

# Electronic Information and Educational Environment of the University as a Means of Organizing Independent Work of Students

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**Abstract**—In the context of the modernization of Russian higher education, training should be built on a differentiated basis, have a problematic and developing character. The main purpose of higher education is to prepare a graduate who is not just knowledgeable but who knows how to apply his knowledge. In this regard, there is a need for continuous self-education and self-development, in the development of selection skills useful for students of professional development and improvement of information. At the same time the efforts of the teacher should be aimed at creating an environment focused on independence, interactivity, productivity of students' activities, an environment that provides an opportunity to form an individual educational experience of a student moving along their own educational path. To organize effective independent work of students it is advisable to create an integrated system for organizing this work based on the information and educational environment of the university. The article presents the experience of organizing independent work of students of the Arzamas branch of Nizhny Novgorod State University through the electronic information and educational environment of the university. The article describes the developed electronic courses in the disciplines of the psychological-pedagogical cycle, shows the importance of such areas of independent work of students when using the electronic educational environment of the university as the search for the necessary information; preparation for practical, laboratory, seminar classes; preparation for the survey, colloquium; test preparation; preparation for tests and other types of written test works; preparation for various competitions, contests and more.

**Keywords**—*electronic information-educational environment, higher education, independent work, student.*

## I. INTRODUCTION

The implementation of state educational standards at all levels of education implies increased requirements for the quality of education. High school is no exception. Here, the problem of improving the quality of the educational process is central. In the modern information

world, the quality of education cannot be achieved only by filling the student with more and more knowledge. In the modern world it is impossible, as in the times of Ya.A. Kamensky, to collect all the knowledge in one book and pass it on to the younger generation since the accumulation of information is proceeding at an accelerated pace. A modern student should be able to navigate information flows and use it with conscience [1]. "Knowledge is knowledge only in the case when it is acquire by the thought and not by memory" [2] – this thesis of L.N. Tolstoy fills the student's learning activities with a strategy of independent activity and personal activity. Therefore, it is necessary to find new approaches, means and opportunities to improve the quality of the educational process in higher education.

In the context of the modernization of the Russian school, a competence paradigm has been adopted. The main goal of higher education is to prepare a graduate who not only possesses knowledge, but knows how to dispose of his knowledge [3]. It is necessary to prepare a professional who would be able to choose the most optimal among a multitude of solutions, a professional who is ready for self-education, self-determination and self-development [4], [5].

The need to prepare a university graduate for continuous self-development and self-education makes the independent work of students one of the basic forms of their preparation for successful life in the information society.

Independent work of students in the scientific literature is a multidimensional concept. Various approaches in defining independent work by various authors systematizes and classifies by I.V. Kharitonova. Independent work is defined as independent exercise activity (V.A.Kozakov [6]); work on the instructions of the teacher (R. Mikelson, B. Esipov [6]); type of

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learning activity (L.I.Ruvinsky) [6]); teaching method (L.V. Zharkova, A.V. Usov [7]); form of organization of educational activities (T.I. Shamov [8], M.I. Moro [9], I. E. Unt [10]); a means of organizing independent activities (P.I.Pidkasisty, R.A.Lofovskaya [11]) and others. Following definition was most prevalent: "independent work of students is an active, purposeful acquisition by the student of new knowledge for him without direct participation in this process of teachers" emphasizes I.V. Kharitonova.

Increase the role of independent work of students in conducting various types of training involves:

- optimization of teaching methods, introduction of new technologies into the educational process, increasing teacher's productivity, active use of information technologies, allowing the student to master the teaching material at a convenient time for him;
- widespread introduction of computerized testing;
- improvement of the practice of conducting practices and research work of students, since it is these types of work that primarily prepare them for the independent fulfillment of professional tasks;
- modernization of the course and diploma design system which should enhance the role of the student in the selection of material, finding ways to solve research problems.

So, the formation of the future specialist skills and skills of independent work is one of the most important tasks of higher education. Successful solution requires an integrated approach which includes scientific substantiation of the essence and content of independent work, development of an acceptable for the student planning system and organization of independent work in the educational process, development of methods of independent activity during the classroom and extracurricular time, management and self-management at different stages of preparation young specialist.

## II. VITAL QUESTION

Education in higher education should be built on a differentiated basis allowing interest and maximum use of strong trained students while not suppressing those students who are not sufficiently prepared and cannot keep up with the pace of work of their peers. The fundamental principle for this should be an independent choice by students of their level of mastering educational material. The nature of multi-level should be done so that unobtrusively, but constantly it was possible to teach a lower level student to constant improvement. Training should be problematic and developing, it should activate students' cognitive activity. It is necessary for students to form the need for continuous self-education and self-development, to develop selection skills useful for their professional development and improvement of information.

## III. PROBLEMATICS

The transformation knowledge type of education to activity type makes the main system forming factor not

the component of obtain knowledge but the method to solve various educational tasks.

Function of teaching must be transformed to function of supporting study. The learner's position should change from a passive learning object, a recipient of ready-made learning information, a learning object and educating influences to an active subject of the learning, independently extracting the necessary information and constructing the necessary ways of doing it [12]. The efforts of the teacher should be aimed at creating an environment focused on autonomy, interactivity, productivity of students, the environment providing the possibility of forming an individual educational experience of the student, moving along their own educational trajectory. To organize effective independent work of students it is advisable to create an integrated system for organizing this work based on the information and educational environment of the university [13], [14]. The teacher should actively use the capabilities of the information and educational environment of the university for the organization of all types of independent work of students, to be an active participant in its creation. The degree of use of the capabilities of the information-educational environment depends on the position of the teacher. The teacher is the initiator of engaging in the educational process of electronic resources.

Analysis of the intensity of use by teachers of the capabilities of the electronic information and educational environment of the Lobachevsky State University of Nizhny Novgorod (Arzamas Branch) shows that more than half of teachers do not seek to actively use it. The study of such a passive attitude of higher education teachers allowed us to identify a number of barriers in the use of the possibilities of the information educational environment of the university:

- conservatism of the faculty of universities (especially older teachers) which is manifested in the fact that these teachers are reluctant to master the possibilities of electronic resources and the capabilities of the university's e-learning system;
- necessity to have long time to create your own electronic courses;
- unwillingness of students, especially the correspondence department, to work in the e-learning system;
- necessity to monitor the implementation of students' tasks in the e-learning system (verification, adjustment of completed tasks requires considerable time which are not taken into account in the teaching load of teachers);
- lack of organized management of the activities of students and teachers when working in the e-learning system by the administration of educational departments of the university, faculties and departments;
- not a well-established system of incentives for teachers who actively use the capabilities of e-learning system.

Therefore, at present, due to the prevailing

contradiction between the need to use the electronic information educational environment of the university for organizing and effectively managing the independent work of students and a number of identified barriers, which together determine the research problem, a range of tasks to be addressed should be defined.

The conservatism of teachers is largely based on the fact that many of them are not familiar with the capabilities of e-learning system, are not sufficiently aware of the fact that e-learning environment makes it possible to put into practice practically all the principles of organizing students' independent work, that is, it is in this sense universal means. The system of interrelated principles of the organization of independent work of students is represented by the following:

- 1) the motivation and interest of students in improving the level of professional training;
- 2) meaningfulness, activity and initiative in mastering subjects;
- 3) mutual respect and trust of students and teachers;
- 4) regularity and consistency (division of work into logical parts, determining the time for each of them);
- 5) expediency (the content of independent work should correspond to the main goals and objectives of certain specific subject areas);
- 6) practical orientation, that is, the orientation of the tasks of independent work on what is necessary in the practical activity of a specialist;
- 7) optimization of actions to achieve the most significant results, minimization of costs for the implementation of secondary actions;
- 8) individualization (independent educational work is based on individually-typological (temperament, character, abilities) and personal (features of perception, memory, thinking, will) properties);
- 9) instrumentalization of actions, that is, the involvement of technical means to search for information, solve typical problems, and assimilate knowledge;
- 10) availability of information and teaching aids which presupposes a high level of equipment in the material, technical and information base, the possibility of its use by students;
- 11) assessability (each type of independent work must be timely evaluated);
- 12) diagnosability (any independent work should contribute to personal, mental and professional development; diagnosis should be carried out with the control carried out by means of diagnosed events).

#### IV. METHODS, ORGANIZATION AND RESEARCH RESULTS

The article presents the materials obtained through the theoretical analysis of the scientific and methodological literature and the description of experimental work on the use of the capabilities of e-learning system by teachers of the Lobachevsky State University of Nizhny Novgorod (Arzamas Branch) for the organization of independent work of students of the faculty of preschool and primary

education.

The experiment was attended by students of 1 and 2 courses in the amount of 100 full-time and part-time departments for 2 years (2016-2017 academic year, 2017-2018 academic year).

The experiment took place in three stages. The first stage is the ascertaining experiment. The purpose of the ascertaining experiment is to identify the level of formation of skills of independent work of students of the 1st course.

One of the factors determining the effectiveness of independent work is knowledge of how to work, what skills to apply. In connection with the five-component structure of educational activities by N.V. Kuzmina all the skills of independent work can be divided into the following blocks: gnostic, design, construction, organization, communication [15].

Gnostic skills include skills related to the process of learning and mastering. Design skills constitute the skills of goal-setting and design goals of independent activities. Constructive skills are the ability to determine the content, logic, sequence of performance of various types of independent study work.

The organizational unit highlights the ability to implement the goals and plans formulated in the process of designing and constructing educational activities.

Communication skills is the ability of the individual to create and implement communicative relations in the conditions of independent work.

Formation of self-study skills begins in school, but in practice, the level of their formation does not meet the requirements of university education. In high school, the need for independent work skills increases dramatically. Therefore, the first-year student has no such skills.

To determine the level of formation of skills of independent work, students were offered a questionnaire in which it was necessary to evaluate themselves for five blocks of skills.

The gnostic skills block contains seven points. Gnostic skills are the skills that:

- highlight the most important thing in the text, in the task, the ability to read the contents of the monitor screen, to see the screen entirely, and not fragmentary, to be able to focus attention on the necessary areas;
- highlight the relationship between the studied phenomena;
- use reference books;
- involve additional sources in the study of the material; formulate a hypothesis;
- outline ways to test it; apply knowledge in changed conditions;
- critically perceive the material, find contradictions;
- use quick reading techniques;
- make analysis;
- make synthesis, generalizations, comparisons,

be able to concretize, give examples of common phenomena;

- plan the pace and rhythm of independent learning activities; be able to break work into stages and plan each of them;
- select the desired method or method for solving the problem;
- plan independent work for a long term;
- plan independent work for the near future and now.

The constructive skills allow to:

- briefly and concisely jot down the material;
- draw up annotations to the texts;
- select and memorize vivid quotes; draw up a plan for the upcoming message, abstract;
- present the studied material in charts, tables, making clusters;
- draw conclusions and generalizations based on the studied literature.

Organizational skills are aimed to:

- organize time, not to waste it on unimportant and unnecessary things;
- organize independent activities in order to acquire the skills and abilities necessary for future profession;
- organize workplace, the means for independent work; organize the information accumulated during the assignment in such a way that it can be used upon completion of work.

Communication skills are the skills that enable to:

- express, highlight own attitude to the facts;
- formulate value judgments and argue own opinion;
- establish contacts with the teacher, fellow students on educational issues.

For each item, students were asked to rate themselves on a scale: high level, medium level, low level. The results of the survey are presented in Fig. 1.

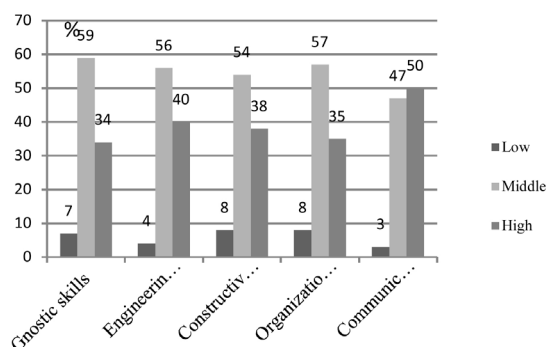


Fig. 1. The level of formation skills of independent work 1st year students, % of respondents

The diagnostic results presented in the diagram indicate that in the first year all skills, with the exception of communicative ones, are formed at an average level. It can be assumed that the relatively high degree of development of communicative skills is related to the fact that at all levels of school education a sufficient amount of manpower and resources was devoted to the development

of students' communication skills. However, gnostic, design, constructive and organizational skills were not sufficiently formed for the productive independent work of students.

The result of the ascertaining stage of the experiment is the conclusion that the formation of skills for independent work should be continued in higher education, it largely depends on the organizing activity of the teacher, on the methodological support of independent work and maximizing the potential of the electronic information educational system of the university.

The second stage of experimental work assumed that, starting from the first year, students of experimental groups were centrally registered in the electronic information system of the university. Each of them received an individual login and password to be able to log in to this system.

For the organization of independent work with students, electronic courses have been developed in the disciplines of psychological and pedagogical cycle ("Introduction to pedagogical activity", "Methodology and methods of psychological and pedagogical research", "Pedagogy (two parts – Theoretical pedagogy and Practical pedagogy)."

According to the discipline "Pedagogy" (theoretical and practical parts), the structure of the courses consists of several sections. Each section contains a plan for studying a separate topic of the course supporting theses on the fundamentals of the theory of the studied question. Each topic is presented on several pages of the electronic manual, that is, students study theoretical material "in portions". After each mini-portion of the theoretical material, students are asked questions and given tests to consolidate and verify their mastery of part of the educational material. The software capabilities of the electronic system allow using video and audio content in addition to the text. Students at a convenient time for them turn to the implementation of tasks on the studied topic. The teacher has the opportunity to remotely check the progress of the student in studying the materials of a section, to give recommendations for its implementation using such forms of communication as electronic correspondence, remote video, as well as audio circulation. Working with an electronic course allows students to vary the course content. The teacher can independently fill in the e-course, supplement it, update its content. The student and the teacher do not lose touch with each other even when the part-time student leaves home after the sessions. Supervision of independent work of students is conducted purposefully, continuously and consistently.

In order to exercise strict control over the activities of students, the teacher sets the time for the performance of a particular task, puts a limitation on the duration of testing.

The fact that the teacher has the ability to quickly verify the test, answer questions, carry out the verification of students' independent work on various creative tasks



(check the essay, abstract, composition, answer recorded in audio and video formats, etc.) can be considered to be positive. In this case, the student promptly receives a response from the teacher. A part-time student has the opportunity to receive qualified assistance. The teacher pre-specifies the time of personal communication with the student, gives the schedule of consultations which is always available to the student. The student learns the content of training courses at his own pace. The implementation of distance learning, control over the educational activities of students is possible only if certain requirements are met which educational information must meet. Compliance with these requirements contributes to the optimization of the educational process.

When composing e-learning disciplines, the teacher should consider the following requirements:

1. The completeness of information that is supported by past experience, the inclusion of a variety of perspectives on the issue under consideration, compliance with the interests and goals of the student, a focus on practical application, compliance with the profile of education.
2. Relevance of information. The amount of information necessary for the successful organization of vocational training should include not all the information from the sources used, but only the part of it that is relevant to the objectives of the training, the study of a specific issue. Therefore, it is necessary to differentiate meaningful basic and additional information. The basic information must be in the reference points of the studied question, placed on the main page since this is where the student starts to study this information. Additional information may be the content of hyperlinks, the contents of which are primary sources, pages of various sites, video clips, audio recordings, etc.
3. Objectivity and accuracy of information. The information that is given for the development must be objective and accurate. This is provided by the presented comparative analysis of various points of view on the studied question and evidence (logical evidence, the results of diagnostic methods, the results of experimental work).
4. Structured information. The multidimensional nature of information coming from various sources makes it difficult to master it, especially under time pressure. Moreover, the structure of each block is also determined by the logic of the studied question. The material is presented in the form of orderly structured blocks.
5. The specificity of information. An example of such a requirement is the non-repeatability of studying basic concepts in various disciplines, a clear distribution among the disciplines of the material being studied (which saves time, covers a greater amount of material in each particular discipline, and makes reasonable connections between different subjects and within each subject).
6. Availability of information. Information can develop the educational and training function when

its content is clear to all students. It is achieved by ensuring that every student has access to work in the electronic information environment of a higher education institution, and access to training in e-courses for teachers. In addition, the student should have the opportunity not only to work in a specific e-course, developed by his teacher, but also to have access to the funds of the main electronic libraries of the University "Student Consultant", "Urayt", "Znanium", "Lan". Accessibility is also provided by the organization of a clear conversational communication, execution of the schedule of direct and indirect contact of the student and teacher in an electronic environment.

7. Timeliness and continuity of information. Information should be timely, as any delayed information either becomes useless, or even harm the student, because it will not correspond to real events and harm the learning situation.

The main areas of independent work of students using the electronic educational environment of the university can be:

- search for necessary information;
- preparation for practical, laboratory, seminar classes;
- preparation for the survey, colloquium;
- preparation for testing;
- preparation for tests and other types of written test papers;
- preparation for various olympiads, competitions;
- performance of home examinations and tasks;
- writing essays, reports of articles;
- drawing up annotations on text documents and watched video and audio recordings;
- implementation of various projects, research works;
- preparation for tests;
- preparation for course and final exams.

The positive fact is that all the information, the products of the student's learning activities remain in electronic form for many years on the student's personal page. A student and graduate can refer to it at any time and clarify forgotten information taking advantage of their work.

Active use of the electronic information system of the university by students contributes to the development of their skills in independent work. This conclusion is confirmed by the results of re-diagnosis (the third stage of the experimental work is the control experiment). The same students participated in the second survey but a year later (2nd year students), that is, in the 2017-2018 academic year (Fig. 2).

The positive dynamics of the level of formation of the skills of independent work of students are presented in Fig. 3.

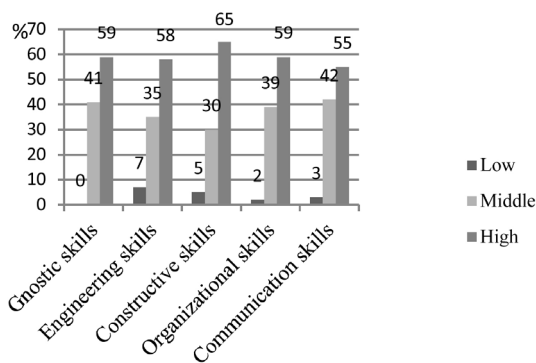


Fig. 2. The level of formation skills of independent work 2nd year students, % of respondents

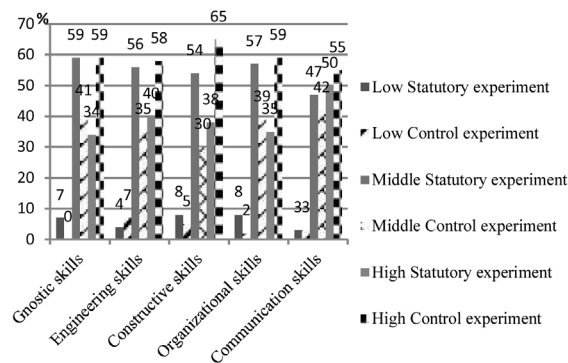


Fig. 3. Comparative characteristics of the results of the ascertaining and control stages of experimental work to identify the dynamics of the level of formation of skills of independent work of students

## V. CONCLUSIONS

A qualitative analysis of the results of the ascertaining and control experiments allows us to draw the following conclusions. The greatest positive dynamics can be traced by the skills of the gnostic, design, constructive and organizational groups. The least change is experienced by the skills of the communicative group. Students have no difficulty in communicating with fellow students and with teachers, however, they find it difficult to argue their answers in oral and written forms. Gnostic skills in second-year students are more pronounced at a high level. Students forming individual techniques and ways of studying the material, they are able to identify the main and peripheral concepts of the topic. Achieve engineering, constructive and organizational skills a high level of development in more than half of the students. Students are much better at planning the pace of independent work, skillfully managing their time resources, rationally distributing their strength in the study of complex material and already familiar issues [16].

Analysis of the results of diagnostics confirmed the assumption about the positive impact of the active use of the electronic information-educational environment of the university on the development of independent work skills among students.

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