

Educational and Cognitive Independence of Students in E-learning

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ABSTRACT

Topicality of the topic is driven by the changed social and economic conditions in Russia, that led to the search for educational paradigms adequate to the new social and economic development of the country, and by the rapid growth of the role of information technologies as well as by the need to improve the professionalism of teachers in their use of computer technologies in education. The aim of the article is to draw the attention of the pedagogical community to the actual forms of e-learning in modern educational practice of Russian education. The leading approach to the study of this problem is the analysis of world and Russian experience of using e-learning in order to strengthen the independence of students. The recommendations on the implementation of e-learning in the context of Russian education were suggested as the result of the research. The material of the article can be useful for teachers seeking to apply modern methods and technologies of teaching.

Keywords: independence of students, educational and cognitive activity of students, e-learning, distance educational technologies

INTRODUCTION

Topicality of the topic under study is driven by the significant changes in the educational system in Russia, by the adoption of the Federal Law "On Education in the Russian Federation" [1], providing computer technologies for education at all levels of education, including e-learning in modern educational practice [2, 3, 4, 5, 6, 7, 8]. The rapid development of information and communication technologies in modern Russian society led to the active acquisition of information technologies by teachers of all levels of education; in our opinion computer technologies are used the most intensive by university teachers who use personal computers to develop methodological support for the academic disciplines of basic educational programs, for educational and pedagogical support of the educational process in general, and the individual educational process for each student in particular, and for organization, improvement and increase of efficiency of students' independent work. In this publication we propose to consider the problems of educational and cognitive independence of e-learning students [9, 10]; the degree of independence of students in e-learning, taking into account the types of e-learning, the type of educational work, the characteristics of student and teacher's activity in the implementation of e-learning.

METHODOLOGICAL FRAMEWORK

Research Methods

The following methods were used to carry out the research: theoretical (systematic and retrospective analysis of pedagogical literature on the research problem, logical generalization of regulatory and scientific literature, modeling of the pedagogical system taking into account the requirements of modern Russian education, factor analysis of pedagogical experience, prediction of pedagogical phenomena, comparative analysis of research

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methods of teacher and student's needs in use and implementation of e-learning); empirical (observation, questionnaire, comparison, analysis of group interactions); experimental (pedagogical ascertaining experiment, designing of pedagogical tasks).

Experimental Resources of the Research

Russian State Vocational Pedagogical University, The Ural State Forest Engineering University, Ural State University of Railway Transport were used as experimental resources of the research.

Research Stages

The research was studied in three stages:

The first stage dealt with the system analysis of scientific publications, regulatory documentation in field of vocational education; problem analysis of the current state of Russian e-learning system; study of the problem of students' educational and cognitive independence in e-learning in an educational organization.

The second stage focused on the development of recommendations for teachers, students and heads of educational institutions on the organization of effective use of e-learning in the process of formation of students' educational and cognitive independence in the period of higher education.

The third stage. Approbation of the intra-university system of e-learning in the process of formation of students' learning and cognitive independence.

RESULTS

There is no doubt that today due to the development of information and computer technologies the emphasis of educational system shifts from the student's dependence of teacher to the independence of student: "If the teacher used to share his knowledge with students and helped them to sip knowledge from books, today due to the existence of global information network, the rapid development of computer technology and new opportunities of distance education, the role of the teacher becomes different, and the emphasis in teaching increasingly shifts to the student's independent work "[11]. The learner, the student in particular, acts as a cognitive subject, and at the same time masters the material without the participation of the teacher, who fulfills the consultative and methodological role in the new conditions, that means the student must "be able to learn" without supervision, regardless of external control, that is be independent.

There are several degrees of independence of the learner, who masters knowledge with help of information and computer technology. Let us cite them in the concept of M. G. Balykhin [4]: self-directed learning; guided learning; instructor-guided learning; integrated training; tv-education and distance training (**Table 1**).

E-learning assumes by its nature the lion's share of independent work and has the advantage of being able to build a learning system that takes into account the hierarchy of student's needs based on his requests [2, 8, 12]. E-learning allows to build the process of the knowledge mastering "from top to bottom" according to the needs (motives) of the learner, in contrast to traditional education, which suggests moving in one direction - from simple to complex regardless of the characteristics and requests of the addressee: "Unaddressed knowledge subjectively perceives as abstract one and requires additional efforts for the retention in the mind." [2]. With e-learning, the effort spent on the retaining in memory of abstract knowledge becomes possible to apply to the mastering of knowledge truly necessary and demanded here and now, and such training will be more effective [13]. It is thought that the changing world and the growing individuality of the educational trajectories in these conditions encourage us to turn to e-learning, in which the learner's personal choice is a priority. The independent work of the student is interpreted by A. L. Kondratyeva [10] as the leading type of educational and cognitive activity of students in the university. "Individualization and increasing the proportion of students' autonomy in university education is the response of the higher school to the challenges of time, to the changes that occurred in the country's economy and social sphere" [10].

As is known, the connection of E-Learning with the traditional form of training gave a lot of hybrids, each of which serves a certain contingent of students [14]. Blended Learning assumes a didactic combination of traditional teaching and E-Learning. "Didactics in the network" deals with theories when classes on some discipline are held using small computer networks. CSCL (Computer-supported cooperative / collaborative learning) implements an approach to supporting cooperative / collaborative learning using ICT. Digital Game-based Learning (DGBL) is a synthesis of the transfer of knowledge and games (computer and video), which helps to motivate the students. Rapid E-Learning is designed for the rapid creation of educational content. Virtual Classroom (also a webinar) is a form of e-learning, in which the teacher and students spatially separated work together: synchronously or asynchronously. In the case of the Web Based Collaboration groups of students work together on the Internet on some educational task [7].

Table 1. Degrees of independence in e-learning

Kinds of e-learning on the degree of student's independence	Type of work	Student's activity	Teacher's participation
Self-directed learning	Mastering the course through self-learning of web content: multimedia presentations, interactive programs	"Independent student", acts autonomously, learns the course at a convenient time, relies only on instructions given in the materials of the course	Not involved in the learning process, does not provide information, does not provide assistance, does not exercise control
Guided learning	Mastering the course together in a group with other students and facilitator with access to web content	The student adheres to the work schedule, interacts, discusses with other students, communicates with facilitator; receives tasks via web-content, executes them and places them in a network mode	Provides support as a facilitator, answers questions, evaluates the tasks performance, but does not manage events directly and does not control the process
Instructor-guided learning	A traditional lesson in real time for remote students using the web technologies: video and audio conferences, chats, recitation, white boards	Can use the video player to view the presentation, ask questions by typing them in the chat window or by sending an e-mail	Shows slides and guides the display of additional material (these presentations are sent by streaming media, accompanied by a voice and a video image of the instructor)
Integrated education	Training for the request: an e-course is embedded in computer programs, help system files, web pages or network applications		
TV-education and distant training	Contact between the student and the mentor by means of electronic communications: video conferences, instant messaging, Internet-phone and other collaborative distant work tools are used	The student has a necessity in a mentor with whom it is possible to communicate on career development issues (long-term) or solving a problem within the framework of the project implementation (short-term training)	Manages the work of the students as a mentor, helps to build a career, gives advice, recommendations

All these mentioned types of e-learning take place in modern educational practice. The teacher or an educational institution makes the choice in favor of one of them.

B. A. Iskakov & S. G. Sakhariyeva [15] characterize three systems of interaction between subjects of educational process in the context of traditional learning and e-learning: traditional, distant and mixed, each of them implements a set of certain methods, means and methods of cooperation. "The degree of learners' independence" is present among the criteria for their delimitation.

The classification of forms of distant learning, proposed by V. I. Snegurova [16], is based on the evaluation of the student's independence in learning activity: "1) traditional (correspondence): oriented only to independent work and not involving the interaction of the teacher and student, which presupposes the conduct of introductory lectures, and then the continuation of independent work on delivered sets of methodological support; 2) the fragmented use of information and communication technologies. In this case, the student independently works with the set of educational and methodical support, which is partially presented in electronic form.

The interaction between the teacher and the student is carried out through various types of communication. The aforesaid models of distant learning practically do not differ from the correspondence learning; 3) electronic - the receipt by e-mail of educational and methodological support and its independent study. It should be noted that in this model too, there is no the specificity of distant learning, which assumes the systematic interaction of the learner and the teacher through a specially created environment; 4) combined" [16].

Let us pay attention to the fact that in the scientific researches the emphasis is increasingly on the delineation of the concepts "independent work" and "autonomous educational and cognitive activity", or "autonomy". The basis for such a separation are the next criteria, on the one hand, a narrow understanding of independent work used as a method (method, form) of organizing work outside the classroom or on the occupation without the participation of the teacher [17, 18, 19] and, on the other hand, the integral nature of the autonomous educational process, the presence of a number of components in it [20, 21, 22, 23, 24]. The constitutive characteristics of autonomous learning are the next: the comprehension of this process, the necessity of the purposeful application of efforts, the setting of goals and objectives, planning, development of the educational trajectory, systematic self-

organization, self-management, motivation, determination of deadlines for the job carrying out, as well as the need of the self-monitoring skills application, evaluation of the results, adjustment of the trajectory.

An important pedagogical postulate is that the student should be trained in independence, since he is not ready for full freedom in the decisions making and self-control. So, N. V. Kasyukova [25] names among the shortcomings of training via the Internet, the following: "unpreparedness of students to tense, effective independent work; the inability to self-organizing and to plan their work independently; the lack of self-discipline. "

The teacher acts as a key figure: he controls the stages of planning, the goal setting, self-control, establishes the pace of work and organizes cooperation with students [26]. In this case, the teacher's role is transformed in comparison with the traditional one, as it is evaluated as insufficiently contributing to the formation of independence. Considering the content of the "independence" concept and the conditions for the formation of the personality independence in learning, D. A. Antonova [27] believes that "the hyperbolization of the teacher's function as a source of information in educational environment and the direct "translation" of socio-cultural experience block the full development of the personality's independence in learning activity ". Now, under the influence of radical changes in the information space, the emphasis in the organization of educational process shifts: "New educational practices do not exclude the traditional activities of the teacher, but impose restrictions on this activity" [27].

The autonomy should be inherent also to the mentor, which forms students' educational and cognitive independence and further educational autonomy, i.e. to the teacher. Among the professional qualities of the modern teacher, I. McGrath [28] singles out the "teacher autonomy", presupposing, on the one hand, self-directed professional actions for self-development, and on the other hand, freedom from external influences in the choice of educational activities.

To achieve the educational independence, it is proposed to use the ideas of cooperation, collaboration between the autonomy of teacher and students: "In the process of the students advising, the teachers take part in various research activities, ask the questions that are useful themselves in terms of increase of the learning process understanding. And in order to increase the students autonomy and it was effectively reflected in the learning, the teacher must constantly think about his role in the class and control the degree of restrictions allowable in the formation of students' thinking and behavior. There is a sense that teachers and students can learn together and become more competent in autonomy achievement, combining it with reflexive learning " [29].

So, the regularity of control from the teacher's side is invoked to help the student in development of a responsible attitude to the learning process: "Clear criteria for monitoring help to optimize the out-of-class independent work of students and give to teacher the real levers for management of this important activity, whose share in the modern educational process is significantly increased " [30]. The teacher is responsible for the preparation, careful development of test equipment, methods, manners, materials.

The function of monitoring in the case of electronic education is not a narrow, private task of the teacher. The scientists say about its significant role, about the necessity for its presence in the educational process: "A fairly common mistake in interpretation of its definition is to emphasize the role of information and communication technologies as a means of rapid delivery of training materials and the operational control of the results of independent learning. The main importance of use the telecommunications is that they allow to restore so important and almost lost in the correspondence learning function as a didactic connection "teacher-student" " [9].

In addition to the concept of assisting tutors and lecturers in the process of student's independent work [31], the forms of independent education by students of each other are being developed among the methods of formation of students' learning and cognitive independence, so-called "peer teaching": peers help each other in preparing for lessons and exams [32].

In a number of works such characteristic of e-learning as adaptability is noted [5, 6, 21]. The adaptive potential of e-learning is the ability to adapt a course developed as an approximate model, according to technical or content parameters to the user: "Adaptability in teaching in modern scientific interpretation is understood as the personification of the learning process on the basis of e-courses development that take into account the individual traits of the learners, including psychological features, perception, level of initial knowledge, as well as individual goals and tasks of the training " [6]. Due to this property of the electronic programs, the practical application of ICT allows to build an individual educational trajectory for each student.

The preparation of a training course focused entirely on the student's self-learning can be performed taking into account the individual style of the student's work, because if he independently organizes his activities, then, as a rule, he behaves in accordance with his psychotype, available abilities and skills.

The teacher's facilities in the organization of students' independent work are favored by such properties of e-learning as its "interactivity, variations for the presentation of the educational material, the modular structure of content, the presence of a constantly active reference system, the development of an individual educational plan and the confidentiality of learning" [33].

At present, we can talk about “self-directed learning”, about the acceptance by the student of the role (function) of manager, i.e. about the fact that modern education should be organized in the way that everyone “can become an independent manager of his own education and professional activity” [4]. This kind of self-management can be considered as the highest step in the development of educational and cognitive independence.

DISCUSSIONS

In pedagogical literature, the different approaches to the definition of the concept of “cognitive independence” are distinguished: the activity approach [34, 35] and the psychological [36]. These approaches are based on the thesis that educational and cognitive independence is formed under the influence of external and internal factors. The external should be understood as the social environment of a person, which predetermine features of his self-organization, the part of which an educational process can and should become. Internal factors are the psychological features of a person, the abilities and inclinations of a person, his will and temperament, which can be adjusted under the influence of various circumstances, including the performance of educational work.

New conjuncture, new contours of public life and educational system find documentary support. “In accordance with the FSES of new generation educational programs allocate a large number of hours for independent work of students. A purposeful and controlled independent work of a student can be effectively organized using modern e-learning technologies. At the same time, the student can independently determine the sequence of mastering subjects, learn at a convenient place, with an individual speed and at time convenient” [3]. It can be stated that the reduction of hours allocated for classroom work and the increase in the hours planned for independent work of students further strengthens the impetus for the active use of ICT in education, and also necessitates the development of educational and cognitive independence of students.

It is generally accepted today that the educational and cognitive independence can be formed in the process of higher education. This also means that this type of independence is necessary for a person not only in the period of his studies in institution of higher education, but also after graduation at the university. Consequently, we can talk about the great importance of this quality of the personality for mastering information in general, for learning throughout all his life, i.e. for the continued participation and interest of a person in continuous education, which becomes more and more oriented toward distance technologies.

Formation of educational autonomy can be seen as the result of the educational independence development. In foreign publications, it is emphasized the necessity of the students’ support in the development of abilities important for self-education [37].

As one of the possible ways to solve the problem, it is logical to assume the planned immersion of the student in a self-regulated educational process: it is necessary “to gradually transfer them some of the responsibility for learning outcomes” because “most students lack the necessary arsenal of autonomous strategies and the experience of autonomous learning” [20].

Meanwhile, the independence of education imposes on the student the obligation to assume - at least in a great measure - the responsibility for its organization and results.

At the same time, the role of the teacher in the process of electronic, especially distance learning, is under discussion. Much attention is paid to the exercise of control functions.

According to A. Scharle & A. Szabo [38], the process of autonomy formation includes three stages: raising of students’ awareness, changing attitudes toward the process itself, and changing the roles from a passive object to an active subject.

Researchers-theorists and practitioners are in search of methodical solutions to the problems associated with the formation of educational and cognitive independence in the framework of different sciences, taking into account the different age categories of students. Thus, M. I. Zaikin & S. V. Napalkov [39] offer a model for using thematic educational Web quests as a means of developing cognitive independence of students in teaching algebra in secondary school; the model includes several blocks: the target blocks (main and accompanying targets), information-content (components of information content, the direction of content enrichment), process-technological (the areas of students’ role self-determination, the strategy of the information content mastering, logic of performing search and cognitive tasks) and evaluation (the expression of the training result, criteria and indicators of its evaluation). I. R. Stashkevich [40] poses the problem of the development of the military cadets’ cognitive independence as an integral professionally significant personal quality in computer support of theoretical training that implements the design - technology principle of vocational training. She proves that “the didactic computer environment is the main element of the computer support system of the educational process in the higher military school and the factor that ensures the positive dynamics of all components of cadets’ cognitive independence in higher military school”, substantiates the existence of three interconnected and interdependent components of cognitive independence - motivational, volitional and content-motivation and suggests criteria for revealing the levels of its formation with the help of 12 indicators [40]. S. S. Yantranova [41] studies the problem of

developing of students' cognitive independence in the natural-science direction in the process of mathematics teaching, taking into account the two-level training of the future specialist. E. V. Kochanovskaya & E. B. Zhadobko [42] estimate the effectiveness of the use of information technologies in the formation of cognitive independence of students of technical and humanitarian specialties in a comparative aspect. N. V. Fomin [43] addresses the problems of planning and methodological support of independent work of students in the bachelor degree and the magistracy; lists factors reducing the effectiveness of independent work of students; adduces the targets of independent work organization by using the electronic technologies: individualization and differentiation of the learning process; self-control and self-correction of educational self-directed activity; training; increasing motivation; the formation of the ability to take the optimal decision independently in a complicated situation, as well as the logical way of thinking and algorithmic culture, information culture in general, and others. In many works, educational and cognitive independence is assessed as being intensively and effectively formed in the context of the ICT use [14, 30, 44, 45, 46, 47, 48].

Thus, it is possible to single out the existence of contradictions between the requirements that society presents to a graduate who must have a high level of development of cognitive independence as a part of his professional mobility, and existing educational approaches that do not ensure the fulfillment of this task in the conditions of higher school; between the necessity for the development of educational and cognitive independence through logical games and the insufficient elaboration of this issue in pedagogical theory and practice; between the prospects of using e-learning for the development of cognitive autonomy through logical games and the lack of a systematic generalization of the advantages and disadvantages of e-learning, taking into account the latest data on the analysis of their use, the solution of which will help to increase the efficiency and effectiveness of the educational process.

CONCLUSION

The authors of the article performed a theoretical and methodological analysis of scientific literature on the research problem and found out that at present there is a need to develop and scientifically substantiate a system for the effective use of e-learning in order to form and improve the educational and cognitive activities of students, resourced of educational services.

The material of the article can be useful for professional educational organizations adapting to the new conditions of activity in the field of education.

The new questions and problems appeared in the research process, that needed their solution. There is a need for further study on the development of tools and methods for the formation of educational and cognitive activities of students, as well as the preparation of university teachers for work in the new conditions of modernization of Russian education.

RECOMMENDATIONS

The stated results of the analytical and exploratory work can be useful for the development of the vocational education system, including the development of professional and competence-oriented educational programs of a new generation that will allow the introduction of effective pedagogical technologies in the educational process.

The authors are supposed to continue the research and actively use logical games for the development of cognitive independence. Game technologies for the development of logical thinking have long been used in the teaching process both abroad and in Russia. However, in the Russian pedagogical practice, logical games in e-learning have not yet been widely proliferated.

Logic games are those forms of educational work that stimulate cognitive independence of students, regardless of their age, contribute to the formation of positive emotional experience, independent study of the material and the ability to transform knowledge and skills obtained during the virtual game into actions in solving real problems, and also humanize the educational environment [44, 49, 50, 51]. The authors draw attention to the necessity to develop new curricula for students, combining the traditional and electronic methods of teaching.

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