Use of blended learning elements for formation of a humanitarian student's creative initiative at learning modern information technologies

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Abstract. The article describes the results of the experiment on formation of creative initiative of humanitarian students during the study of disciplines related to use of modern information technologies in professional activity by means of the informational and educational environment in its function as a remote part of the blended learning method. It describes the infrastructure of informational and educational environment, determines the methodical system of education used in the experiment, and analyzes the outcomes of the experiment. It was revealed that use of the blended learning method was capable to raise the level of creative initiative.
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Introduction

The current state of the higher professional education is determined by the necessity of permanent modification of the education process of a higher educational institution with the purpose of, on the one hand, ensuring training of skilled employees in the circumstances of varying demands, and, on the other hand, adopting and adapting the successful experience of other educational institutions in their activity. Undoubtedly, at the development of modern methods of education, it is necessary to take into account the rapid growth of the use of information technologies, which has been observed within the last decade, and also a large quantity of educational and technical innovations [1, 2]. One of such innovations is the use of the blended learning, the concept of which assumes that in the current state of the system of higher professional education, traditional education can be combined with the advantages of distant educational technologies [3, 4]. The idea is that a considerable part of the material is transformed into the distant form, allowing time at classes for various interactive forms, which would improve their efficiency [5, 6]. The "teacher-student" and "student-student" interactions can be also implemented in the distant form using various educational elements of the learning management system [7].

Besides, at studying disciplines related to the use of information technologies in professional activity of a humanitarian student, there is a considerable quantity of exercises of the reproductive level, which involve fulfillment of tasks «on a template». At using such exercises, it is difficult to form the creative initiative with a student; it is necessary to change the basis of tasks using elements of blended learning.

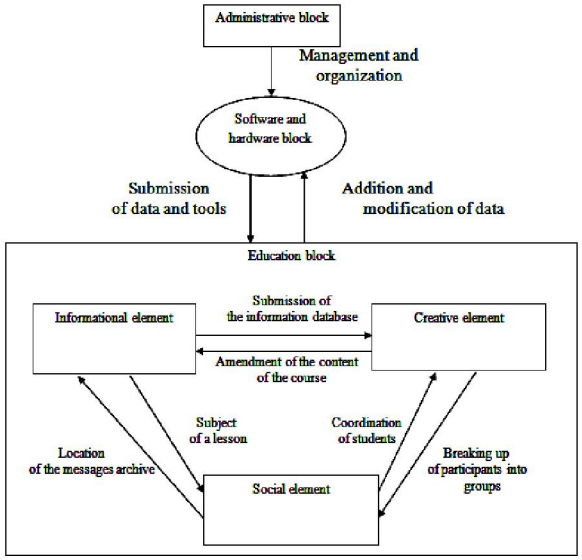
1. Materials and methods

At teaching humanitarian students, the Moodle learning management system was used. Informational and educational functionality of the given system was added by the electronic library system, the reading room, and the Internet center of the university. Interaction of the given elements made it possible to build the current infrastructure of the informational and educational environment [8] of the university (refer to Figure 1):

- the administrative unit (organization and control of the education process: organization of resources allocation, accounts management, educational software support, creation of standards of using discipline units, etc.);
- the educational unit (educational interaction of the participants of the education process), which is subdivided into three elements:

1. the informational element (the study process itself, use of electronic and printed versions of educational materials, study of theoretical material and discipline-related literature, use of training tests for self-check, etc.).
2. the social element (the direct or mediated dialog in the form of the "student-student" and "student-teacher" interactions, and also group interaction through forums, chats, etc.).
3. the creative element (using databases on the course subject, supplying content for glossaries, accomplishing creative works by means of the wiki-technology, etc.).

- the program engineering block (hardware and software used for storing information and providing for interaction between the participants of the education process).



The given elements of the university infrastructure can intersect by their functional properties. The core of the environment was the Moodle learning management system.

According to the given structure, the methodical system of education was modified to fulfill the experiment purposes.

Under the condition of using various disciplines related to studying information technologies in the professional activity (in linguistics, in the social sphere, etc.), the purpose of the education generally consisted in teaching the capabilities of the information science methods to students, as well as implementing them in professional activity and obtaining practical skills of using the modern information technologies in their future work.

The teaching means of the pedagogical system were printed materials (manuals, books, etc.), electronic documentary means (manuals, books, and other training materials in electronic form), multimedia resources (video and audio, interactive means of cognition), electronic learning systems (electronic practical works and simulators, including the online ones), databases and knowledge bases (cataloged informational resources in electronic form).

The education content was determined by the curriculum of the training direction and working training programs. The third generation standards include all necessary components of this content.

The organizational forms were lectures, seminars, consultations, practical, laboratory, and independent works, trainings, tests, and each of these forms was arranged in the distant form using the elements of the informational and educational environment.

At usage of the informational and educational environment of the university, three types of interaction were arranged:

- student-teacher (interaction of a student with a teacher both in passive form (electronic lectures, video and audio materials) and in active form (voice and text chatting, video conferences, and in-class learning); in this case the relations "one to many" and "one to one" are used);
- student-student (interaction of a studying student with other students according to the "many to many" principle);
- student-the informational and educational environment (interaction of a student with educational resources and minimum involvement of a teacher and other students, self-education).

Lectures, which were held intramurally, were substantiated with electronic materials. As their predominant purpose is to teach systematized basic concepts of scientific knowledge in a discipline, missing or incompletely perceiving them entails certain problems in adoption of the whole course. Therefore, the emphasis was made on one of their advantages – the opportunity of replaying the information, which is impossible to make at in-class lectures.

Practical and laboratory work is necessary mainly for acquisition of practical skills within the framework of a discipline. At that, the academic hours assigned for such classes are insufficient for mastering such skills. Therefore, the given form of study uses distant teaching aids. Within the framework of the experiment, two approaches to this activity were applied:

- remote access to the electronic laboratory devices, which model the experiment;
- delivery of a portable laboratory practical stuff to one's home.

The former implemented the so-called project activity oriented to creativity of a student; the latter implemented obtaining basic skills in using the stuff applied in the professional activity of a student. The main problem of implementation of the first approach was the organizational complexity, which was aggravated with the functionality of the hardware and software system. Therefore, the second approach was used more often: a student gained necessary methodical materials, fulfilled some tasks, and based on the studied material developed his own project. At

that, the individual work (or in pairs or groups) on project development was organized using the Moodle learning management system.

Methodical directions for accomplishment of laboratory works were provided in electronic form. As a rule, they were combinations of text and some graphic information in the form of screenshots. In certain cases, this content was provided as videos. Videos represented the program work area and audios represented the teacher's comments concerning actions to be done for achieving certain effect. Experience showed that in that case it was easier to teach main principles of operation with the given means in the visual form. Thus, the possibility remains to work simultaneously with methodical stuff; one can pause the video at any time and make necessary actions.

Control and evaluation means were applied in the intramural form of education; and if a discipline contained scheduled project activity, its defense was carried out at a classroom, as well. The learning management system application was reduced to acquaintance with the questions for preparation for the respective form of the control and evaluation event and to fulfillment of training tests.

Independent work of a student consisted in single or group learning of the part of a discipline, which had been scheduled for distant learning. Various interactive forms were used for this purpose. For example, one of the effective forms was writing an essay on the subjects selected by students, and the teacher just approved the subjects and compiled the evaluation criteria.

At implementation of the blended learning methodology, there was a probability of its rejection by some teachers and students. Therefore, among them regular polls were taken using the learning management system for the purpose of modification of the education process [9]. It is necessary to mention the most popular suggestions: use of electronic mail for communication of a teacher with a student; refusal from the blended learning for the benefit of the traditional one; use of the learning management system just for delivery of the training stuff and cancellation of interactive forms.

2. Results

The experiment on evaluation of the efficiency of creative initiative formation was carried out at the Sholom-Aleichem Priamursky State University among humanitarian students of the Linguistics, Pedagogy and Elementary Education Methodology, Pedagogy and Psychology, Social Work, Trade, Foreign Russian Language, and Advertising and Public Relations specialties. The level of creative initiative of a humanitarian student needs to be characterized by the level, on which he interacts with modern information technologies. Accordingly, the criteria of efficiency of the humanitarian bachelors' creative initiative formation were the V.P.Bespalko's levels of assimilation [10], modified with regard to the student's creative initiative in the modern information technologies application field (Refer to Table 1). In order to determine the creative initiative level, it is necessary to develop tasks that would detect the conformance of a student to his assimilation level.

Table 1. Characteristics of the levels of creative initiative formation

Assimilation level	Level title	Level of the creative initiative	Level characteristics
1	Recognition	None	The student works with modern information technologies only in the reproductive regime (on a template).
2	Reproduction	Low	When working with modern information technologies, a student independently reproduces and applies the information about the earlier assimilated base of accomplishment of this work (for example, solution of a task following the algorithm which he has memorized and is now reproducing).
3	Application	Medium	In the course of the work with modern information technologies, a student extracts subjectively new information during independent synthesis of a known basis of a standard action (for example, solution of a task through a known method by changing interpretation of its conditions; at that, the result of the task solution is known only in general terms).
4	Creativity	High	A student, by operation with the modern information technologies in a new situation (at a new task), creates new algorithms of actions, i.e. objectively new information.

According to V.P. Bespalko's method, a student reaches this level if he has successfully solved 70% of this level's tasks. At that, evaluation of the assimilation level of a student was determined by the highest level, in which he had successfully solved the admissible minimum of tasks. In this case, efficiency of the creative initiative formation is expressed by transition of a student to a higher level of assimilation.

In the beginning of the experiment, input test was carried out, during which the current level of humanitarian students was determined. The results of this test showed a very low level of creative initiative of students. In particular, nobody attained the creativity level; just one student showed the application level; and the absolute majority of students were on the level of task fulfillment on a

template (which is responsible for the recognition level) and reproduction.

Having studied the discipline, humanitarian students passed the final test, which consisted of similar tasks. Its results showed considerable decrease of the share of the lowest assimilation levels: the number of students being on the assimilation level decreased by 25.2%, and the number of students being on the reproduction level decreased by 25.7%. Accordingly, the number of students of the application and creativity levels increased by 22.7 % and 27.2 % accordingly (refer to Table 2). These results confirm the effectiveness of this approach to humanitarian students' creative initiative formation.

Table 2. Results of the creative initiative formation experiment

#	Stages	Levels of the creative initiative formation							
		Recognition (A)		Reproduction (B)		Application (C)		Creativity (D)	
		Number	%	Number	%	Number	%	Number	%
1	Before the experiment	20	30.3	45	68.2	1	1.5	0	0
2	After the experiment	4	6.1	28	42.5	16	24.2	18	27.2

Summary

The education, which is compiled using the informational and educational environment with a similar infrastructure, has much in common with traditional education, but it allows using modern production technologies and experience in the circumstances of decreasing the share of intramural classes. At that, the education of students becomes more intensive due to the group work and the creative element of the education and more transparent due to the control through the learning management system and other elements, which together create the informational and educational environment, namely reading rooms, libraries, Internet centers, etc.

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