

## Improving student readiness to overcome IT-related obstacles during pedagogical interaction in post-Soviet education

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### Abstract

The relevance of the study deals with the importance of improvement of student readiness to overcome IT-related obstacles in post-Soviet social studies education. In this regard, this paper aims at identifying the concept of pedagogical interaction in the information and educational environment and revealing the effective use of pedagogical interaction to improve student readiness to overcome IT-related obstacles. The leading research method used to solve the problem is teaching project, which allows an integrated treatment of methodology in developing student readiness to overcome IT-related obstacles. The paper presents such methods as creating positive motivation, arranging interactive educational cognitive and practical student activities and boosting the personal educational environment; it is shown that a distinctive feature of pedagogical interaction is the acquaintance of students with various elements of the information and educational environment, leading to the development of student readiness to overcome IT-related obstacles; it is found out that the use of pedagogical interaction in the information and educational environment ensures the purposefulness and efficiency of educational process; it is justified that using interactive means of information and educational environment in the context of arrangement of pedagogical interaction can enrich educational process, develop specific student skill that will definitely help them in future professional activities. The research materials are of practical value to the further expansion of functional and methodical aspects of using interactive media in the information and educational environment.

**Keywords:** *information competence, student readiness to overcome IT-related obstacles, information know-how, pedagogical interaction, information and educational environment, post-Soviet education.*

### Introduction

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Various software tools are used in modern teaching methods to support and organize the educational process in the post-Soviet studies education. The analysis of studies devoted to the use of IT in post-Soviet education in the late 1980-s –early 1990-s shows the problems of using IT in the field of humanitarian knowledge. Technology in education in the post-Soviet area uses lots of ideas which were integrated by A. Toffler and T. Alvin (1981). Information technology was mainly used as a tool for mathematical calculations and programming, and at that time applications to support learning process (Kuznetsov & Dolmatov, 1989). Further technological development has resulted in the need to information promotion of humanitarian knowledge and general technology in education (Robert, 1986). At the end of 1990s educational and information environment which showed up in various university websites development were used in education in the post-Soviet area (Lapchik & Efimov, 1990).

The advent and intensive development of web 2.0 technologies allowed creating and adapting more complex learning management systems (LMS). As a rule, LMS are used as ready-made kits (Moodle, Canvas, Edmodo, etc.) or specifically created for a particular post-Soviet educational organization. This is due to the specificity of both the level of education (higher, professional, general) and of each educational institution separately as a regional component of education. Every lecturer who implements interactive tools in the learning process when using the LMS tends to replace some modules of this system by third-party tools that provide similar functionality, but are more convenient in terms of organizing some types of learning activities. All the above causes the research problem, that is the lack of effective pedagogical support to develop student readiness to overcome IT-related obstacles under increasing opportunities of information and educational environment.

### **Literature Review**

During the Soviet period A. Kuznetsov and V. Dolmatov (1989) defined the basic concept of development of an educational system for teaching the basics of computer science and computer facilities. I. Robert (1986) explored the possibilities of modern information technology, educational value of their application and the promising areas of their use. M. Lapchik and V. Efimov (1990) identified the concept of technology in teacher education and challenges emerging in the process.

The labor market is tasked with training qualified personnel due to changing requirements for university graduates in the post-Soviet area at present. More initiative,

creativity, group communication and internal motivation are required from modern employees. Besides, the readiness to overcome IT-related obstacles is very important, being one of the components for further successful skill upgrade and retraining. Many teachers have already begun to prepare students for initiative (Kangas et al., 2017), creativity (Shtepa et al., 2015) and the use of electronic learning environments (Kim & Smith, 2017). Thus, student readiness to overcome IT-related obstacles is one of the most important components of the IT know-how of the future employee.

Besides, according to the analysis of theoretical studies and statistical data in modern conditions, the student contingent is heterogeneous. In this regard, it is relevant to consider the levels of student readiness to overcome IT-related obstacles (Kılınç et al., 2016). These levels illustrate the behavior of the student in the event of difficulties when working with software. One of the important conditions for improving the student's readiness to overcome IT-related obstacles can be the use of pedagogical interaction in the information and educational environment of the university (Tarman & Acun, 2010).

There is actually a concept of all-pervasive learning (U-learning). It implements the availability of training anywhere in the world (Lopez et al., 2016, Coto et al., 2016). Many studies use elements of this concept to create interactive learning web-based environments (Albertos-Marco et al., 2016). In addition, a continuous analysis of the effectiveness of e-learning courses (Umek et al., 2017, Mwalumbwe & Mtebe, 2017) and videoconferencing tools (Krutka & Carano, 2017) is conducted, student satisfaction is assessed (Clawson, 2007). The use of information technology to support this concept is analyzed (Smeureanu & Isaila, 2011). All means declared as tools for organizing and supporting education are located in the information and educational environment of the university (IEE).

The analysis of studies on the use of different approaches to the implementation of pedagogical interaction in the learning process shows that different methods have a positive impact on the competence of students (Mathews, 2016; Mauch & Tarman, 2016). For example, the studies of Y. Al-Ashmoery and R. Messoussi (2015) showed the effectiveness of using interactive forms of communication in real time to gain competence in the field of Data Mining with the help of educational analytical systems. At the same time, according to the research by A. Horvat (2015) and other scholars (Touya & Fakir, 2015; Tarman, 2016), students in general are positive about these innovations in the educational process. The organization of pedagogical

interaction is used to develop professional competence in applied informatics (Nazarova et al, 2016), engineering training fields (Maldague et al., 2016).

The methods boosting student readiness to overcome obstacles were developed in the context of teacher training (Rios et al., 2014), business workers (Hrebiniak, 2008) and communications (Hill, 2002). In addition, this component of information competence is addressed in the studies of M. Zamalia and A. L. Porter (2016). One of the methods providing this process is the construction of an individual educational trajectory in an electronic course (Cakula & Sedleniece, 2013).

The analysis of the studies conducted to evaluate the use of interactive methods for blended learning (Luchaninov et al., 2016) confirms that the use of IEE interactive tools can support the educational process, turning it into pervasive learning.

### **Materials and Methods**

The purpose of this article is to analyze the effectiveness of the application of pedagogical interaction in IEE conditions to boost student readiness to overcome IT-related obstacles.

#### **Prospects of Studies:**

- to clarify concepts of pedagogical interaction, information and educational environment, student readiness to overcome IT-related obstacles;
- to find out purposefulness and efficiency of using pedagogical interaction in information and educational environment to develop student readiness to overcome IT-related obstacles;
- to validate the use of interactive features of information and educational environment in regards with the preparation of pedagogical interaction.

By IT know-how we mean a set of knowledge, skills and experience in the field of IT when implementing it in future professional and educational activities of a student in the context of IT interaction and IT activities between subjects of educational process.

Accordingly, IT know-how of students will be defined as the possession of IT competencies that ensure the implementation of value and motivational components in future professional activities.

Pedagogical interaction is a purposeful interaction between professors and students of a university, providing quantitative and qualitative changes in the form of improving existing and increasing new knowledge, skills, and competences through mutual influence.

Information and educational environment of a university is a set of programs, technical, educational, methodical, organizational and administrative components of a university system, providing prompt access to necessary information and organizing subject to subject communication between participants of educational process.

According to the clarified definition of the IEE, it is necessary to describe the content of the components of this set of tools. So, the software presented for the IEE consists of different platforms to support educational process. Among them are official and methodical sites of the university, LMS (in this research LMS Moodle) and tools for mediated pedagogical interaction (e-mail, social networks). The technical tools that make up the IEE are related to the equipment of the university (local university networks, servers and computers of the organization). Educational and methodological components include methodological materials developed on the organization of educational process (subjects' training methodological systems, educational and methodological sets of subjects, etc.). Organizational and management components are related to the administrative organization system of the IEE and are governed by normative documents at the federal and local levels (in the Russian Federation – the Federal Law on Education, the state standard of higher education, the regulations on the use of the IEE by the university, etc.).

Interactive tools of the university IEE represent a complex of components making up the university IEE that provides a quick access to the necessary information, organizes indirect pedagogical interaction between professors and students, as well as actively and diversely responds to their actions.

The analysis of normative documents of higher education made it possible to determine the main competencies that are responsible for the formation and development of student readiness to overcome IT-related obstacles. These competencies include the ability to assess critically one's own strengths and weaknesses, choose ways and tools developing the former and eliminating the latter; readiness to be responsible for the results of their professional activities; care about the quality of the work performed, etc.

Readiness to overcome IT-related obstacles is seen as the ability of students to overcome themselves, continuing to work with IT after failures and prevent emerging difficulties in future professional activities. This component is defined as the ability to take responsibility for results and take care of the quality of the work performed. The analysis also made it possible to identify 3 levels of student readiness to overcome IT-related obstacles:

- Low (a student, working with information technology, easily gives in to difficulties, performs tasks based on minimum considerations, cannot objectively evaluate his work);
- Average (while working with IT a student looks for a solution in difficult situations, it is hard to assess his own work, perform work based on personal representations of completeness);
- High (a student diligently looks for a solution in difficult situations when working with IT, critically estimates his own work, works until satisfied with the results).

The activities of a lecturer consisted of developing methodological material and supporting learning process. The experiment consisted of three stages:

1. Preparation of students for work using pedagogical interaction.
2. Educational process using interactive tools of information and educational environment.
3. Control and evaluation activities for students.

The preparatory stage consisted of the students passing one of the training modules “Use of the university IT resources in educational activities” of a sub-discipline which is called “Freshman's school”. Within the framework of this module, first-year students got acquainted with the IEE resources, which they later had to use in educational activities. In the disciplinary module, students got acquainted with the official website of the university, learned to find some necessary information about upcoming and past events, work with the rating system recording student academic achievements, and create a community in a social network to communicate on educational needs. In addition, they studied LMS Moodle, the structure of the course in the system, the algorithm to pass disciplinary modules in the system.

The procedural stage included organization of educational process in accordance with the working curricula developed by a lecturer based on the use of pedagogical interaction. The study was conducted for IT based disciplines in future professional activities. For each subject a curriculum was developed. After it a number of tasks was selected or developed that allowed the implementation of pedagogical interaction with IEE.

The control and measuring stage was implemented when defining student readiness to overcome IT-related obstacles. These measurements were carried out for each subject of the research at the first and last classes.

The activity of the lecturer while working with the electronic course consisted of the development of electronic versions of materials adapted to the application using distance educational technologies. These materials were completed before direct registration of the

electronic training course in LMS Moodle. All materials were posted in the system, a chat room, news forum were set up for discussions. A news forum was organized as well. In addition, for each subject a community in the social network VKontakte was implemented to arrange pedagogical interaction. Those preparations had been made before the academic semester started. During the term, the lecturer's task was to verify and evaluate the practical assignments completed by students; comment on a project work in a chat, forums, the social network community, and e-mail.

To arrange pedagogical interaction of the IEE in 2015/2016, organizational forms of pervasive learning with interactive tools were used. Work was carried on to provide pedagogical interactivity for the disciplines being implemented (see Table 1).

Table 1

*Techniques used to increase IEE interactivity for the disciplines implemented in the study*

<b>Quality criteria</b>	<b>In-class interaction</b>	<b>Mediated interaction</b>
Establishing a tight communication	Role-plays, workshop-debates	Feedback session, interactive individual tasks for students, group work on the social network VKontakte, e-mail
Elaborating easy and clear instructions for the doing work	Critical assessment of works, samples of reports on works, textbooks, student rating system	Critical appraisal of extracurricular work, samples of reports on extracurricular work, electronic teaching tutorials, student rating system
Using a variety of techniques and technologies in the learning process	Role-plays, workshop-debates	Scientific papers, essays written by students, feedback session, interactive individual tasks for students
Readiness to use software and hardware in training	Using software to interact in role-plays (i.e., LAN Messenger)	Use of the social network VKontakte, Skype, e-mail

*Note. Source: the authors.*

Students' activities consisted of completing independent or group practical tasks involving a computer and Internet. A group of forum was provided for arranging interaction among students so that they could share information. Reports on completed practical assignments were made by each student in the form of a file and uploaded for the professor's review in LMS Moodle. To get information on the points scored by students faster, a grading system for educational achievements is used, which is a part of the University IEE. We are going to give several training methods to improve student readiness to overcome IT-related obstacles with examples.

A seminar that had been held was based on students' specific studies and supervised by the professor. At the beginning of the training students were given a task to make a report. For example, for those students who study linguistics machine translation systems were proposed.

They made reports that were submitted on the forum and discussed in a group. The discussion began a month after the assignment had been given. During the work the professor assessed each student's activities, his reply to his group mates' comments, his activity to defend his work and activity when studying the other students' work.

The feedback method involves the following: a student is given the task (abstract, essay, making video, etc.), and after completing it he is to upload his work in a special group of the forum. The other students of the group evaluate this work, pointing out its drawbacks and recommend some corrections. Thus, the student should defend his work, and then correct it according to the given notes. The main idea of this task is to analyze the work that implements some of the project activities, ability to get used to criticism of various kinds and interaction between group members. Interactive tools of IEE in this case are used as a necessary link between the students laying out work for evaluation and a group of students evaluating this work.

The methods of creating positive competence motivation are used in arranging and holding direct academic classes, such as workshop-disputes and workshop-conferences. Initially, students receive a topic for their presentation. Within this topic student chooses a proper theme for presentation, makes a report, and speaks up at a kind of a conference.

Methods of arranging student interactive cognitive and practical activities are performed in a distance form. They are research tasks aimed at independent cognitive activity with minimal professor's support and completed by means of mediated pedagogical interaction. Each student was given a task that he was doing during the academic semester. In this work (for example, algorithms for publishing), he could consult the professor via chat once a week. Other types of advice on that assignment were not available. At a fixed rate the student handed in the work, and then he was tested according to the established criteria. The final checking for these academic disciplines was divided into two stages. The first stage was meant to test students in the conditions of LMS Moodle. Opportunity to test opened on schedule and each student was given one attempt only. The second stage was to develop and defend one's own project in the subject. The project defense took place during a fixed appointment in the classroom.

### **Results and Discussion**

The task of the research student readiness to overcome IT-related obstacles was to observe and record dynamics of the indicators. The object of the study is to promote student

readiness to overcome IT-related obstacles while the subject is the dynamics of student readiness to overcome IT-related obstacles.

When organizing pedagogical interaction to boost student readiness to overcome IT-related obstacles in 2015/2016, organizational forms of all-pervasive learning were used based on elements of distance educational technologies implemented with the help of the LMS Moodle. The experimental base of the study was Sholom-Aleichem Priamursky State University. Students and members (76 people) of the faculties of Pedagogics and Psychology, Sociocultural Activity and Service, Mathematics, Information Technologies and Technics, Philology, History and Journalism took part in the study at various stages. For the academic subjects involved in the study, electronic courses were developed that implemented pedagogical interaction methods and supported the full-time educational process. In addition, interactive tools were implemented, both within the university IEE and third-party tools, such as social networks. During the research discussions were held with the participants of educational process in order to reveal their attitude towards classes both in direct and indirect ways, taking into account their remarks and wishes.

The test measurements showed quantitative changes in the indicators in enhancing student readiness to overcome IT-related obstacles (see Table 2).

Table 2

*Dynamics of readiness levels for overcoming IT-related obstacles*

Stages	No. of students	Readiness levels to overcome IT-related obstacles					
		low		average		high	
		No.	%	No.	%	No.	%
Before the experiment	69	34	49.3	27	39.1	8	11.6
After the experiment	69	21	30.4	31	44.9	17	24.7

*Note. Source: the authors.*

As a result of applying pedagogical interaction with IEE tools, student readiness to overcome IT-related obstacles has increased greatly from 11.6% to 24.7%. This change shows that the applied methodology is effective for development of this indicator of student professional competence. At the same time, the transition of students from low level readiness to overcome IT-related obstacles to average level is especially significant. This stands for a shift in competence, the appearance of a vector for further student development. Quantitative indicators in the dynamics attest the effectiveness of the experiment: pedagogical interaction in IEE conditions contributes to the development of student readiness to overcome IT-related obstacles.

In addition, at the end of the research students were interviewed of their impressions of the classes they attended. 46 % of students stayed satisfied with the studies and claimed that they had learnt much from the course. 37% of students estimate classes as adequate and necessary and fruitful in the overall structure of educational process. 17% of students felt unhappy with the experiment and considered those forms not wanted in education. In general, all the participants of educational process were content with intensive classes in learning studies.

### **Conclusion**

The control measurement according to the indicators after the experiment showed quantitative changes in the indicators of raising student readiness to overcome IT-related obstacles. The dynamics of these data indicate the effectiveness of the experiment:

1. As a result of studies it was confirmed that the use of pedagogical interaction does not require the establishment of fundamentally new external institutional forms, fitting into existing practice of administrative organization of the studies but to a significant extent upgrades internal forms of education and teaching methods by means of additional teaching aids. A distinctive feature of using pedagogical interaction in the conditions of IEE University to develop student readiness to overcome IT-related obstacles is an arrangement of intensive indirect cooperation between a professor and students leading to mastering their educational and professional competencies.

2. To achieve the goal of the experiment, co-education methods based on pedagogical interaction, interactive methods of one-to-one personalized teaching, methods for making positive motivation, methods for organizing interactive cognitive practical students' activities are used.

3. The use of pedagogical interaction provides purpose, proper sequencing, and the efficiency of the process.

The research presented in this paper does not solve the whole issue which is in focus totally. It just offers only one possible solution. Prospects for further research may be related to a more detailed development of diagnostic techniques and the expansion of the forms of pedagogical activity on the interactivity of the information and educational environment that forms student IT know-how. Data obtained from the experiment can be considered the basis for additional studies of student IT know-how through training in educational institutions of the post-Soviet area. The

experiment described in this paper reflects the significant development of the post-Soviet social studies education for over the last 30 years.

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