EXPERIMENTAL WORKS ON THE ORGANIZATION INDEPENDENT LEARNING BASED ON BLENDED LEARNING TECHNOLOGY

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Student independent work (SIW) is a systematic activity aimed at mastering a certain part of the knowledge, skills and qualifications defined in the curriculum for a certain discipline, with the exception of the classroom and outside the classroom based on the advice and recommendations of a teacher of disciplines.

The organization of SIW in the initial stages of training is associated with a number of tasks. It is especially difficult that freshmen get used to the next type of education - the higher education requirements. They practically do not know how to organize their independent activities in the training process. The big problem for them will be from which sources, how to find the data, analyze and edit them and highlight the necessary ones, summery, clearly and vividly express their opinion, directly allocate their time, as well as evaluate their mental and physical capabilities. The main thing is that they are spiritually not ready for independent education.

Therefore, each professor-teacher must first give the student confidence in his abilities and mental capabilities, teach them to organize patiently, gradually independently. It is necessary to increase their initiative and role, taking into account the fact that the knowledge and skills learned by students independently are complicated and expanded from the course. Then the student, accustomed to independent education, not only performs the work determined by the teacher, but also independently learns to select additional knowledge that he considers necessary, turning to his needs, interests and abilities.

In determining the form and scope of independent student work, the following aspects should be taken into account:
- training stage;
- the specificity of a certain science and the difficulty degree in mastering;
- the ability of the student and the level of theoretical and practical training (basic education);
- the degree to which science is provided with sources of information;
- the student's work level with sources of information.

The form and volume of tasks for independent work, the complexity degree should change and increase in accordance with the formation of skills from semester to semester. That is, it is necessary to gradually increase the students' independence level in fulfilling tasks, teach them a systematic and creative approach to completing tasks.

To conduct the experiment, we determined the students' independent education skills in the field of pedagogy and psychology of the Pedagogical Faculty of Samarkand state university within the framework of the science "Theory and history of pedagogy."

According to the exemplary and educational plan for the subject "Theory and history of pedagogy" for the I semester of the 2018-2019 school year, 156 hours were allocated, of which 20 hours - for practical and 96 hours - for independent training.

According to the new regulation developed by the Presidential decree of the Republic of Uzbekistan S. Mirziyoev on 05.06.2018 PD 3775**"On additional measures to improve the education quality in higher educational institutions and ensure their active participation in the widespread reforms being carried out in the country"**, from the 2018-2019 academic year, students of the 1st year were allocated 5-day classes per week and 1 day of independent search for students who will effectively spend time on an independent search for the student and work on it further.

This suggests that students need to pay special attention to the independent education process, work with literature, and equal distribution of time.

In the framework of the concept of blended learning (mixed education), in order to master the hours allocated to independent education, a wider and deeper study of the subject "pedagogical history and theory" we created a mobile program (program), which is called "Pedagogy" as a practical result of dissertations, before obtaining the results of training from students obtained under this program.

On the basis of methodological manual developed in order to determine the effectiveness of the technology of organizing and managing the independent educational activities of students in the theory and history of higher education pedagogy, we conducted pedagogical experiments in the direction of "Pedagogy and Psychology" of the Pedagogy Faculty for 2018-2019 years.

Experimental researches were carried out directly at the faculty with students in the natural conditions of their education. Pedagogical experiments were conducted in 5110900 - "Pedagogy and Psychology" undergraduate education groups of Samarkand State University. Pedagogical experimental testing work during 2018-2019 was carried out in the following three stages.

At the first stage of study (2018-2019), the current state of the problem was studied. To this end, educational normative documents, scientific sources and practices were analyzed; goals and tasks that need to be achieved were identified. On the basis of the survey, the primary - general education state and the attitude of students to independent educational activity were studied. At the same time, a survey of three blocks was created, which included questions related to the interest of students in the subject "Theory and history of pedagogy," the attitude to independent education.

In the second block there were questions related to the second direction of our research - the study of their attitude to independent education.

In the third block, issues related to the identification of factors impeding independent educational activities were raised. An analysis of curricula, textbooks, methodological manuals on the subject "Theory and history of pedagogy," a check of the students' preparation level for independent work was carried out. Mathematical statistical analysis of the results was used. Analysis of results, observations, conversations and pedagogical personal experience were used in the elaboration of methodological manual for the organization of independent education in the subject "Theory and history of pedagogy," in particular, for conducting experimental training in the content of independent work outside the audience and the technology for their implementation.

In the second phase (formative practical training) (2018-2019 academic year), independent training was conducted on the basis of a mobile application (program) for formative practical training developed by the master. An experimental mobile application has been developed. The effectiveness of the technology for organizing and managing students' independent learning activities developed during the study was tested and put into practice.

Formative experimental trainings were conducted mainly with students of the 1st stage of the bachelor's degree program "Pedagogy and Psychology" of the Pedagogy faculty of Samarkand state university. Two parallel groups, the Experimental Test Group (ETG) and the Control Group (NG), were separated to conduct the experiments. Based on written and creative work, interviews with teachers, groups were selected who were prepared to perform approximately the same independent work for the experimental and control groups. Theoretical and methodological training of teachers teaching in parallel groups is almost the same. In the course of the research, the researcher personally tested the effectiveness of methodological applications for independent learning, mobile applications and independent work on the theory and history of science and pedagogy, which form the basis of students' independent learning.

Assignment options were also provided that reflected the skills that students should be able to acquire on the topic.

In the third (final) stage (2019), the results of the formative experimental work were summarized, processed and analyzed in mathematical statistics. The results and conclusions were formalized in the form of a master's dissertation. The essence of the methodological developments developed for practical training is as follows: - lectures and practical classes focus on encouraging students to learn independently; -development of learning and control tests for students to complete learning tasks independently and the issuance of results after their completion; - recommendation of the necessary literature for additional use by students in independent work. This allowed us to assess the effectiveness of the methodology we have developed for the organization of independent study of the subject "Theory and history of pedagogy" in the bachelor's degree program "Pedagogy and psychology".

21 students took part in the first stage and 17 students took part in the second stage. A total of 38 students participated. Experience in the first and second stages (beginning of the experiment) - to determine the level of pedagogical knowledge and skills acquired by first-year students in secondary schools and colleges on questions related to the subject of the test, and independent learning activities questionnaires and test questions, inspections were conducted to determine the relationship.

The study allowed to determine the state of creative readiness of students in the experimental and control groups of the experimental phase, and showed the following results.

The initial state of students' readiness for independent study

Table 3.1

Experimental phase	Number of students		Level (mastery)	I group (EG)	II group (CG)
	In the experimental group	In the control group			
Phase I: 2018-2019 academic year (at the beginning of the experiment)	34	32	The highest (excellent)	3 (7,6 %)	2 (5,4 %)
			High (good)	10 (29, 1 %)	11 (35,1 %)
			Intermadiate (satisfactory)	20 (63,3 %)	19 (59, 5 %)

The experimental program of independent teaching of the subject "Theory and history of pedagogy", pedagogical experiments to test the effectiveness of the methodology of its application were conducted by the researcher and teachers and practitioners of the same subject. During the preparation and conduct of the experimental work, plans and texts were developed with a detailed description of the content of teaching materials on the topics studied, teaching aids and manuals were used, and science topics were described. Didactic materials and guidelines for each lesson on the use of problem-based learning elements in teaching have been developed. Data revealing the content of the science before and during the experimental work, the results of experimental work conducted by researchers and teachers showed a classified criterion for increasing the level of knowledge of students in the process of testing the proposed scientific hypothesis.

Assimilation and analysis of data, striving to acquire new knowledge, to develop the ability to apply it in practice, to develop students' independence and creative activity, as well as pedagogical qualities on the subject "Theory and history of pedagogy" were accepted as the main indicators of the "Theory and history of pedagogy". The study material mastery by the students, the criterion of knowledge, skills and competencies on this material determined the level of professional development skills of the future teacher bachelors, because it has been shown that the skill of professional formation is formed only on the basis of the acquisition of relevant information about professional activity.

Views of the course "Theory and history of pedagogy": demonstration in the explanation of a new topic, creating problem situations, organizing discussions, sharing students' ideas, developing creative activity, forming independent thinking, focusing on independent learning , developing their aspirations for scientific innovation. These pedagogical methods were taught during lectures and practical classes on "Theory and history of pedagogy."

During the research, the selection of goal-oriented content for the lesson or independent work, demonstration of delivery methods of teaching materials to the student, analysis, the student's ability to apply the acquired knowledge in practice classes were carried out according to the instructions. At the end of the experiment, students received final control on the subject "Theory and history of pedagogy" from practical tests and questionnaires.

II phase indicators of students' creative preparation

Table 3.2.

Experimental phase	Number of students		Level (mastery)	I group (EG)	II group (CG)
	Experimental group	Control group			
I phase: 2018-2019 academic year (At the beginning of the experiment)	34	32	The highest (excellent)	8 (7,6 %)	2 (5,4 %)
			High (good)	11 (29, 1 %)	10 (35,1 %)
			Intermediate (satisfactory)	15 (63,3 %)	20 (59, 5 %)

The highest level (excellent) (86 to 100 points) - students who have fully mastered the ability to solve problems (independently) and have fully mastered the knowledge and skills.

High (good) level (71 to 85) - students who have mastered problem-solving and knowledge and skills, but can solve only the set problems identified in the course.

Intermediate (satisfactory) level (from 56 to 70 points) - students who have an idea about the set objects and things, has mastered the solution of compositional problems in constructive construction methods, and has mastered the knowledge and skills, but solves the problems specified in the course, find it difficult to solve problems independently. Those who scored up to 56 points were also included in the list of conditionally successful students.

The study took into account that the students in the group met the requirements of the State Educational Standards. In order to determine the effectiveness of the technological approach to the students' orientation to independent learning in pedagogical classes on the basis of experimental analysis, the final control results obtained from students were analyzed in quality and quantity. Methodological literature on evaluating the effectiveness of independent learning activities in the experimental process was studied and applied to the experimental results.

One of the education priorities is the students' ability formation to learn independently in the formation of students' practical, life skills in the minds to determine national and universal values, to find their rightful place in society in the future is calculated.

When reviewing the scientific and pedagogical literature, we see that in the process of conducting experiments on a particular problem, the main focus is on the practical aspects of the problem under study. The pedagogical process is a process that takes place between the teacher (teacher-educator) and the learner (pupil-student) and reflects the content of practical activities that have didactic features. Theoretical pedagogical ideas are decided on the basis of direct study, analysis and generalization of the educational process essence in practice. Therefore, the experimental work organization in the pedagogical research process is the core of this process. Based on the above considerations, the student formation levels at the beginning of the experimental work on the organizational skills formation in students are reflected in the table below.

The formation of students' organizational skills in the classroom and out-of-classroom activities showed that the knowledge level acquired in the pedagogical system disciplines is reflected in the figures in the table above, which is low.

Now we analyze the pedagogical experiments results in quantitative and qualitative terms. Mathematical and statistical methods were used in the processing of experimental results.

Let's make an in-depth comparative analysis of the numerical data in Tables 3.1. and 3.2. above using mathematical statistical methods. We use the following designations and formulas for this purpose. Numerical data on the subject "Theory and history of pedagogy" were obtained for each stage. Based on this information, we make the following definitions:

Denotation:

x_i – assessments appropriate to the experimental group

y_i – assessments appropriate to the control group.

$$i = \eta = \frac{x0}{y0}$$

Changes in the students' knowledge dynamics based on the independent learning activities activation (in numbers and %)

x and u – appropriate arithmetic mean values for the experimental and control groups.

$$x = \frac{\Sigma x_i n_i}{n}; \quad y = \frac{\Sigma y_i m_i}{m};$$

Here: x_i, y_i – Accepts "excellent" (5), "good" (4) and "intermediate" (3) values respectively. n, m – the number of students in the control and experiment group.

The intermediate value that evaluates the learning process efficiency is the ratio of the arithmetic mean values of the experimental and control groups assessments, i.e. the efficiency coefficient is obtained as follows:

$$\eta = \frac{x}{y} \quad (2)$$

Mean squared deviation sizes:

$$s_x^2 = \frac{1}{n} \Sigma_i n_i * (x_i - x)2 \quad (3)$$

Standard deviation sizes:

$$s_x = \sqrt{s_x^2}; \quad s_y = \sqrt{s_y^2}; \quad (4)$$

Identification index of average value :

$$C_x = \frac{s}{\sqrt{n*x}} * 100\%; \quad C_y = \frac{s}{\sqrt{m*x}} * 100\%; \quad (5)$$

Confidence intervals for unknown averages of the general set:

$$a_x \in \left[x - \frac{t}{\sqrt{n}} * S_x; x + \frac{t}{\sqrt{n}} * S_x \right] \quad (6)$$

$$a_y \in \left[y - \frac{t}{\sqrt{m}} * S_y; x + \frac{t}{\sqrt{m}} * S_y \right]$$

Here: t - the probability of normalized deviation confidence is determined on the basis of R. For example, in R q 0,95 is equal to t q 1,96.

We propose the hypothesis of H_0:a_x q a_y on the equality of average values and check that the opposite is H_1:$a_x \neq a_y$ through Student statistics based on the above data.

$$Tm_1{}_n = \frac{(y - x)}{\sqrt{\dfrac{S_x^2}{n} + \dfrac{S_y^2}{m}}} \quad (7)$$

If $T > T_r$ q t, hypothesis N_0 is rejected and hypothesis N_1 is obtained

Based on this information, we will perform calculations for each stage below and provide a comparative analysis in tabular form.

In this study, the initial assessment of the assessment system was conducted at the beginning of the experiment and was assessed by a test based on the knowledge acquired by students in secondary schools and the initial knowledge acquired during the semester. At the end of the experiment, students' knowledge of creative-written and oral assessment on all topics of the discipline was determined.

Thus, the technology based on the activation of independent learning activities conducted in the experimental group was confirmed to be more effective than the traditional training conducted in the control group.

Table 3.3
Effectiveness indicators of students' knowledge and skills

№	Indicators	Experimental group		Control group	
		At the beginning of the experiment:	At the end of the experiment:	At the beginning of the experiment:	At the end of the experiment:
1	The arithmetic mean value (x, y)	3.18	3.81	3.18	3.42
2	Performance Indicator (η)	1.19		1.07	
3	Intermadiate value confidence interval ($a_x e, a_y e$)	[2,98; 3,38]	[3,32; 4,34]	[3,0; 3,36]	[2,93; 3,91]
4	The intermadiate value standard error ($S_x S_y$)	0.91	0.79	0.86	0.88
5	Identification index ($S_x S_y$)	3.22%	2.88%	3.15%	2.93%
6	Student statistics (T)	4.5		0.88	
7	Summary of indicators	Hypothesis N $_1$ is accepted		Hypothesis N $_0$ is accepted	

An analysis of the experimental results showed that the results of the experimental group (compared to the control group) (Table 3.3) were 1.12 (12%) higher and the results of pedagogical experiments confirmed the effectiveness of technology to improve the quality and effectiveness of creative training of future teachers based on the activation of the proposed independent learning activities.

The table shows that the students' creative preparation level in the experimental and control groups selected at the beginning of the experiment is almost the same (the highest: ETG–7,6; NG–5,4%; high: ETG–29,1; NG–35,1%; intermadiate ETG–63,3; NG–59,5). At the end of the experiment, i.e. the intermadiate value of the sum of the "highest" and "high" indicators of the students' creative preparation level after the activation of students' independent learning activities on the basis of technology based on the activation of independent learning activities increased by 12 percent (the highest –from 6,4% to–24,3%; high – from 29,1% to 32,5%). The results of the students' knowledge performance indicators were presented in tables for all stages and compared with each other.

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