

The Development of University Students' Self-Sufficiency Based on Interactive Technologies by Their Immersion in the Professional Activity

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Abstract

The article discusses the problems of using web technologies in the development of self-sufficiency of University students. We hypothesize that real professional situations in which he/she is obliged to work independently on the basis of web technologies contribute to the development of students' self-sufficiency. It is shown that the activity approach to learning, based on the use of project learning technologies in the process of preparing for lessons by learners and interactive technologies of blended learning, promotes the development of independence and self-reliance of students on the basis of web technologies. This article contains a matrix of integration of interactive technologies in the process of independent work of students. This will allow the teacher to select the tools for Moodle Learning Management System in order to successfully implement the interactive forms and education methods in independent work of students in the conditions of turning down the monologue-based oral presentation of training material by the teacher. For assessment of the effectiveness results of research we carried out a survey of Bachelors of pedagogical education. The article presents the results of the survey of four-year students confirming the results of the study.

Keywords: student, individual work, cooperative work, matrix, distance learning course, distance learning, interactive technologies, educational process, Learning Management System, information and communication technologies, web technologies

1. Introduction

The relevance of the use of web technologies in the development of students' self-sufficiency is determined by two factors. On the one hand, the demands of society and employers to a University graduate (Shilova & Belykh, 2010), as well as the state policy of Russian Federation in the field of education development point to the fact that one of the leading personal characteristics of a competitive specialist in the job market are his intellectual skills ("learning through life") and the level of preparedness for continuous self-education and advanced training (Klochcova, 2012; Ljubimova & Galimullina, 2014). We are speaking about such projects in the sphere of education development as the Russian Federation state program called "Development of education" created in 2013; the Law on education called "On education of the Russian Federation" and the Federal law called "On higher and postgraduate professional education" in 1996 (The state program of the Russian Federation, 2013; The law on education, 2012; Federal law of August 22, 1996).

On the other hand, the use of educational Internet resources in training opens up opportunities to have an access to different information resources and technologies (Hughes & Attwell, 2003; Nimatullaev, 2012). The didactic potential of telecommunications is the basis for e-learning. Above all, it is a purposeful and controlled intensive independent work of a student (Ljubimova & Galimullina, 2014). It is obvious that web technologies provide fundamentally new didactic opportunities with significant potential for development of education (Kulagina, 2011) and, primarily, of self-education (Ljubimova & Sabanaev, 2014; Sabanaev & Sabanaeva, 2010).

In conditions of increased attention to the organization of independent work of the student, the role of a teacher is being changed. The teacher is transformed from the main source of information into a coordinator, a consultant, an employee. The main principle of learning process organization is social constructionism, which aims to contribute not only to self-identifying and designing new knowledge by students, but also to the acquisition of

tools for getting new knowledge and ways of action. Training is much more effective if the learner creates something for others and passes on his knowledge and experience (Costello, 2013). Thus, a student turns into a teacher, i.e. the roles change. In such cooperation, in our view, a waiver from a monologue-based oral presentation of training material by the teacher is relevant. Learning becomes more interactive.

Interactive learning is one of the most important ways of improvement of students' training in a modern high school. The main methodological innovations are directly related to the use of interactive technologies and teaching methods. Moodle Learning Management System is considered to be a quite powerful interactive learning organization source.

The concept of "interactive" comes from the English "interact". Interactivity is a way of cooperation in a form of a dialogue in real or virtual (using a computer) space based on the subjective position of the participants of the cooperation (Golovanova, 2014). Interactive learning is a special form of organization of cognitive activity. It implies very specific and predictable goals. One of these goals consists in creation of a comfortable learning environment in which a student or a listener feels his successfulness and intellectual capacity, which makes the learning process rather productive (Galimullina, 2014).

The current training system is not aimed at developing the abilities of students to self-learning. The formation of the students' abilities for self-education on the basis of web technologies happens randomly, slowly and inefficiently. Primarily this is due to teachers' lack of scientific and methodological base, clear understanding of the problems, which may rise in the use of web technologies with the intention of students' independent work development in the conditions of Moodle learning management system usage, which is based on the idea of social constructionism. So, currently, there is a need to develop and validate methods that promote the independent activity of students on the basis of web-technologies in the conditions of use of distance learning systems. Undergraduates of pedagogical education are no exception to this. The modern teacher must constantly carry out professional self-education and have ability to self-organization using the tools of information and communication technologies (DeLong, 2009).

We have hypothesized that the development of students' self-sufficiency contributes to the integration of interactive technologies and real professional situations in the educational process, in which a student has to work independently on the basis of web-technologies.

The purpose of the study is to determine the pedagogical conditions of immersion of future teachers into practical pedagogical activity on preparation for classes with students of their groups, which will contribute to the development of students' abilities for independence on the basis of web technologies. We also aim to identify the principles, opportunities and tools for learning management systems in integration of interactive forms and methods of education in independent work of students in the conditions of waiver of monologue-based oral presentation of training material by a teacher.

2. Material and Methods

2.1 Interactive Learning Is the Basis of Students' Self-Sufficiency and Independence

The learning process based on the use of interactive teaching methods is organized with respect to the involvement of all the students of the group into the learning process. Cooperative activity means that each person does his own special individual contribution: in the course of work students exchange their knowledge, ideas and ways of activity. The individual, pair and group works with documents and information sources are organized, the project work and role plays are used. Interactive methods are based on the principles of interaction and activity of trainees, basing on group experience and feedback. This creates an environment of educational communication, which is characterized by openness, interaction between the participants, the equality of their arguments, the accumulation of collective knowledge and the possibility of mutual evaluation and control (Galimullina, 2014; Andronova, 2013; Leonova, 2008).

As for traditional education, its main purpose is to transfer the necessary amount of knowledge to students. The teacher translates the already thought-out and differentiated by him-/her- self information and necessary skills that from his/her point of view must be developed in students. The challenge of students is as soon as possible and accurately reproduce the knowledge generated by the teacher. Obtained in the course of such training knowledge has an encyclopedic nature and represents a certain amount of information on various subjects, which in the minds of students exists in the form of thematic blocks, sometimes without any semantic connection to each other.

The knowledge gained with the use of interactive methods in the learning process acquire different forms. On the one hand, they represent some information about the surrounding world, the peculiarity of which is that the

student gets it in his own activity process. On the other hand, a student in the process of interaction in class with other students and the teacher masters the system of proven ways of activity in relation to himself and to the group, and acquires various mechanisms of knowledge search. Therefore, existing knowledge is also a tool for self-acquisition of new information (Rodrigues, 2005).

Thus, the goal of interactive learning is the creation by a teacher of the conditions under which the student will discover, acquire and construct the knowledge. This is a fundamental difference between the goals of active learning from the traditional one. This principle implies a transfer of a teacher to a new level of relationship with the students. Preserving all his experience, a teacher should become “a wise source of knowledge” for them, that is to say a person who not only gives his students a certain amount of knowledge, but also directs and guides them to an independent way of finding information. It helps to be open to the possible participation of other people in learning situations and enables all the participants to share ideas, listen to others, ask questions, and to organize communication (Asafova & Golovanova, 2013).

2.2 Tooling of Moodle Learning Management System in the Implementation of Interactive Learning

To implement the above principle in Moodle LMS is a powerful tools (forums, wikis, glossaries, databases, seminars, blogs, private messages), which provide opportunities for both student and teacher to participate in the creation of general knowledge. In addition, students’ rights can be extended to the rights of the teacher. Thus, the student learns in more active, interactive communication. An even greater effect can be achieved, if the activity of the learner and his results are available to other participants. This makes the student to take more responsibility for the results, as more attention is paid to the self-examination and thinking that significantly improves learning. Moodle LMS has a set of tools to implement this principle:

- Forums of various types;
- Wiki, which one can use in organizing collective work with documents;
- Glossary that allows you to organize collective work on a list of terms that will be automatically contacted by all the content of the course;
- Database, which is an extension of ideas glossaries to work on your favorite structured records;
- Seminars that allow to organize multi-position, multi-criteria assessment of students;
- Blogs.

These and other tools of Moodle can be used for active exchange of opinions, discussion, etc. In this environment, not only the learning process becomes effective, but also the students get the opportunity to acquire skills independent work on the basis of web-technologies and learn to work “in a team”, critically evaluate the information obtained and back up their opinions. In this work the LMS has a transparent character (Costello, 2013). Using external applications and including references to resources are an obligatory requirement for modern LMS courses that allow you not only to expand the range of sources of information, but also to encourage students to independent educational and professional activity on the basis of web-technologies.

Teachers of Elabuga Institute of Kazan Federal University take classes using interactive methods and forms of education. In the current system of educational activity of students of the University educational forms are based on the organization of the process of independent work. First of all, the forms and methods of training should promote the active work of the teacher with the use of distance learning techniques and methods, as well on the basis of the LMS (Ljubimova & Galimullina, 2014). At the University the platform Moodle LMS is being actively used which allows to create distance learning courses, including all necessary training, support and control materials (or links to them), that is, the educational content is in constant free access for students.

The usage of a distance course, in our opinion, allows to organize classes without a systematic and consistent, monologue-based oral presentation of training material by a teacher, typical for traditional delivering of lectures. Instead, teachers carry out introductory, installation, and final lessons having an information-explanatory function. During these lessons, the teacher identifies the problems and the aim of the course, the plan and the logical sequence of the study, explains the methods of work with it and distance learning course itself, as well he/she recommends the basic and additional literature. Thus, a complete waiver of delivering lectures, instead of it the lecture material is developed by students in the process of cooperative work in the information environment of distance learning course. As required the teacher carries out an explanatory or corrective training, within it a more complex material, requiring the participation of him/her is considered. During the cooperative work all the participants interact with each other, share information, solve different problem together, model the situation, evaluate the actions of others and their own behavior and so on. On the final lecture, the teacher

together with the students highlights the main ideas of the course and shows how to use the obtained knowledge in practice and sets interdisciplinary connections (Galimullina, 2014). Moreover, the course contains a training forum where participants ask questions and discuss problems encountered in the process of doing practical tasks, as well as exchange views on educational issues. Students can always ask questions on - and offline on-site distance learning or during the installation auditory lessons.

2.3 Modeling the Future Professional Activity by the Student

The process of formation of skills for independent learning activities based on web technologies student must be arranged in the process of immersion in the future professional activity. We identified various ways of such immersion, one of which is the practical work of the student on the preparation and conducting classes with students of his/her group.

A Bachelor of teacher education is yet not ready to develop the technology of preparation and conduction of the practical lessons, but he is able to learn how to teach the students like him/her. In the learning process the learner is given the opportunity to model their future professional activity in preparing and conducting classes in one of the laboratory practical work with students in their group. The experience will allow the student to gain ideas about future profession and prepare for the acquisition of professional competencies.

With the aim of immersing students in the professional activities, the laboratory classes are held in cooperative work, which presupposes joint activities in small groups (the group size is determined by the number of students in the subgroup). In the process of project activity the students gradually master the modules of the course (see Table 1), the result of which is conducting classes with students of their group, acting as teachers. In preparation for the lesson, which will be conducted by a small group, students consult with the instructor as needed, which they define themselves.

The content of the student's activity in this case is his activity as the teacher - developer of the class. For conducting an effective lesson, the student (at the same time the teacher) should pass all the stages of preparation to it: from the study of the content and development of software to planning and assessment materials. In these circumstances, in our opinion, the most suitable for the organization of classes is the technology of project activity.

Taking into consideration the orientation of the learning process to development of the ability of students to self-learning activities on the basis of web-technologies in the context of immersion in activities of a teacher on preparation and training, the use of LMS is the most profitable and justifiable under implementation of blended learning (Ljubimova & Sabanaev, 2014; Bailye, 2013). On-site distance learning of Kazan Federal University, we have created a number of distance learning courses, which are the basis of the idea to use interactive learning, immersing students in professional activities applying to project technology.

Each module of this course is a cluster step of project activity towards the development of a student's ability to act as a teacher, in terms of active interaction with his team members and the teacher, expressing scientific and creative thinking, ability to evaluate his/her own activities and the activities of others, to build forecasts and to correct mistakes. The modules involve unconventional independent work aimed at solving problems of the course. Tasks are done by the student or, if necessary, with the support of group mates and the teacher.

In the module there are: sources of information; tasks in which students submit the results of their work at this stage; educational forums in which the participants express their opinions on educational issues; a forum of reflection, in which the results and difficulties encountered in the process on this stage are discusses. In addition, students can always ask questions, to resolve their difficulties on- and offline on-site distance learning of Elabuga Institute of Kazan federal University and in class. The final module includes: a Glossary of the course, the educational forum called "Let's analyze the results" and "Book of complaints and suggestions. In the "Book of complaints and suggestions" students leave their comments and suggestions on the course, which can help the teacher to analyze the results, adjust the structure, content and forms of organization of the learning process.

2.4 Network Communities as the Component of the Professional Space of Future Teachers

One of the new attributes of a professional space of a competent teacher meeting modern requirements, implementing an individual plan of self-education, including Internet resources, to maximize self-realization and self-actualization are network communities of teachers. Professional network of teachers is a database of educational information resources. This is the place for professional communication, exchange of experience and training. A university teacher must be a member of such communities, and attract students. In the process of learning students must declare about themselves in the network of professional communities and work actively in them. The issues discussed in the forums, discussions, etc. face to face and in the distance course can get a

broader discussion in forums, webinars, etc. of the network communities of teachers.

3. The Results of the Investigation and Discussion

For determining the efficiency of the learning model we used, we had selected students of the fourth year (groups 110, 111 of Elabuga Institute of Kazan Federal University) mastering the discipline of “Information and communication technologies in education”. To estimate the effectiveness we used the survey and expert assessment of studies conducted by the listeners of the course.

The introductory survey of students showed that 76% of students had difficulties in the search and selection of the necessary factual material for classes, 87% had difficulty in finding, installing and learning software applications (including educational), 91% had never trained and never had lessons, 98% didn't know how to work in the social communities of teachers.

To the questions: “Do you know how to participate in cooperation (cooperative work) and joint activities with the teacher and fellow students; work individually and in a group: find general solutions; to formulate, prove and defend your opinion?”, “Can you act as a developer of an electronic presentation accompanying your report?”, “Can you learn software tools of information and communication technologies and confidently use them in training and independent work?”, “Do You know how to search for information and software products in the field of media using a variety of sources (print, electronic, distributed in the Internet)?”, “Do you know how to interact in the Internet for educational purposes?”, the vast majority responded positively (about 96%). However, in the process of learning the students noted that these questions were answered without awareness of the fact that their views on the specified activity did not coincide with reality.

The analysis of conditions for the development of students' self-sufficiency on the basis of interactive technologies by immersing in professional activities allowed us to make up a training model.

The model is based on the following principles:

- Integration of interactive forms and methods of learning;
- Waiver of oral presentation of educational material by the teacher;
- Immersion of future teachers in practical pedagogical activity;
- Increase of students' independence and self-sufficiency on the basis of web-technologies;
- Use of Learning Management System tools.

The structure of this learning model can be represented in the form of the scheme shown in Figure 1.

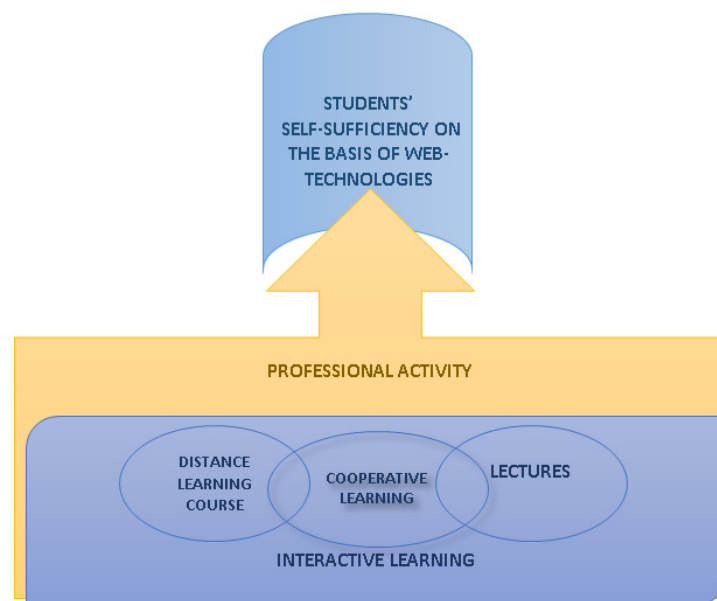


Figure 1. The structure of the learning model, ensuring the development of skills of self-sufficiency of students on the basis of interactive technologies by immersing in a professional activity

In implementation of the developed model, the following online form classes were the most effective:

- The method of discussion (“Round table”, “Brainstorm”, “Aquarium”, “Snowball” and others);
- The method of cooperative learning (“Learning Together”, a joint work of a group of students with the teacher);
- The interactive technologies of e-learning in distance course on the platform Moodle Learning Management System, as well as different types of interactions of the participants in the educational process:
 - student ↔ interactive content;
 - student ↔ student;
 - student ↔ teacher.

One of the key points of our model is the technology of project activity in a distance course, the result of which is the held lesson with the students of their group (see Table 1).

Table 1. Module theme-stages of project activity

Module #	Module theme	Tasks of the module
1	The choice of the lesson theme	To get an idea what content should be included in the chosen theme and to learn the demands of the results of learning.
2	Theoretical material survey	To examine basic sources of information; to get the point of the main issues; make a plan.
3	The study of software products on the subject of the lesson.	To download the necessary software distributions, see the documentation; install programs on the computer; to learn to work in programs; to create their own resources, using the studied programs.
4	Planning the activities of the lesson.	To formulate the objectives of the lesson and its results; to make a plan; to determine the methods and forms of organization of educational process; to consider forms of control; to develop detailed lesson plan; to make up a system of assessment.
5	Development of materials of the lesson	Preparation of didactic and other accompanying materials: demonstration, practice controlling.
6	Organizing and conducting classes. Summarizing lessons	Consideration of the organizational issues of training; management trainees; awarding grades.

The analysis of conditions for the implementation of interactive learning and opportunities of LMS Moodle for their support, we developed a matrix integration of interactive technologies in the process of independent work of students (Table 2).

Table 2. The matrix of integration of interactive technologies in the process of independent work of students.

Principles of interactive learning realization	Possibilities of Moodle LMS to ensure the implementation of interactive learning	Tools of Moodle LMS to ensure the implementation of interactive learning
Comfort training	in Educational content is always available, and it's presented in a convenient form	Resources: hyperlink, book, folder, note, page, file. Elements of the course: database, wiki, an external application, interactive lecture, Glossary.
Feedback	Implementation of different types of interaction of participants of the educational	Resources: explanation, page file. Elements of the course: profile, wiki, an

	process: student ↔ interactive content, student ↔ student, student ↔ teacher	external application, interactive lecture, seminar, assignments, quiz, chat, forum, survey, feedback.
Cooperative activity of students	Organization of individual, pair and group work with the aim of fulfilling the tasks and accumulating collective knowledge	Elements of the course: wiki, an external application, seminar, Glossary, chat, forum, poll.
Mutual controlling and estimation	Open educational environment for free interaction, mutual evaluation and control	Elements of the course: wiki, an external application, seminar, assignments, test, Glossary, chat, forum, poll.

The model of learning based on the immersion of students in the future professional activity, using interactive technologies with the aim of developing independent activities of students on the basis of web-technologies turned out to be successful. Re-survey of students showed that 97% got rid of the difficulty in finding and selecting the necessary factual material for classes, 93% successfully coped with the task of finding, installing, and learning software applications (including educational ones), 99% had registered and are constantly working in the social communities of teachers.

To the questions: “Do you know how to participate in cooperation (cooperative work) and joint activities with the teacher and fellow students; work individually and in a group: find general solutions; to formulate, prove and defend your opinion?”, “Can you act as a developer of an electronic presentation accompanying your report?”, “Can you learn software tools of information and communication technologies and confidently use them in training and independent work?”, “Do You know how to search for information and software products in the field of media using a variety of sources (print, electronic, distributed in the Internet)?”, “Do you know how to interact in the Internet for educational purposes?”, the vast majority responded positively (about 91%). It is less than in the first attempt, but the answers were given in accordance with the reality.

4. Conclusion

The elaborated training model has allowed to successfully determine the pedagogical conditions of immersion of future teachers in practical pedagogical activity on the preparation and holding lessons with students of their group in the course called “Information and communication technologies in education”, which contribute to the development of students’ abilities of independence and self-sufficiency on the basis of web-technologies. This is promoted by the activity approach to learning, based on the use of project learning technologies in the process of preparing and conducting classes by students using blended learning.

We have shown that the basis of independent work of students can be guided; interactive technology and teaching methods that would eliminate the passivity of students in the classroom and enhance their cognitive activity. Independent work-based interactive teaching methods, characterized by activation, allow the student to master the tools for independent acquisition of new knowledge and ways of action. As a result, the interactive forms of learning take on new depth and significance in the organization of independent work of students. The matrix we have developed will allow the teacher to carry out the selection of tools for Moodle Learning Management System for the successful integration of interactive forms and methods of education in independent work of students in the conditions of the waiver of a monologue-based oral presentation of the training material by the teacher.

The proposed training model, based on immersion of students from different qualifications and profiles into the future professional activity using in-person and distant interactive technologies, is successfully piloted by teachers of Elabuga Institute of Kazan Federal University. For the development of the proposed training model it is necessary to work out guidelines for teachers for its further usage.

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