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Improving the Organisation of Independent Work of Students of Higher Education Institutions in a Distance Learning Format

Article's History:

Received: 15.07.2020

Revised: 29.09.2020

Accepted: 26.10.2020

Suggested Citation:

Puhach, S.S., Dembitska, S.V., & Kobylanska, I.M. (2020). Improving the organisation of independent work of students of higher education institutions in a distance learning format. *Scientific Bulletin of Mukachevo State University. Series "Pedagogy and Psychology"*, 6(2), 9-19.

Abstract. The relevance of the subject matter is determined by the fact that Ukrainian higher education institutions in a pandemic are forced to switch to combined or distance learning while providing quality training for future professionals. Accordingly, there is a need to find effective means and methods of developing the competences of future professionals, considering the realities of combined and distance learning. The purpose of the study is to analyse scientific publications, the available practical experience of organising independent work of students in the conditions of remote classes and identify ways to optimise this process. The study considers the specific features of the organisation of independent work of students during remote classes. Based on the analysis of scientific sources on the subject matter and the survey, the main disadvantages of organising independent work in higher education institutions during distance learning were identified (lack of relevant methodological skills of teachers; the absence of developed algorithms for effective organisation of independent work by students in modern conditions; low motivation level of some students to master new material). The pedagogical experiment involved 56 teachers and 241 students. Ways to solve the outlined problems were substantiated and suggested. In particular, regarding the first problem, options for organising appropriate methodological work with scientific and pedagogical staff to acquire skills of remote organisation of independent work are proposed. To solve the second problem, it was proposed to structure the independent work of students in a distance format in accordance with the approach of reverse design in learning, which is depicted schematically. To solve the third problem – ways were developed to increase motivation to perform independent work of students who unite in the professional aspect of academic disciplines. Prospects for further research include the specification of the described approach to the organisation of independent work of students on the example of the study of occupational safety disciplines in technical institutions of higher education

Keywords: professional training, self-education, blended learning, distance learning, optimisation of the educational process

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Вдосконалення організації самостійної роботи студентів закладів вищої освіти за умов дистанційного формату навчання

Анотація. Актуальність теми дослідження визначається тим, що українські заклади вищої освіти в умовах пандемії змушені переходити на змішану або дистанційну форми занять, однак при цьому повинні забезпечити якісну підготовку майбутніх фахівців. Відповідно, виникає необхідність пошуку дієвих засобів і методів формування професійної компетентностей майбутніх фахівців, враховуючи реалії змішаного та дистанційного навчання. Метою статті є аналіз наукових публікацій, наявного практичного досвіду організації самостійної роботи студентів в умовах дистанційного проведення занять і визначення шляхів оптимізації цього процесу. У статті розглядаються особливості організації самостійної роботи студентів під час дистанційного проведення занять. На підставі аналізу наукових джерел з проблеми дослідження та проведеного авторами опитування було визначено основні недоліки організації самостійної роботи у закладах вищої освіти під час дистанційного проведення занять: відсутність відповідних методичних вмінь викладачів; відсутність розроблених алгоритмів щодо ефективної організації виконання самостійної роботи студентами в сучасних умовах; відсутність мотивації частини студентів до опанування нового матеріалу. У педагогічному експерименті було задіяно 56 викладачів і 241 студент. Були обґрунтовані та запропоновані шляхи вирішення окреслених проблем. Зокрема, щодо першої проблеми запропоновані варіанти організації відповідної методичної роботи із науково-педагогічним персоналом для набуття вмінь дистанційної організації самостійної роботи. Для вирішення другої проблеми було запропоновано структурування самостійної роботи студентів у дистанційному форматі відповідно до підходу зворотного дизайну в навчанні, яка зображена схематично. Для вирішення третьої проблеми – розроблені шляхи підвищення мотивації до виконання самостійної роботи студентів, які гуртуються на професійному спрямуванні навчальних дисциплін. Перспективою подальших наукових пошуків є конкретизація описаного підходу організації самостійної роботи студентів на прикладі вивчення працезохоронних дисциплін у технічних ЗВО

Ключові слова: професійна підготовка, самоосвіта, змішане навчання, дистанційне проведення занять, оптимізація освітнього процесу

INTRODUCTION

Considerable attention is paid to ensuring the quality of training of specialists in the current conditions of the pandemic, since, despite the difficult training conditions, graduates of higher education institutions (HEI) should have developed professional competence at a sufficient level. The introduction of blended and distance learning in higher education institutions requires teachers to improve existing and search for new, effective teaching methods, considering the modern realities of the educational process.

The performance of independent work by students of higher educational institutions in the conditions of blended and distance learning formats is an integral component of their professional training, the features of which are due to global integration processes, modern requirements of the competitive labour market for the competence of specialists, innovative educational processes, and the need to take into account the content of professional activity in conditions of a certain uncertainty inherent in the free market system of economically developed countries.

Features of the implementation of blended learning in HEI were considered in the publications of Ya. Sikora [1]. The researcher compared the features of conventional, blended, and distance learning, identified their positive and negative features. Moreover, foreign models of blended learning, which are promising in the Ukrainian educational space, were analysed. However, it was assumed that higher education institutions will introduce blended learning gradually, developing a legislative and methodological framework for this type of training.

O. Romanovska, Yu. Romanovska and O. Romanovskiy [2] analysed the experience of the world's leading universities in implementing distance learning, considering the current circumstances in the world. In accordance with the above-mentioned study, practice shows that it is possible to provide high-quality training of specialists with substantially fewer classroom hours than is provided for in the curricula in Ukrainian HEIs. Therewith, the main task is to combine online technologies and relevant methodological developments to ensure effective interaction between teachers and students directly and remotely.

In the publication of N. Symonenko [3], approaches to the organisation of independent work for students in the HEI of Great Britain and the USA are analysed. The effectiveness of blended learning in the context of organising independent work of students is also noted. Methodological foundations of blended learning were studied by O. Korotun [4]. Based on the results obtained using blended learning in higher education institutions in European countries and the United States, which testified to its effectiveness, the researcher defined the term "blended learning" as "a purposeful process of interaction of learning subjects, in which conventional and distance learning models are combined, the lessons are conducted in the classroom and out of it, in synchronous and asynchronous modes, based on the wide use of information and communication technologies" [4, p. 119] and characterised methodological approaches, the requirements of which should be taken into account during the introduction of blended learning in Ukraine (system, competence, personal, activity-based, and resource-based).

The analysis of the studied problem gives grounds to assert that the organisation of independent work of students of higher education institutions in the conditions of remote classes does not allow sufficiently creating conditions for the full development of independence of the future specialists, their ability to self-education.

The purpose of the article is an analysis of scientific publications, the existing practical experience in organising independent work of students in the conditions of remote classes and determining ways to optimise this process.

In accordance with the specific purpose of the study, the following *tasks* were outlined:

1. To analyse scientific and methodological publications on the problem of organising independent work of students in a remote format.
2. To conduct a survey among teachers and students of the Vinnytsia National Technical University regarding the specific features of independent work in the conditions of remote classes and identify existing complications.
3. To develop ways to improve the organisation of independent work of students of higher educational institutions in the conditions of distance learning format.
4. To summarise the obtained data and practical developments on the research problem in the publication.

LITERATURE REVIEW

The spread of the pandemic and quarantine restrictions have led to the transition of higher education institutions to distance or blended classes. At the beginning of this process, numerous problems arose that reduced the effectiveness of training future specialists. These include insufficient technical support for the organisation of such training; certain psychological problems that have arisen due to the lack of face-to-face interaction between teachers and students; a considerable increase in time for creating academic disciplines in a distance format, and so on.

One of the most important elements of professional training of future specialists is the independent work of students. Despite the lack of a unified approach to the interpretation of the content of "independent work", the researcher's views are unanimous that it is important in the professional training of a future specialist.

In particular, A. Verbytskyi and M. Iliazova [5] assert that promising ways to improve the professional training of future specialists are the introduction of active training and improvement methods for independent work using elements of problem-based and scientific search. According to V. Naumchuk, methodically correctly planned independent work of students "provides students with creative conditions, which allow them to determine the trajectory of mastering the profession" [6, p. 137].

M. Shved generalised the problems of organising

independent work of students in the HEI in the study [7]. The researcher focused on the following aspects: ensuring the effectiveness of students' independent work, evaluating its results and the performance, in particular, in a distance learning environment.

Zh. Kartashova and N. Aleksandrovykh consider the independent work of students during their professional training vital and claim that the main obstacles to ensuring its effectiveness are insufficiently developed methods of its organisation in modern conditions, the inability of elementary students to implement it, the lack of students' motivation to perform it [8, p. 191].

Several publications by O. Sushko and O. Kolodiy are devoted to the problems of managing the independent work of students in the HEI [9; 10]. In particular, the researchers specify that methodically correctly selected and organised independent work in professional training "increases students' motivation to study, acquire skills, and abilities to apply them practically" [9, p. 109].

D. Blizak, S. Blizak, O. Bouchenak, K. Yahiaoui investigated the perceptions of Algerian university students regarding the abrupt transition to online learning amid the COVID-19 pandemic. The results showed that students have a negative perception of online learning. They are reluctant about this new digital pedagogy and prefer the traditional way of teaching to online teaching during the coronavirus pandemic [11]. R. De Michele evaluates the psychological impact of e-learning on the mental health of quarantined students. Preliminary results show that the possibility of interaction and relationships with teachers and peers may have a positive impact on perceived levels of anxiety and stress [12].

MATERIALS AND METHODS

To determine the specific features of the organisation and ways to improve the independent work of HEI students in blended and distance learning formats, the study analysed scientific and methodological publications on the research problem and summarised the practical developments and the pedagogical experience. Moreover, the study analysed problems that arose during the entire period of distance learning under quarantine restrictions at the Vinnytsia National Technical University by conducting a survey among teachers and students. The authors studied reports of the university's methodological commissions, which were compiled based on the results of observations and visits to online classes, analysis of the overall learning outcomes of students, and their performance of course and qualification works.

Accordingly, the study consisted of two stages:

analytical-diagnostic and ascertaining. At the analytical-diagnostic stage, the features of the organisation of independent work of HEI students in the conditions of blended and distance learning formats were determined and analysed and the current state of independent work of students, features and disadvantages of its organisation in Vinnytsia National University were characterised.

Based on the analysis of curricula and training programmes for future specialists in higher education institutions and Vinnytsia National Technical University (VNTU); reports of methodological commissions of the University, the results of a survey among teachers and students, typical problems that arose in organising independent work of students were identified and differentiated. To improve such work in the conditions of blended and distance learning formats, the leading practices in this area in Ukraine and abroad and the possibilities of its practical implementation in Ukrainian HEIs were examined.

The pedagogical experiment involved 3rd-year students of VNTU of five specialities within one field of knowledge: 12 "Information Technologies", as well as teachers who provide professional training in three faculties. A total of 56 teachers and 241 students were involved in the pedagogical experiment. The uniformity of the student sample was determined by qualitative indicators (students had the same academic performance in the subjects studied, the same teaching staff, etc.) and by statistical criteria (Fischer's angular transformation method).

The purpose of the survey among teachers was to identify the main problems that arise in organising distance learning (insufficient information and communication competence of teachers and students, limited technical capabilities of the Internet, poor quality of information transmission on the Internet, etc.) along with the format according to which the study of academic disciplines is conducted:

- such format is fundamentally different from the classical one by structuring the content of the academic discipline and using other forms and methods of educational interaction;
- the available material has been converted to a remote format and supplemented with graphic and video materials;
- the available material has been converted into a remote format without changes, and the training course has been supplemented with a test control of students' knowledge and skills;
- distance learning of the discipline was not fundamentally different from the conventional one.

To establish the reliability of the information received, students were invited to participate in a distance survey on the main problems of organising a distance-learning format. Students were asked to express their own opinion on the specific features of organising distance learning of academic disciplines in accordance with the questionnaire, which contained the following questions:

- Did you like this format of training sessions?
- Has it become easier to perform independent work?
- Has the overall quality of training improved?
- Have your learning outcomes improved with the new form of training?
- Would it be enough for you to conduct classes in audio format?
- Do you need additional remote consultations?
- Do you need additional classroom consultations?

For the subsequent analysis of the learning outcomes and rating of students, remote testing of their acquired knowledge and practical skills in those disciplines teachers of which took part in the pedagogical experiment was conducted.

At the ascertaining stage, analytical material was summarised on the effectiveness of organising independent work of VNTU students in the conditions of distance learning format using mathematical and graphical methods of mathematical statistics and computer data processing methods for analysing research results.

Thus, to achieve this purpose, the authors used the following research methods:

- *theoretical*: comparative and retrospective analysis of pedagogical, psychological, sociological sources on the research problem; theoretical analysis, synthesis, comparison, and generalisation of educational and regulatory documentation, concepts of the Ministry of Education and Science of Ukraine on the organisation of the educational process and independent work in particular; analysis of curricula and training programmes for future specialists in higher education institutions; generalisation of Ukrainian and foreign pedagogical experience, which created opportunities to identify the development level of the research problem and areas of the pedagogical ideas and the methodological foundations on the studied problem; generalisation, abstraction, classification, and design to substantiate the theoretical foundations and concepts of the organisation of independent work of HEI students in the conditions of distance learning format; design to determine the structure, stages, algorithm of independent work of students; summing up the results and compiling recommendations that will ensure

effectiveness of independent work by students in the conditions of distance learning format;

- *empirical*: observational (self-assessment, observation and reflection), diagnostic (testing, surveys, questionnaires, rating, conversations, analysis of learning outcomes etc.), which allowed generalising analytical material on the effectiveness of organising independent work of HEI students in the conditions of distance learning format; mathematical statistics for analysing the results of research and establishing their reliability; graphical for visual representation and graphical interpretation of the results; mathematical (registration, ranking, primary and secondary statistical processing of research results) for processing the obtained data and establishing a quantitative relationship between the phenomena and processes that were studied; mathematical statistics and computer data processing for statistical examination of the obtained results.

RESULTS AND DISCUSSION

Analysis of scientific sources on the research problem and features of remote classes at the Vinnytsia National Technical University has shown that the main obstacles to the effective organisation of independent work of students in the conditions of remote classes are:

- lack of appropriate methodological skills of teachers to organise control over the performance of independent work of students remotely;
- absence of developed algorithms for effective organisation of independent work by students in modern conditions;
- low motivation level of some students to master new material in the context of distance learning.

To develop recommendations, each of the obstacles should be considered separately. One of the reasons for the lack of methodological skills of teachers to organise control over the performance of independent work by students remotely is that most teachers of technical HEIs are specialists in technical fields, and the organisation of distance learning requires certain pedagogical skills, the ability to adapt the accumulated material to the format of such training. Based on their own experience and the survey conducted, the authors identified the properties that are necessary for the effective organisation of independent work of HEI students in the conditions of distance learning:

- knowledge of ways and features of planning independent work of students in distance learning;
- skills to organise the interaction of participants in the educational process during distance learning;
- ability to perform psychological and pedagogical

diagnostics of students' state during remote communication;

- ability to monitor students' academic achievements during distance and blended learning, using various methods;

- ability to identify materials that require processing in the course of distance learning, as well as outline areas for independent work of students.

To eliminate the lack of appropriate methodological skills of teachers to organise control over the performance of independent work of students remotely, it is necessary to ensure appropriate work with scientific and pedagogical staff. As the analysis of scientific publications and the experience of leading countries has shown, blended and distance learning has the potential to organise effective training of higher education applicants. Nevertheless, the teachers and students should be prepared for this type of work and the appropriate regulations and methodological framework should be developed. Today, in the context of the pandemic, people are forced to switch to a blended format of training without having enough experience in this area.

Accordingly, to reduce the shortcomings of the organisation of the educational process, it is necessary to provide methodological support for teachers. At the Vinnytsia National Technical University, such support is provided through systematic methodological seminars of the department and faculty, which address problematic issues related to conducting

classes and organising work with students in a remote format. To ensure the educational process, use "JetIQ electronic control system". JetIQ is a global information base of the university for: managing the educational process, accounting for students' knowledge, and learning activity, testing knowledge in the system. Furthermore, seminars are regularly held on the organisation of distance learning on the JetIQ platform. The effectiveness of distance learning in HEIs directly depends on its organisation. First, it is necessary to process each academic discipline to adapt it to the distance format, simulate actions during its study, and detail the independent work of students, the volume of which notably increases during this format. Therewith, control over the learning process, the interaction between all its participants, automation of the teacher's work should be ensured, since the volume of control automatically increases during the study of any training course.

To effectively organise the performance of independent work of students during the distance format, the material of the training course should be adapted accordingly. Practice shows that under quarantine conditions, a considerable part of teachers transferred their available material to digital format, without fundamentally changing their approaches to teaching it. A survey among teachers on this issue was conducted, the results of which are shown in Figure 1. A total of 56 people took part in the survey, all respondents have academic degrees and are lecturers.

Figure 1. Results of a survey among teachers on the specific features of remote classes

As can be observed from Figure 1, only 8.93% of teachers organised a distance learning course, considering the specific features of such learning. When conducting classes and organising independent work in a remote format, the volume of educational content should be clearly structured. Moreover, a sequence of

student work should be calculated, which will allow:

- combining different types of educational activities, identifying tasks for independent work of the student, and outlining its results;
- checking the educational achievements of students using test methods and by performing creative tasks;

- conducting a discussion of unclear or debatable issues that arise in mastering new material;
- constantly receiving feedback to ensure control over the work performed.

The survey results among 3rd-year students (87 people in total), who studied academic disciplines using innovative teaching methods adapted to the features of distance learning (30.36% from the total number of academic disciplines), indicate that they are highly interested in this form of the training organisation. Moreover, the motivation for high-quality independent work has increased. Thus, in this group, the respondents' responses were divided as follows:

- to the question “Did you like this format of conducting training sessions?” 75.9% of respondents (66 people) answered positively;
- to the question “Has it become easier to perform independent work?” There are 62.1% positive answers among the respondents (54 people);
- to the question “Has the overall quality of training improved?” 71.3% of respondents (62 people) gave a positive answer;
- to the question “Have your learning outcomes improved with the new form of conducting lessons?” 60.9% of respondents (53 people) answered positively;
- to the question “Would it be enough for you to conduct classes in audio format?” 24.1% of respondents (21 people) answered positively;
- regarding the need for additional consultations, 34.8% of the respondents need them remotely and 8.5% in the classroom format.

3rd-year students in five specialities (154 people in total) who studied the disciplines using a conventional methodology and supplemented by distance testing (69.64% of the total number of academic disciplines), when their content was only translated into the electronic format without appropriate adaptation to the

features of distance education, answered as follows:

- to the question “Did you like this format of conducting training sessions?” 36.4% of respondents (56 people) answered positively;
- to the question “Has it become easier to perform independent work?” 24.7% of respondents (38 people) gave a positive answer;
- to the question “Has the quality of training improved?” 14.3% of respondents (22 people) gave a positive answer;
- to the question “Have your learning outcomes improved with the new form of conducting lessons?” 5.8% of respondents (9 people) answered positively;
- when asked about the need for additional consultations, 47.6% of respondents need them in a remote format and 32.5% in a classroom;
- to the question “Was it enough for you to conduct classes in audio format?” 66.2% of respondents (102 people) answered positively.

Thus, the survey showed that students positively perceived innovative methods of teaching academic disciplines, the purpose of which was to increase the effectiveness of their professional training in the context of distance learning.

To improve the organisation of independent work of HEI students in the conditions of distance learning, the authors suggest using the reverse design approach in teaching, which is proposed by the Center for Innovative Teaching and Learning at Indiana University Bloomington [13]. This approach is to structure the content of the discipline with a focus on assessment, the results of which should demonstrate how much students have achieved the outlined purpose of the course.

According to this approach, the authors propose the following scheme for designing independent work of students (Fig. 2).

Figure 2. Structuring students' independent work in a distance format in accordance with the reverse design approach in teaching

The last problem identified by the authors concerns the effectiveness of performing independent work of students in the distance form of training is the lack of motivation of some students to master new material in such conditions. The authors share the opinion of K. Maslova, who considers motivation to perform independent work of students to be one of the important factors in ensuring the effectiveness of training. The main problems that decrease motivation to perform independent work, according to the researcher, are:

- inability to work independently;
- complexity of the material to be processed;
- lack of understanding of the importance of the task being performed for professional growth;
- a specific psychological state that is established in a student in the case of imaginary “familiarity” in transition from one educational discipline to another [14, p. 35].

S. Pukhno claims that only the presence of established motivation in a student contributes to activity growth in learning. Motivated students “strive for the independent solution of educational problems; defend their own point of view, as opposed to accepting information as a fact, without independent critical analysis, lack of initiative, and orientation to ready-made samples of task performance” [15, p. 124].

To develop the motivation to perform any independent task, it is necessary to shape students' understanding of the purpose of this task. Therefore, each independent task begins with familiarisation with the outline of the skills that students should master and that will be useful in their future professional activities (Fig. 2). Moreover, the purpose of performing independent work in a particular discipline should correlate with the content of professional competence that will be established in the student after graduating from HEI.

The next step is to analyse the relevance of the task being performed and the relevance of the content of the training course. The process of updating the human knowledge base and related technological changes is quite dynamic. Information becomes the determining factor in the economic development of any state. In a matter of few years, the knowledge that a modern student will receive while studying at the HEI will become outdated. Specialists of the future will be forced to study throughout their lives to have competitive advantages in the labour market. Accordingly, the content of academic disciplines should also respond to changes in technologies, legislation, methods, etc., it is impossible to motivate students who study irrelevant

information. The above provisions were substantiated by the authors in publications [16; 17].

For the effective organisation of work, it is necessary to inform students of the entire course structure, a list of all tasks for independent work that need to be completed, assessment criteria, and deadlines for each topic or type of work. The convenience of the distance learning format is that students have access to all the materials of the discipline around the clock and can choose a mode of their work outside the schedule of online classes or consultations.

One of the most powerful factors of motivation is the possibility of using the acquired skills in professional activities. Therefore, if possible, tasks should be professionally oriented. The final point that should be considered when organising the independent work of students in a remote format is the availability of feedback. Such communication should be provided not only in the form of performing tests or passing completed works but also in the format of online communication [18-20].

Summing up the above, for the effective organisation of independent work of students during the study of certain academic disciplines in a remote format, it is appropriate to provide:

1. Students' assessment at the beginning of the course. Such an assessment is conducted to determine the initial level of knowledge, to discover students' expectations from the development of this course.
2. Defining the purpose of studying the course in general and independent work of students in particular, considering aspects of future professional activity of students.
3. Familiarising students with the structure of the entire course, deadlines for completing tasks, schedule of online meetings, deadlines for each content block.
4. Familiarisation of students with reporting forms, assessment, and feedback tools. The assessment should be clear to students.

CONCLUSIONS

Training of specialists in HEIs in the context of the pandemic is conducted in blended and remote forms. Such changes have their advantages and disadvantages. The advantages are the ability to use information and communication technologies in training specialists during classes, convenient operation mode, automation of some tasks. Nevertheless, the disadvantages include the lack of developed methodological tools for performing such work. At present, it is important to learn

from previous mistakes, not in the format of a limited pedagogical experiment.

Accordingly, the article attempted to summarise the accumulated results on the organisation of independent work of students in the conditions of remote classes. In particular, based on the conducted pedagogical research and analysis of scientific literature, the existing disadvantages in the organisation of independent work of students in blended learning conditions were identified: the lack of appropriate methodological skills of teachers to control the performance of independent work students remotely; the absence of algorithms for the effective organisation of independent work by students, the low motivation level of some students to master new material in the conditions of remote classes. The content of the pedagogical experiment was to substantiate ways to improve the organisation of independent work of students in blended learning conditions and check their effectiveness in the educational process. 56 teachers and 241 students of the Vinnytsia National

Technical University were involved in the experiment, the results of which give grounds to outline the following tasks to improve the educational process:

- conducting methodological seminars for teachers on the organisation of independent work of students in modern learning conditions;
- structuring students' independent work in the distance format of classes. The authors developed and characterised a scheme for designing independent work of students taking into account the results of the experiment;
- increasing students' motivation to master new material in distance learning conditions. To perform the above tasks, it is worth analysing their relevance and the relevance of the content of the training course for the further professional activity of the employee.

The prospects for further research are the detailing of the proposed approach to organising independent work for students on the example of studying labour protection disciplines in technical HEIs.

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