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Flipped learning in higher school: theory and practice

Перевернуте навчання у вищій школі: теорія і практика

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Abstract


The article clarifies the essence of the technology of "flipped learning" and reveals the main stages of the educational process during the application of this technology, models of "flipped learning" for the educational process are taken into account, and the advantages of the technology of "flipped learning" are highlighted, which are taken into account when training specialists in institutes. Having disclosed the content of the main elements of the "flipped learning" technology and proposing an algorithm for conducting classes using this technology, we experimentally proved that the use of "flipped learning" technology is an actual technique in the formation of independent educational work and is necessary for the educational process. The purpose of the study was to determine the criteria for comparing the results of traditional training and training using the "flipped learning" technology. EG respondents noted that using the "flipped learning" method, it is easy for them to learn the material; they are more active in class; can process more educational material, they are attracted by the independence in processing new information, the


Анотація


У статті з'ясовано сутність технології «перевернутого навчання» та розкрито головні етапи освітнього процесу під час застосування цієї технології, враховано моделі «перевернутого навчання» для освітнього процесу, виокремлено переваги технології «перевернутого навчання», які враховано при підготовці фахівців у закладах вищої освіти. Розкривши зміст основних елементів технології «перевернутого навчання», та запропонувавши алгоритм проведення заняття з використанням саме такої технології, нами експериментально доведено, що застосування технології «перевернутого навчання» є ефективним прийомом у формуванні самостійної навчальної роботи та є необхідним при освітньому процесі у закладі вищої освіти. Метою дослідження було визначення критеріїв порівняння результатів традиційного навчання та навчання за технологією «перевернуте навчання». Респонденти ЕГ відмітили, що за методикою «перевернуте навчання» їм легко засвоювати матеріал; вони більш активні на занятті; можуть опрацювати більше навчального матеріалу, їх

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availability of electronic educational materials, the opportunity to study educational materials at their own pace, anywhere, at a convenient time.

Keywords: "flipped learning" technology, institution of higher education, formation of professional competencies, students of higher education, advantages of "flipped learning" technology.

Introduction

Modern society is impossible without public communications and the virtualization of life activities. Information and communication technologies have deeply penetrated our everyday lives and changed our communication, our behavior, our way of life, and our approaches to recreation and work (Riabukha et al., 2020).

In the circumstances of active changes, in connection with the intensive implementation of updated requirements for the enactment of pedagogical interaction in the educational process, the modern development of society, the special conditions of the organization, and the functioning of educational processes during the pandemic, teachers are reorienting the informative content of educational events in the institution of higher education (Ridkodubaska, 2021).

Currently, large-scale changes are taking place in the education system, which requires the starter of new pedagogical technologies in the training of qualified specialists, leading to an increase in the role of knowledge and the need to bring it into line with the new challenges of social life, focused on individual personality development, the ability to clearly solve tasks, development skills of continuous learning and independent education, etc. This requires in the educational process the constant introduction of alternative modern forms of educational technologies, which include "flipped learning" (Chuchmii et al., 2020). Therefore, it is expedient to investigate the peculiarities and advantages of implementing the technology of "flipped learning" in higher education in the preparation of future competitive specialists.

Literature review

Many theoreticians and practitioners have researched and are researching the theoretical and practical basics of the outline of blended learning into the education system and the

приваблює самостійність в опрацюванні нової інформації, доступність електронних навчальних матеріалів, можливість у власному темпі, у будь-якому місці опрацювати у зручний час навчальні матеріали.

Ключові слова: технологія «перевернутого навчання», заклад вищої освіти, формування фахових компетентностей, здобувачі вищої освіти, переваги технології «перевернутого навчання».

technology of "flipped learning" as its component.

O. Honcharuk, L. Shust, & V. Datsiuk (2021) considered the technology of "flipped learning" in primary school and substantiated the possibilities of its use. The term "flipped learning" is interpreted by the authors as "a form of active learning, the essence of which is the assimilation of new material by students at home, i.e. familiarization with the educational material before the next lesson takes place independently, and the time of classroom work is used for understanding and applying knowledge, skills, and abilities, i.e. for practical tasks". The advantages of this form of work are determined. Features of the use of innovative interactive technologies in educational activities, in particular, the technology of "flipped learning" in higher education were defined by H. Ridkodubaska (2021). The teacher presented a description of the main ways of implementing interactive innovative technologies during the study of the educational discipline "Project Management in Education", which will improve the quality of professional training of future specialists in modern conditions. The essence of the "flipped learning" technology ("which consists in a radical reorganization of the educational process – changing the distribution of the time spent by the teacher on explaining new material and practicing it, which makes it possible to use classroom hours effectively") and the possibility of introducing the discipline "Foreign Language" into teaching is considered of this technology by such scientists as T. Riabukha, N. Hostishcheva, L. Kulykova, & T. Kharchenko (2020). The advantages of its use are highlighted for both teachers and students. It has been proven that this technology enables the formation of the foreign language competence of the future specialist and the opportunity to achieve high results in the study of a foreign language. The methodology of using the "flipped learning" technology by N. Dobrovolska (2020) was considered. It has been proven that the

technology of "flipped learning" includes other pedagogical technologies, to activate the cognitive activity of students of higher education, enabling them to work at a convenient time, and encouraging the development of research skills. The main advantages and disadvantages of introducing the "flipped learning" technology into the educational process of a higher educational institution are revealed.

L. Konoplianyk, & K. Melnykova (2019) examines the actual issues of introducing the "flipped classroom" technology into the educational process. The general features of the technology are characterized; by the advantages are highlighted. The same problem is investigated in the process of professional training of social workers by O. Kolomiets, & T. Demydenko (2022), attention is focused on the features of using the "flipped class" technology during online learning, its advantages and disadvantages are determined, and a comparison is made with traditional learning technologies in institutions of higher education at training of future social workers. Also, the advantages and disadvantages of the innovative teaching model "flipped class" by N. Honchar, O. Zadorina, & N. Lopatynska (2022), which can recover the excellence of pedagogical education and teaching in general, are determined. To rise the productivity of the educational process, practical tools for the implementation of the flipped class model in pedagogical institutions of higher education are proposed.

O. Klekho, & T. Chetverykova (2023) improve the same questions, highlight the essence, and note the rewards of this didactic skill. Scientists noted that "the use of this technology in a modern school is an integral component of the organization of the educational process, which determines the relevance of the formation of teachers' skills to effectively use modern methods for preparing classes, organizing remote interaction and communication between participants in the educational process."

In the trainings of experts, attention is focused on the importance, shortcomings, and fundamental differences of the "flipped learning" technology in the organization of the educational process from others. Aspects of the work of students of higher education using the "flipped classroom" technology are highlighted. But it is value noting that, despite a significant sum of meaningful and original works by scientists on the studied issues, there are practically no studies devoted to the problems of the influence of "flipped learning" on the level of mastery of knowledge by students

of higher education institutions, which remains relevant today.

The purpose of the research was to investigate the features and advantages of implementing the "flipped learning" technology in higher education in the preparation of future competitive specialists; study the influence of the "flipped learning" technology on the formation of professional competencies of higher education students; determination of criteria for comparing the results of traditional training and training using the "flipped learning" technology.

Methodology

In order to realize the purpose, means of scientific knowledge were used: theoretical – analysis of psychological-pedagogical, philosophical, methodical literature – to outline the conceptual boundaries of the studied phenomenon; classification, logical-systemic analysis, induction, analogy, deduction, generalization of practical data and scientific and theoretical data – to determine the aspects of the work of students of higher education using the "flipped learning" technology; modeling – clarification of various models of "flipped learning" in the organization of the educational process; comparison of the received data – to clarify the connections, dependencies, fundamental differences of the "flipped learning" technology in the organization of the educational process from others; empirical – observations, surveys, conversations, tests – to find out and check the effectiveness of the implementation of the "flipped learning" technology in the organization of the educational process; pedagogical experiment – in order to study the influence of the "flipped learning" technology on the formation of professional competences of students of higher education, a comparative analysis of the educational achievements of students was carried out; quantitative and qualitative analysis of research results to verify the results of the experiment using methods of mathematical statistics (non-parametric Pearson test χ^2).

To study the influence of the technology "flipped learning" on the formation of professional competencies of students of higher education, a comparative analysis of the educational achievements of students was carried out:

48 students of higher education took part in the study:

- 26 respondents of the control group (CG), where learning by the "flipped learning" technology was not used;
- 22 respondents of the experimental group (EG), where training took place using the "flipped learning" technology.

The purpose of the study was to regulate the criteria for comparing the results of traditional training and training using the "flipped learning" technology.

The survey showed that respondents of EG have a more positive attitude to learning than students of CG. Since the emotional attitude of students of higher education to study affects their motivation, the levels of study motives of the respondents of the experimental group and the control group were diagnosed.

The results of the survey indicated the ease of assimilation of the material by EG higher education students, showing that EG students are more active in classes and interested in the forms and content of the educational material.

EG respondents noted that using the "flipped learning" method, it is easy for them to learn the material; they are more active in class; can process more educational material (94.7%), they are attracted by the independence in processing new information (63.2%), the availability of electronic educational materials, the opportunity to study educational materials at their own pace, anywhere at a convenient time (100%).

Research, and implementation of the technology "flipped learning" showed that this technology, taking into account the specifics of professional training, contributes to the development of not only the skills of creating professional electronic products but also ICT competencies.

Results and discussion

1. The essence of the "flipped learning" technology

A purposeful process of partial change is the innovation of education. Such changes lead to the version of the education process to new necessities; modification of the goal, forms of education, methods, contented of the educational process, and teaching (Kuchai, 2014). "Innovations in education are a natural phenomenon, dynamic in nature and developmental in results, their introduction allows to resolve contradictions between the traditional system and the needs for qualitatively

new education. An essential feature of innovation is its ability to influence the general level of the teacher's professional activity, to expand the innovative field of the educational environment in the educational institution, region" (Stratan-Artyshkova, 2022).

Such an innovation in the educational process is the organization of flipped learning, a complex process that requires proper methodical support and thorough preparation. Therefore, if the content of the course is carefully planned, the training methods are selected, and the appropriate technical means are used, the effectiveness of such training is achieved. There are various ways to "overtun" learning during the organization of the educational process. Such a technique can be applied not to the entire course, but to individual classes, on certain topics (Konoplianyk & Melnykova, 2019).

2. The main stages of the educational process when applying the "flipped learning" technology and the "flipped learning" model

The heart of the technology of "flipped learning" – classroom and homework – lies in the radical rearrangement of the main stages of the educational process. Everything happens differently, that is, the opposite of traditional education:

- classroom work, classes at home,
- homework – in class (Reyes-Ruiz, 2022).

Let us describe the main stages of the educational process throughout the request of the "flipped learning" technology:

- 1) work in the classroom involves discussions, interactive tasks, cases, role-playing games, web quests, projects, etc., that is, interaction and cooperation;
- 2) work at home consists of independent familiarization of students of higher education with new educational material: working with presentations, watching video lectures, working with recommended literature, working with materials from recommended sites;
- 3) implementation by the teacher of feedback, observation, monitoring, and evaluation.

There are many approaches to the implementation of "flipped learning", but all approaches are based on the main single principle: classroom work is aimed at the practical application of the acquired knowledge, and familiarization with new material takes place outside the classroom (Cueva & Inga, 2022).

Let's reflect the most actual models of "flipped learning", which should be used in the educational process of a higher school.

1. "Classic" model of "flipped learning". It is this model that provides the student of higher education with a preliminary introduction to the theoretical material of the future course. For the preparation of students of higher education, data can be provided in the form of a paragraph of a textbook, materials of a reference outline of lectures, in the form of video and audio documents, slides, etc.

In the classroom, the teacher uses interactive teaching methods, arranges a conversation of self-learned material, describes hard points that are unclear to students and answers questions. Even though the educational process is partly carried out remotely, this model has a translational character and resembles a traditional education system: first, concepts, theories, and models are considered, and then their real request. However, they are all based on a basic single principle: learning is realized directly outside the classroom, while the learning time is devoted to the application of the acquired knowledge in a practical dimension.

2. "Advanced" model of "flipped learning". Such a model provides for the expansion of types of activities and the gradual complication of the level of tasks. It has two stages: classroom and outside classroom. In the process of preliminary preparation, students of higher education read articles, individually search for material on a given subject, watch videos, individually or in mini-groups prepare theses that will be presented in the audience, questions for a round table or debate. Students of higher education post the results of their work on a common electronic platform so that the teacher and other students of higher education can better prepare for the class and familiarize themselves with them in advance.
3. "Combined" or "systemic" model of "flipped learning". Its essence consists in rearranging the key components of the educational process, and not in changing the place of performance of a certain type of activity.

In the classroom, under the guidance of the teacher, students analyze the tasks, present the sources and information found, compare the advantages of the proposed solutions, and highlight the shortcomings. After that, there is a remote stage again: students of higher education study the experience of activities related to the specified problem, and find out the theoretical foundations of the issue. At the final stage in the classroom, the learned material is consolidated,

summaries of the topic are drawn up; and the possibility of applying the developed model to other situations is analyzed.

Therefore, during "flipped education", every student of higher education receives the most targeted and relevant help when he needs it the most – at the stage of the practical application of the acquired knowledge. And the usual classroom system of the educational process at the time of traditional homework leaves the student of higher education "alone", which requires the application of the theoretical knowledge acquired in the classroom in practice (Riabukha et al., 2020).

3. Advantages of flipped learning technology

Let's highlight the advantages of the "flipped learning" technology:

- 1) rational use of classroom time;
- 2) conscious integration of the quantifiable by students of higher education;
- 3) activation of interaction "student"- "student", "teacher"- "student";
- 4) strengthening of the autonomous position of the student of higher education;
- 5) optimization of creativity among students, development of critical thinking, and transformation into an integrative part of the educational process (Prykhodkina, 2015).
- 6) a personalized approach to each student;
- 7) the opportunity to work at their own pace for each student of higher education;
- 8) the opportunity to make up missed classes;
- 9) a more comfortable and friendly atmosphere in the auditorium;
- 10) permanent possibility of archiving the material;
- 11) interactive nature of the organization of work in the lesson;
- 12) positive transformation of the role relations of the student and the teacher (teacher – adviser, guide, assistant) (Riabukha et al., 2020).

4. Basic elements of flipped learning technology

The main elements of flipped learning technology are individual protection of one's practical work, concise coverage of the topic for independent study, brief explanations of new educational material during online meetings on videoconferences, preliminary familiarization of higher education students at a convenient time and outside the classroom with new educational material, permission to use information materials

by higher education students during work, assessment of knowledge and skills of higher education students during practical work, introduction of means of disadvantage and impossibility of write-offs (Shetelya et al., 2023). The technology of "flipped learning" makes it possible to significantly improve success rates. However, the effectiveness of its application in practice depends on the teacher because the implementation of the "flipped learning" technology requires creativity, knowledge of ICT, time investment, deepening of knowledge, and the ability to build meaningful and interesting lessons (Dobrovolska, 2020).

The use of the technology of "flipped learning" is an effective technique in the formation of independent educational work. "Educational independent works are tasks that are offered to students of education for independent assimilation of new material" (Leão et al., 2023).

The success of independent assimilation of new material depends on the ability to analyze, generalize, compare, and draw conclusions and the level of formation of the skill of conscious, correct, and rapid assimilation of material. This form of work serves to ensure that each student of higher education reaches his or her own level of development through an individual pace of work, freeing up study time in classes to clarify specific unclear questions, for practical work, to activate the cognitive activity of students of higher education who are interested in working with gadgets, which serves to increase their interest in acquiring knowledge (Slushnyi, 2016). The teacher has wider opportunities for an individual approach, becomes a consultant for a student of higher education, better understands the gaps in the skills and knowledge of each individual, and therefore more effectively corrects them in their educational activities, applying various types of work. At the same time, the teacher is faced with several difficulties, in particular, the need for a high level of ICT proficiency, more time spent on recording videos, etc., predicting possible difficulties for students during independent work, lack of control during the performance of tasks according to the level of independence (Honcharuk et al., 2021).

5. Algorithm for conducting classes using the "flipped learning" technology

When conducting a class using the "flipped learning" technology, the teacher:

- records an explanation of new material on video;
- posts videos on YouTube, distributes videos to students of higher education, etc.;
- as homework, students receive links to educational resources and an educational video;
- students perform tasks online;
- the teacher in the class involves all students in the work;
- the lesson begins with repetition and a short discussion based on materials from electronic resources or videos;
- analysis and review of online assignments by students of higher education;
- a survey of higher education seekers to activate their attention;
- monitoring of educational achievements of students (da Silva, 2021).

Types of "flipped learning". In practical use, the next types of flipped learning are most significant:

1. The Standard Flipped Classroom. By viewing text materials or video lectures, students study the material of a practical lesson or an upcoming lecture. Conducting classes in the "virtual classroom", the teacher has additional time for individual work with each student of higher education;
2. The Discussion-Oriented Flipped Classroom. Students receive the task of processing materials from Internet resources or certain videos, and the teacher organizes a discussion of the received information in class;
3. The Demonstration-Focused Flipped Classroom. Students of higher education perceive and analyze the necessary activities that the teacher demonstrates to them, and then independently perform the tasks set before them;
4. The FauxFlipped Classroom. It will be appropriate to use this form if there is no certainty that the higher education students will prepare at home on their own. The model allows students of higher education to watch a video in class, and after that to complete the corresponding tasks;
5. The Group-Based Flipped Classroom. The model encourages students of higher education to get the right answers in the process of interactive interaction, to learn from each other, to find effective ways of conducting scientific research and ways of obtaining information, etc.
6. The Virtual Flipped Classroom. Organizes the work of students of higher education so

that the entire education process takes place remotely: the teacher offers material for students of higher education to review, consults online, uploads practical tasks, and assigns final scores by conducting testing. Independent processing of the relevant material takes place as it happens according to the principles of the "flipped class";

7. Flipping The Teacher involves doing all the work, not necessarily by the teacher. His task is to form practical tasks, advise, search for or prepare video materials, and check works. Students of higher education can perform certain types of work, and the teacher will monitor the organization of the learning process, and the presentation of information and, if necessary, will provide assistance (Kovtun & Krykun, 2019).

It is most appropriate to use Lourdes Morán's (2022) definition of the essence of "flipped learning" technology:

- at the organizational level: determine the place, time – general conditions;
- at the substantive level: develop a general education plan and individual programs;
- at the methodical level: find a means of learning that advances the student of higher education forward;
- at the social level: define such goals, establish rules, create working conditions, organize cooperation, conduct classes, develop a plan for continuous education;
- at the personal level: establish student-student and teacher-student relationship models.

6. An experimental study of the influence of the "flipped learning" technology on the formation of professional competencies of higher education students; comparison of the results of determining the criteria of traditional training and training using the "flipped learning" technology

Having clarified the essence of the technology of "flipped learning" and revealed the main stages of the educational process and taking into account the models of "flipped learning", we singled out the advantages of the technology of "flipped learning", which are taken into account in the training of specialists.

Having disclosed the content of the main elements of the "flipped learning" technology and proposing an algorithm for conducting classes using this technology, we experimentally proved that the use of "flipped learning"

technology is an effective technique in the formation of independent educational work.

To study the influence of the "flipped learning" technology on the formation of professional competencies of students, a comparative analysis of the educational achievements of students was carried out:

- 48 students participated in the study.
- 26 respondents of the control group (CG), where learning by the "flipped learning" technology was not used;
- 22 respondents of the experimental group (EG), where training took place using the "flipped learning" technology.

The resolution of the study was to control the criteria for comparing the results of traditional training and training using the "flipped learning" technology:

- 1) motivation of higher education seekers to study;
- 2) emotional attitude of students of higher education towards studies;
- 3) difficulty (ease) of assimilation of the material by students;
- 4) passivity (activity) of students of higher education in class;
- 5) academic achievements of higher education applicants.

The survey showed that respondents of EG have a more positive attitude to learning than students of CG. Since the emotional attitude of students of higher education to study affects their motivation, the levels of study motives of the respondents of the experimental group and the control group were diagnosed, namely:

- connected to the content of didactic activities: educational and cognitive;
- related to forms of education: educational;
- communicative activity in class, affirmation of personality in the student body: communicative;
- the importance of educational activities for mastering a specialist's future profession: self-improvement, and professional skills.

The outcomes of the review indicated the ease of assimilation of the material by EG higher education students, and showed that EG students are more active in classes and interested in the forms and content of the educational material:

- pronounced interest and ease of learning the material – 26.3%,

- expressed interest and ease of learning the material – 68.4%,
- weakly expressed interest and ease of learning the material – 5.3%,

than among students of CG:

- pronounced interest and ease of learning the material – 12.5%,
- expressed interest and ease of learning the material – 56.3%,
- weakly expressed interest and ease of assimilation of the material – 31.2%.

EG respondents noted that using the "flipped learning" method, it is easy for them to learn the material; they are more active in class; can process more educational material (94.7%), they are attracted by the independence in processing new information (63.2%), the availability of electronic educational materials, the opportunity to study educational materials at their own pace, anywhere at a convenient time (100%).

These factors affect the emotional satisfaction of higher education students, their intellectual satisfaction with the process of education using the "flipped learning" method, and learning outcomes.

EG respondents showed three times more communicative activity (188 additions and complete answers) than CG respondents (67 additions and complete answers), which was recorded in classes by the number of student performances (30 hours allocated to classroom classes).

In the research process, the "Motivation to Success" test was used to identify the self-improvement and professional motives of CG and EG respondents.

The results of testing according to this method showed that the number of EG students with a high level of motivation (by 23.2%) and an excessively high level of motivation (by 17.6%) increased before achieving success and the intended goals. There were no significant changes in the motivation levels of higher education students who were part of the CG.

Interesting forms of work during the educational process using the "flipped learning" technology stimulated future specialists' desire for self-realization. 79.4% of EG respondents received high scores for their own developments, in contrast to CG – 12.7%.

As the survey showed, the respondents of the experimental group spent more intellectual effort and time on tasks than the respondents of the control group. As a result, the educational achievements of EG respondents were higher than those of CG respondents (according to academic journals).

The application of the "flipped learning" technology meets the demands and wishes of the student youth of the modern world, which provides superior training of competitive specialists and is focused on direct work with electronic sources of information.

Research, and implementation of the technology "flipped learning" showed that this technology, taking into version the specifics of qualified training, contributes to the development of not only the skills of creating professional electronic products but also ICT competencies. Just as the process of education of competitive specialists is not limited to paper media, the knowledge of the teacher, this technology increases the cognitive interests of students of higher education, creates an opportunity for independent processing of additional information in a short period, promotes motivation of students to achieve success and set goals.

We will present the obtained average values of the indicator we singled out as one of the main reflective and creative components of the use of the "flipped learning" technology.

At the beginning of the experiment, there was no significant difference (10.46 ± 0.22 points) between the average value of the indicator of the respondents of the experimental group and the average value of the indicator of mastery of skills (respectively 11.01 ± 0.23 points) for the reflective-creative component of respondents of the CG. After using the "flipped learning" technology, the average values of the indicator for the reflective-creative component, we observe a significant difference (respectively 10.46 ± 0.22 points) between the average value of the indicator of mastering the skills of EG respondents at the beginning of the experiment and the average value for the reflective-creative component indicator of skill mastery (respectively 13.21 ± 0.19 points) of EG respondents at the end of the experiment.

The results of the analysis show that there is a difference in the reflective-creative component between the average value of the indicator of mastering the skills of the respondents of the CG (respectively 11.01 ± 0.23 points) at the

beginning of the experiment and the average value of the indicator of the respondents of the control group (respectively 12.4 ± 0.19 points) at the end of the experiment. At the end of the experiment, there is a difference between the average value of the reflexive-creative component of the indicator of mastering the skills of the respondents of the experimental group (respectively 13.21 ± 0.19 points) and the average value (respectively 12.4 ± 0.19 points) of the indicator of mastering the skills of the respondents of the CG. At the end of the experiment, there are differences between the average value of the reflexive-creative component of the indicator of mastery of skills by future specialists in both EG and CG respondents. At the analysis stage, each respondent determined the purpose of further work, taking into account the possibilities of using the acquired knowledge in practice; recommendations, topics, and tasks for further work at home were marked.

Conclusions

Having clarified the essence of the technology of "flipped learning" and revealed the main stages of this technology and taking into account the models of "flipped learning", we singled out the advantages of the technology of "flipped learning", which are taken into account in the training of specialists.

Having disclosed the content of the main elements of the "flipped learning" technology and proposing an algorithm for conducting classes using this technology, we experimentally proved that the use of "flipped learning" technology is an effective technique in the formation of independent educational work and is necessary for the educational process.

The purpose of the study was to determine the criteria for comparing the results of traditional training and training using the "flipped learning" technology.

The survey showed that respondents of EG have a more positive attitude to learning than students of CG. Since the emotional attitude of students of higher education to study affects their motivation, the levels of study motives of the respondents of the experimental group and the control group were diagnosed.

The results of the survey indicated the ease of assimilation of the material by EG higher education students, showing that EG students

are more active in classes and interested in the forms and content of the educational material.

EG respondents noted that using the "flipped learning" method, it is easy for them to learn the material; they are more active in class; can process more educational material, they are attracted by the independence in processing new information, the availability of electronic educational materials, the opportunity to study educational materials at their own pace, anywhere, at a convenient time.

Research, and implementation of the technology "flipped learning" showed that this technology, taking into account the specifics of professional training, contributes to the development of not only the skills of creating professional electronic products but also ICT competencies.

The educational sector needs further research into the issues of activating the cognitive activity of students of higher education.

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