-experimentation are important at this stage because they encourage the student to reflect on their work.

The third phase is self-reflection. The phase includes self-evaluation based on social comparisons and personal performance, adjusting one's performance for the process of performing the next educational task.

W. Lan, R. Bremer, T. Stevens, G. Mullen [29] presented the conceptualization of self-regulated learning using six constructs: structuring the environment, setting goals, time management, seeking help, task strategies, and self-evaluation.

According to the results of the research by D. Davis, S. Neitzel [14], students testified about the need to feel control over their learning environment, therefore they attributed the structuring of the environment to the most significant constructions of self-regulated learning. Other constructs of self-regulated learning, namely: setting goals, time management, seeking help, task strategies, self-assessment are effectively implemented in case of formation of relevant skills or acquisition of practical experience by students.

D. Schunk [44] refers to the structure of self-regulated learning as self-observation, which is manifested in the observation of one's internal mental plan, which allows one to record various manifestations (experiences, thoughts, feelings, etc.).

According to CAST [12], with the development of self-regulated learning in learning design management, three predominant types of checkpoints are distinguished: 1) the type of checkpoints points that contribute to the expectation of learning optimization; 2) the type of checkpoints that promote personal problem-solving skills; 3) the type of checkpoints that allow students to develop self-esteem. Each checkpoint includes suggestions for implementing strategies for self-regulated learning. For example, providing prompts, providing mentors, structuring content, and using diagrams.

According to research by S. Chumbley, J. Haynes, M. Hainline, T. Sorensen [49], students who successfully regulate and change their learning know where and how to get the knowledge they need to succeed in an online environment. They have the highest level of self-regulation in e-learning regarding structuring the environment and setting goals, and the lowest level of self-regulation regarding defining strategies and formulating tasks.

The change and development of self-regulated learning skills occurs as a result of the interaction of personal, behavioral and environmental factors [52].

Features of the organization of self-regulated learning are:

- providing constant feedback to students (discussion posts, blogs, online journals, etc.) [26];
- development of didactic prescriptions for the implementation of self-control (reflection and evaluation of one's own actions, analysis and correction of correspondence between goals, means and the obtained results of actions);
- focusing students' attention on self-control as the ability to perform activities in situations that disorganize their performance and affect the emotional sphere.

In self-regulated e-learning, students' self-efficacy is positively related to academic self-efficacy (success in the written test) and self-efficacy when using the Internet [29].

An essential factor of self-efficacy in self-regulated e-learning is students' attitude to e-learning skills and their ability to improve these skills. According to a study by R. Bates, S. Khasawneh [7], students who viewed e-learning ability as a variable and learned skill reported higher levels of self-efficacy, more positive expectations about e-learning outcomes, less anxiety about using technology, and higher skill level. In contrast, students who perceived eLearning ability to be a relatively fixed skill reported higher levels of anxiety, lower prior success, and lower levels of self-efficacy.

Students who were more independent of online technology tended to have higher self-efficacy than students who were dependent on online technology and had lower self-efficacy (M. DeTure [16]). In addition, correlations were found between efforts and opportunities in self-efficacy and also future needs in self-regulated e-learning (N. Gebara [23]).

Sources of self-efficacy development in e-learning

A. Bandura [5; 6] developed a basis for considering the role of experience in the development of self-efficacy. According to the scientist's work, a person's direct experience with the same or a similar phenomenon is one of the strongest sources of a person's self-efficacy beliefs. The main sources of self-efficacy development are enactive master experiences, vicarious experiences, verbal persuasion, and physiological and affective state.

In the context of e-learning, experience also plays an important role. Thus, R. Bates, S. Khasawneh [7] identified previous e-learning experience as a critical factor in the development of self-efficacy and the manifestation of attitudes towards e-learning.

K.M.M. Fletcher [20] examined self-efficacy in terms of the influence of alternative experiences. In order to use it effectively, it is necessary to constantly monitor the diverse experience of students in the field of technology and involve it in the teaching practice. The scientist also distinguishes mastery experience and mediated experience. As a result of the conducted research, the scientist formulated the conclusion that mastery experience and physical/emotional response to task performance are stronger sources of self-efficacy than verbal persuasion and mediated experience.

K. Jan Shazia [47] distinguishes between two types of experience: the experience of academic self-efficacy and the experience of computer self-efficacy. According to the results of the scientist's research, academic self-efficacy best predicts satisfaction with e-learning.

Yi-Chun Lin, Jyh-Chong Liang, Ching-Ju Yang, Chin-Chung Tsai [51] attributed the experience of using the Internet to meet basic and life needs to the sources of self-efficacy of middle-aged and older people. Internet self-efficacy is the self-perceived confidence and expectation or belief in one's abilities to perform various tasks on the Internet (M. S. Eastin et al. [18]). Internet self-efficacy can enhance or inhibit students' attitudes toward e-learning.

Self-efficacy of students through the prism of different types of interaction in e-learning

T. Miyer, N. Machynska, H. Bondarenko, N. Rudenko, L. Romanenko, I. Sukhopara, R. Shpitsa [35] distinguish two types of interaction in e-learning. Direct interaction in e-learning involves the mutual influence of e-learning participants on each other, which takes place at a clearly defined time, which is recorded in the class schedule, does not depend on the physical location of the lecturer and students, but involves their presence in the class in the role e-lecturer and e-students. Instead, mediated interaction in e-learning involves the impact on electronic students of the content of educational materials that are developed in advance by the lecturer and placed in the educational environment of e-learning, the performance of the role of an electronic lecturer is not foreseen.

The analysis of scientific works revealed that direct and indirect interaction in e-learning influence the self-efficacy of students. Based on the results of N. Gebara's research [23], the conclusion was formulated that the presence of a teacher increased students' self-efficacy and had a significant impact on overall satisfaction with e-learning.

In the study of R. Bates, S. Khasawneh [7], a positive effect of direct interaction in e-learning on students' self-efficacy was also recorded. In addition, it was found that students who received prompt and regular feedback from a lecturer about their performance in e-learning had higher outcome expectations, reported higher levels of mastery and self-efficacy, and spent more hours per week on e-learning than students who did not receive such feedback from the lecturer.

Y.-C. Kuo, A. E. Walker, B. R. Belland, K. E. E. Schroder [28] distinguish three types of interaction in e-learning: 1) interaction between a student and a lecturer; 2) student interaction with e-learning content; 3) interaction between students. Scientists have found that student-teacher interaction and student-content interaction significantly contribute to self-efficacy in e-learning and student satisfaction. They spent most of their time reading and thinking about e-learning content. It was also established that the nature of the student's interaction with e-learning content is influenced by the organization of the content, the approach to document layout, and the ease of access to e-learning materials.

Student interaction with e-learning content has a greater impact on learning outcomes in asynchronous settings. Strengthening the interaction of students with e-learning content contributes to [2; 28]:

▪ Using media tools or interactive videos;
▪ Use of technologies that support interaction and interactive learning design;
▪ Inclusion of tasks that involve cooperation and search for online resources;
▪ Organization of problem-oriented learning, which involves searching for information to solve educational problems;
▪ Taking into account the value of tasks for students. Task value is related to the fact that the task the student is performing is valuable to him or her and tends to predict whether or not to continue with the study.

According to the results of A. Artino's research [3], self-efficacy, task value and learning quality are positive predictors of student satisfaction with e-learning. In turn, the perception of the quality of education is related to the motivational beliefs of students regarding the performance of the educational task, and insufficient motivation and lack of self-regulation of learning skills make e-learning difficult

Y.-C. Kuo, A. E. Walker, B. R. Belland, K. E. E. Schroder [28] also experimentally prove that self-efficacy and task value are important predictors of student satisfaction, contribute to persistence and achievement in e-learning.

Activation of interaction between students during e-learning is facilitated by joint projects, performance of group tasks,

discussion of professional situations, use of Internet materials [50]. It should be taken into account that students with a higher level of self-efficacy on the Internet have better skills in searching for information, which increases their confidence in using the Internet, as well as in solving problems during e-learning based on interaction between students (Y.-C. Kuo, A. E. Walker, B.R. Belland, K.E.E. Schroder [28]). Time spent online can inform lecturers about students' levels of self-efficacy and self-regulation online.

The content of independent work during e-learning: an experimental study of students' educational requests

The experimental work was aimed at: determining students' educational requests for the content of independent work during e-learning; determining the types of tasks that, according to students, are the most effective during e-learning; summarizing data on the ways of independent work during e-learning, which students prefer.

Based on the analysis of questionnaire data, it was established that in the formulation of educational requests for the content of independent work during e-learning, students in the vast majority of cases indicated the following undesirable aspects in the content of independent work during e-learning:

▪ Insufficient complexity of the content of the task (simple tasks do not contribute to professional formation and development (68% of respondents), lack of value for me (28% of respondents));
▪ The content of the task does not contribute to the formation of a challenge (I repeat what I have already done (44% of respondents), I do not apply knowledge and skills in combinations that are new to me (12% of respondents));
▪ The content of the task is not aligned with the level of experience (if the tasks are too simple or too difficult for my level of experience, and I cannot get the maximum benefit from them (82% of respondents));
▪ The content of the task does not require creativity (I feel the desire to complete the task as quickly as possible (68% of respondents), I do not think about the process of completing the task, I think about how to quickly complete this task (32% of respondents));
▪ The content of the task involves significant time costs (the process of completing the task takes a lot of time, and I do not feel the value for my professional growth (42% of respondents));
▪ The content of the task involves the use of technical resources that are not always available (64% of respondents)).

According to students, the following types of tasks are most effective during e-learning:

▪ Tasks of propaedeutic direction (work through the proposed content independently, write an essay based on the results of the work, or draw up a scheme (fill in or develop a table), or develop a project, or apply it to solve a problem situation);
▪ Tasks of a creative nature (find information, or create an information map, or conduct observations (surveys), or analyze the results obtained, or view media materials, or attend a conference and write an essay, or demonstrate the results in an interesting way);
▪ Tasks on the development of didactic structures (apply different approaches to drawing up lesson notes or their fragments, or develop materials for organizing various types of activities (project, game, research, search, etc.);
▪ Research tasks (investigate the phenomenon (process, object, etc.), summarize the obtained data, prepare for the presentation of the obtained results, present);
▪ Tasks for solving problem situations (the content of the tasks should relate to professional situations and (or) situations of personal development);

- Tasks based on mnemonic processes (remember, apply, consider how to better remember information and implement own ideas);
- Tasks based on thought processes (compare, make an analogy, determine the main thing, generalize, systematize, structure, critically analyze, propose an unconventional way to solve a problem, etc.);
- The task of searching for information with a specific goal (prove (disprove) the expediency of implementing something or the optimality of someone's actions; provide arguments "for - against"; summarize the search data and highlight those that are significant for solving the problem);
- Tasks for modeling and analyzing situations that are significant for professional and personal development;
- Tasks for the development of the project, its implementation, summarization of the received data and presentation of the results of project activities;
- Tasks for preparing for a discussion or debate;
- Tasks to develop materials for interactive web resources, educational online games, etc.

We also summarized the data on the methods of independent work during e-learning, which students prefer. In the students' questionnaires, they indicated:

- Differentiated way of performing independent work (tasks of different complexity (simple, medium complexity, complex) – in 84% of cases;
- Work in groups chosen by students (all members of the group work on a common task) - in 92% of cases;
- Work in groups, the members of which are determined taking into account the complexity of the task - in 58% of cases;
- Independent work with feedback from the lecturer - in 96% of cases.

4 Conclusion

Based on the analysis of scientific works, the organization of e-learning is represented in such theories as: 1) constructivism (the process of active construction by students of their own understanding of new information, which is carried out on the basis of the guiding actions of the lecturer in the direction of the formation of objective knowledge by students on the basis of operating with facts and reflective thinking about previously acquired educational (professional, life) experience); 2) cognitivism (organization of e-learning with an emphasis on students setting their own goals, promoting their self-efficacy and self-regulation in the learning process).

According to the leading ideas of constructivism and cognitivism, to achieve success in e-learning, a student must "make a lot of independent efforts" (A. Artino). Independence in e-learning acquires the following manifestations: the student independently organizes his learning at his own pace, without time and space restrictions, in a self-determined order of studying the educational material, with the possibility of independently determining the expediency of re-processing the educational material (T. Miyer, N. Machynska, H. Bondarenko, N. Rudenko, L. Romanenko, I. Sukhopara, R. Shpitsa); independently manages his own learning process and independently monitors his learning, independently searches for information for professional and personal development, independently works with information in printed or electronic format, independently separates main and secondary information in the text (T. Miyer, K. Zhurba, L. Holodiuk, N. Dyka, S. Stetsyk, O. Tretiak, S. Tsybulska); to independently make decisions about solving technical problems, in case they arise during e-learning (K. Raman, N. Othman, G. Danaraj).

During the organization of e-learning, one should: 1) provide students with methodical support to support independent work (T. Miyer, N. Siranchuk, N. Vyshnivska, N. Rudenko, O. Shkurenko, L. Romanenko, Y. Fedorova); 2) to prevent the appearance of a feeling of fatigue, which is enhanced by experiencing states of dissatisfaction and depression in the case of informing students about a task for independent performance, which they perceive as voluminous, complex, uninteresting and as having no practical significance (T. Miyer, L. Holodiuk, V. Savosh); 3) take into account that self-regulated learning is manifested in the fact that students successfully regulate and change their learning, know where and how to get the knowledge necessary for success in the online environment (S. Chumbley, J. Haynes, M. Hainline, T. Sorensen); 4) pay attention to self-efficacy as an important component of success in learning and self-regulation as a prerequisite for this success; 5) to understand that students' self-efficacy acquires different manifestations during direct and indirect interaction in e-learning and during students' interaction with e-learning content.

According to the results of experimental work, it was established that tasks for independent work in e-learning should provide a level of complexity sufficient for professional and personal development, take into account the experience of students, contribute to the formation of an intellectual difficulty that students will want to overcome. And also, be characterized by creativity, ensure consistency between intellectual and time costs, take into account technical capabilities and ensure the variability of educational tasks. These can be tasks of a propaedeutic direction, tasks of a creative nature, tasks for the development of didactic structures, tasks for research, tasks for solving problem situations, tasks based on mnemonic processes, tasks based on thought processes, tasks for searching for information with a specific purpose, tasks for modeling and analysis of situations, tasks for project development, tasks for preparing for a discussion or debate, tasks for developing materials for interactive web resources, educational online games, etc.).

It was established that students prefer such ways of performing independent work during e-learning, such as: a differentiated way of performing independent work; work in groups chosen by students; work in groups, the members of which are determined taking into account the complexity of the task; independent work with feedback from the lecturer.

Literature:

1. Alenezi, A. (2020). The Role of e-Learning Materials in Enhancing Teaching and Learning Behaviors. International Journal of Information and Education Technology. Vol. 10, №1, 48–56.
2. An, Y. & Reigeluth, C. (2008). Problem-based learning in online environments. The Quarterly Review of Distance Education, Volume 9(1), 1–16.
3. Artino, A. R. (2007). Motivational beliefs and perceptions of instructional quality: predicting satisfaction with online training. Journal of Computer Assisted Learning, 24(3), 260–270.
4. Bada, S. O. & Olusegun, S. (2015). Constructivism learning theory: A paradigm for teaching and learning. Journal of Research and Method in Education, Vol. 5, №6, 66–70.
5. Bandura, A. (1997). Self-efficacy: The exercise of control. New York, NY: Freeman.
6. Bandura, A. (2004). Swimming against the mainstream: The early years from chilly tributary to transformative mainstream. Behavior Research and Therapy, 42(6), 613–630.
7. Bates, R., & Khasawneh, S. (2007). Self-efficacy and college students' perceptions and use of online learning systems. *Computers in Human Behavior, 23*(1), 175–191.
8. Bekh, I. D. (2005). Pryntsypy suchasnoi osvity. Pedahohika i psykholohiia. №4. S. 5–27.
9. Bodner, G. M. (1986). Constructivism: a theory of knowledge. Journal of Chemical Education, 63(10), 873–878.
10. Broadbent, J. & Poon, W. L. (2015). Self-regulated learning strategies and academic achievement in online higher education learning environments: A systematic review. The Internet and Higher Education. Vol. 27, 1–13.
11. Buriak, V. K. Aktyvnist i samostiinist uchniv v piznavalnii diialnosti. Pedahohika. 2007, №8, 71–78.
12. CAST. (2018). Universal design for learning guidelines version 2.2. *http://udlguidelines.cast.org*

13. Danylov, M. A. Vospytanye u shkolnykov samostoiatelnosty y tvorcheskoi aktyvnosty v protsesse obuchenyia. Sovetskaia pedahohyka, 1961, №8, 43.

14. Davis, D. S., & Neitzel, C. (2011). A self-regulated learning perspective on middle grades classroom assessment. Journal of Educational Research, 104(3), 202–215.

15. Dede, C. (2008). Theoretical perspectives influencing the use of information technology in teaching and learning. In J. Voogt, & G. Knezek (Eds.), International handbook of information technology in primary and secondary education (pp. 43–62). Boston, MA: Springer US.

16. DeTure, M. (2004). Cognitive Style and Self-Efficacy: Predicting Student Success in Online Distance Education. American Journal of Distance Education, 18(1), 21–38.

17. Duffyand, T. M. & Jonassen, D. H. (2013). Constructivism and the Technology of Instruction: A Conversation, Routledge

18. Eastin, M. S. & et al. (2000). Internet self-efficacy and the psychology of the digital divide. Journal of Computer-Mediated Communication.

19. Ertmer, P. A., & Newby, T. J. (1993). Behaviorism, cognitivism, constructivism: Comparing critical features from an instructional design perspective. Performance Improvement Quarterly, 6(4), 50–72.

20. Fletcher, K.M.M. (2005). Self-efficacy as an evaluation measure for programs in support of online learning literacies for undergraduates. The Internet and Higher Education. Vol. 8(4), 307–322.

21. Fosnot, C. T. (2013). Constructivism: Theory, perspectives, and practice. Teachers College Press.

22. Fosnot, C. T., & Perry, R. S. (1996). Constructivism: A psychological theory of learning. Constructivism: Theory, Perspectives, and Practice, 2, 8–33.

23. Gebara, N. L. (2023). General self-efficacy and course satisfaction in online learning: A correlational study. Ph.D. thesis, University of Missouri - Columbia.

24. Haleta, Ya. V. Formuvannia piznavalnoi samostiinosti studentiv ekonomichnoho koledzhu zasobamy informatsiinykh tekhnolohii: avtoref. dys. na zdobuttia nauk. stupenia kand. ped. nauk: spetsialnist – 13.00.04 «Teoriia i metodyka profesiinoi osvity». Kirovohrad, 2005, 27.

25. Honcharenko, S. Ukrainskyi pedahohichnyi slovnyk. Kyiv: Lybid, 1997. 376 s.

26. Iran-Nejad, A., Chissom, B. (1992). Contributions of active and dynamic self-regulation to learning. Innovative Higher Education, 17(2), 125–136.

27. Koohang, A., Riley, L., Smith, T., & Schreurs, J. (2009). E-learning and constructivism: From theory to application. Interdisciplinary Journal of E-Learning and Learning Objects, 5(1), 91–109.

28. Kuo, Y.-C., Walker, A. E., Belland, B. R., & Schroder, K. E. E. (2013). A predictive study of student satisfaction in online education programs. *The International Review of Research in Open and Distributed Learning*, *14*(1), 16–39.

29. Lan, W. Y., Bremer, R., Stevens, T., & Mullen, G. (2004). Self-regulated learning in the online environment. Paper presented at the annual meeting American Educational Research Association, San Diego, California.

30. Lauren, Hays & Katelyn, Handler (2020). Good Design is Universal: Using Universal Design Principles to Promote Self-Regulated Learning in Learning Management Systems When Teaching Information Literacy, Journal of Library & Information Services in Distance Learning, 14:2, 127–140.

31. Lee, E. A.-L., & Wong, K. W. (2008). A review of using virtual reality for learning. In Z. Pan, A. D. Cheok, W. Müller, & A. El Rhalibi (Eds.), Transactions on edutainment I (pp. 231–241). Berlin, Heidelberg: Springer Berlin Heidelberg.

32. Liaw, S. S. & Huang, H. M. (2013). Perceived satisfaction, perceived usefulness and interactive learning environments as predictors to self-regulation in e-learning environments. Computers and Education. Vol. 60, №1, 14–24.

33. Maksymenko S. D. (2002). Rozvytok psykhiky v ontohenezi. Modeliuvannia psykholohichnykh novoutvoren: henetychnyi aspekt. Kyiv: Forum, 335.

34. Miyer, T. I., Holodiuk, L. S., Savosh, V. O. (2021). Preventing the pre-sick conditions of those who practice lifelong learning Wiadomości Lekarskie, Volume LXXIV, Issue 1, 107–111.

35. Miyer, T., Machynska, N., Bondarenko, H., Rudenko, N., Romanenko, L., Sukhopara, I., Shpitsa, R. E-learning in the conditions of the information economy as a factor in the development of future teachers for the sustainable development of society. AD ALTA. Journal of Interdisciplinary Research. 2023.Vol. 13, Issue 1, Special XXXII, 13–20.

36. Miyer, T., Siranchuk, N., Vyshnivska, N., Rudenko, N., Shkurenko, O., Romanenko, L., Fedorova, Y. (2023). Indirect and direct pedagogical interaction of teacher with students in the conditions of e-learning and their performance of the roles of "e-teacher" and "e-student". *AD ALTA. Journal of Interdisciplinary Research*. Vol. 13, Issue 1, Special XXXIV, 62–68.

37. Miyer, T., Zhurba, K., Holodiuk, L., Dyka, N., Stetsyk, S., Tretiak, O., Tsybulska, S. (2023). Information and information resources as social and personal values of education and of subjects of the educational process in the information era. AD ALTA. Journal of Interdisciplinary Research. Vol. 13, Issue 1, Special XXXII, 6–12.

38. Moon-Heum Cho & David Jonassen (2009) Development of the human interaction dimension of the Self-Regulated Learning Questionnaire in asynchronous online learning environments, Educational Psychology, 29:1, 117–138.

39. Pavlov, Y. P. (1951). Yzbrannыe proyzvedenyia. Lenynhrad: Hosudarstvennoe yzdatelstvo polytycheskoi lyteraturы, 582.

40. Pintrich, P. R. (2000). Multiple goals, multiple pathways: The role of goal orientation in learning and achievement. Journal of Educational Psychology, 92(3), 544–555.

41. Pintrich, P. R. (2000). The role of goal orientation in self-regulated learning. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), Handbook of Self-Regulation (pp. 451–502). San Diego, CA: Academic.

42. Psykholohichna entsyklopediia (2006). Avtor-uporiadnyk O. M. Stepanov. Kyiv: «Akademvydav», 424: 387.

43. Raman, K., Othman, N., Danaraj, G. Investigating key factors for successful e-learning im- plementation. Asia Proc Soc Sci 2019; 4: 49–52.

44. Schunk, D. H. (2005). Self-regulated learning: The educational legacy of Paul R. Pintrich. Educational Psychologist, 40(2), 85–94.

45. Shapar, V. B. Suchasnyi tlumachnyi psykholohichnyi slovnyk. Kharkiv: Prapor, 2007. 640:449.

46. Sharma, S., Agada, R., & Ruffin, J. (2013). Virtual reality classroom as a constructivist approach. In 2013 proceedings of IEEE southeast on, 1–5.

47. Shazia, K. Jan (2015) The Relationships Between Academic Self-Efficacy, Computer Self-Efficacy, Prior Experience, and Satisfaction With Online Learning, American Journal of Distance Education, 29:1, 30–40.

48. Shuell, T. J. (1986). Cognitive conceptions of learning. Review of Educational Research, 56(4), 411–436.

49. Steven "Boot" Chumbley, J. Chris Haynes, Mark S. Hainline & Tyson Sorensen. A Measure of Self-Regulated Learning in Online Agriculture Courses. Journal of Agricultural Education, 59(1), 153–170.

50. Woo Y. & Reeves T. (2007). Meaningful interaction in Web-based learning: A social constructivist interpretation. The Internet and Higher Education, 10(1), 15–25.

51. Yi-Chun, Lin, Jyh-Chong, Liang, Ching-Ju, Yang, Chin-Chung, Tsai (2013). Exploring middle-aged and older adults' sources of Internet self-efficacy: A case study. Computers in Human Behavior. 29(6), 2733–2743.

52. Zimmerman, B. J. (1998). Academic studying and the development of personal skill: A self-regulatory perspective. Educational Psychologist, 33(3), 73–86.

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