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Higher pedagogical education in the European Union: Innovative technologies

Educación pedagógica superior en la Unión Europea: Tecnologías innovadoras

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Abstract

Higher teacher education in European countries has undergone a remarkable transformation due to the constant convergence of educational systems and institutions of higher education in Western Europe. The aim of the article is to analyze the experience of using innovative technologies in higher pedagogical education in the European Union countries. Methods of analysis and synthesis, prediction, comparison, and abstraction were used to realize this main task. The results traced the main innovative technologies popular in European pedagogical universities. The effectiveness of interactive learning, modular education system, technology of level differentiation, methods of learning through research

(use of the project method), E-learning, and deep use of digital platforms, which contributes to the formation of theoretical and practical knowledge, development of critical thinking and creative potential in higher education applicants is demonstrated. It is pointed out that e-learning based on university platforms allows users to actively participate in various international educational projects, creatively interact with other users and even create new content. Several European universities (from France, Germany, Austria, and other countries) have merged their e-learning platforms into one professional global service called web2.0. Important directions for the further development of teacher education will be heutagogy, peeragogy, or paragogy and cybergogy. The conclusions stressed the importance of further integration of digital innovative methods to teaching pedagogical disciplines.

Key words: higher teacher education, innovation, technology, approaches, EU countries.

Resumen

La formación pedagógica superior en los países europeos ha experimentado una notable transformación debido a la constante convergencia de los sistemas educativos y las instituciones de enseñanza superior en Europa Occidental. El objetivo del artículo es analizar la experiencia del uso de tecnologías innovadoras en la formación pedagógica superior en los países de la Unión Europea. Para llevar a cabo esta tarea principal se utilizaron métodos de análisis y síntesis, predicción, comparación y abstracción. Los resultados permitieron rastrear las principales tecnologías innovadoras populares en las universidades pedagógicas europeas. Se demuestra la eficacia del aprendizaje interactivo, del sistema educativo modular, de la tecnología de diferenciación de niveles, de los métodos de aprendizaje a través de la investigación (uso del método de proyectos), del e-learning y del uso profundo de las plataformas digitales, que contribuye a la formación de conocimientos teóricos y prácticos, al desarrollo del pensamiento crítico y del potencial creativo de los aspirantes a la educación superior. Se señala que el e-learning basado en plataformas universitarias permite a los usuarios participar activamente en diversos proyectos educativos internacionales, interactuar creativamente con otros usuarios e incluso crear nuevos contenidos. Varias universidades europeas (de Francia, Alemania, Austria y otros países) han fusionado sus plataformas de e-learning en un servicio profesional global denominado web2.0. La heutagogía, la peeragogía o paragogía y la cibergogía serán orientaciones importantes para el futuro desarrollo de la formación del profesorado. Las conclusiones subrayan la importancia de seguir integrando métodos digitales innovadores en la enseñanza de disciplinas pedagógicas.

Palabras clave: formación superior del profesorado, innovación, tecnología, enfoques, países de la UE.

1. Introduction

Integration processes on the European continent and Ukraine's entry into the educational and scientific space of Europe require a thorough and comprehensive study of the conceptual foundations and the search for effective mechanisms for the development of educational systems in our country. Implementing European standards, norms, and achievements plays an important role in establishing a European ethno-cultural identity in Ukraine and developing long-term foundations and strategies for modernizing domestic education in the context of the challenges of the information society. Higher education in Europe has undergone significant changes associated with the gradual convergence of educational systems and institutions of higher education in Western Europe. Most governments and leaders of higher education institutions have

realized that general discussions on the various problems encountered in this field will be beneficial to all, regardless of national and sub-regional differences. However, this trend is not reducing the diversity of higher education in Europe, although higher education institutions on the continent have been in need of reform of their structures for many years. At the same time, the World Declaration on Higher Education pays attention to the quality of education, accreditation, and competitiveness, the promotion of teacher and student mobility, the reduction of public funding for higher education, and the need for their diversification.

The use of innovative technologies in teacher education is also among today's current challenges. The study of this aspect is not fully completed, as the modern development of digital technologies, distance education, and the like point to new likely vectors of future teaching experiments. At the same time, summing up some experience of the European system of higher teacher education, their integration with the latest methods of work is an extremely urgent task, including the Ukrainian realities and their further improvement.

The aim of the article is to analyze the experience of using innovative technologies in higher pedagogical education in the European Union countries. Accordingly, the main objectives of the study are:

1. Characteristics of the main innovative technologies used in EU higher teacher education
2. Compare the peculiarities of innovative methods and technologies implementation in individual EU countries.
3. Describe the key aspects of the organization of online learning in European universities

2. Materials and methods

To achieve the goal of the study were used theoretical methods of pedagogical knowledge, in particular, analysis and synthesis. The analytical principle was used to determine the current state of teaching pedagogical disciplines, to describe the content of educational programs and methods used in their implementation. The work was based on the method of abstraction, which provides a transition from the analysis of general theoretical provisions to the formation of specific recommendations and generalizations. Thanks to this method of cognition, which also consists in separating certain aspects of the object of research from its general image, general regularities, theories, and concepts of development of higher pedagogical education in European countries were formulated. In addition, the comparative method of comparative analysis of educational approaches and methods used in the EU countries was applied. The method of comparison made it possible to establish significant differences and common features between the objects under study. When comparing two or more objects the scientific research revealed certain patterns, trends, perspectives, and challenges that have them in relation to each other.

The issues of further implementation of innovative technologies in the field of education and training of teaching specialists were investigated using the predictive method. The predictive method involves identifying possible consequences that may result from certain decisions and developing strategies to avoid undesirable outcomes. This requires collecting and analyzing a variety of data, including analytics, historical data, expert assessments and opinions of scientists, information on the objectivity of development conditions, etc. The article is also based on the

principles of critical analysis of educational programs and syllabuses of disciplines, which aims to study the use of various innovative methods of teaching in EU institutions.

Note that the work is not limited to certain geographical boundaries. The study analyzes innovative technologies and approaches used in Latvia (University of Latvia), France (Sorbonne University), Germany (University of Hamburg, University of Hannover, University of Freiburg), and Austria (University of Vienna).

3. Results

In the European Union countries, pedagogical technologies respond to global and information trends in the development of society. Technologies of developmental, collaborative, interactive, and modular learning are actively used. The essence of interactive learning is dialogue and cooperation between the teacher and the student (Milanković Jovanović et al., 2022). In addition, learning is formed as a series of interconnected problem situations and involves group work of students, promoting the emergence of trust and cooperation in the learning team. Integral technology is used as a way of learning that is based on identifying common elements of different educational subjects such as problems, events, and stories, and combining them into a new system with a specific purpose (Papadakis, 2016). At the same time, the University of Latvia actively applies interdisciplinary approaches and active learning technologies. Note that modern universities strive to develop interdisciplinary knowledge and skills (Hyams, Brown, & Foster, 2013; Pliushch & Sorokun, 2022). This will ensure that students are prepared to solve complex problems in their future professional lives (Cherng & Davis, 2019). Active learning technology allows them to participate in the learning process. It includes methods such as discussions, group work, discussions, organization of different projects, etc. Also, in the University of Latvia among the innovative technologies stands out the use of blockchain technology, which is used to create digital documents, which allows students to save their results and achievements, as well as certificates, diplomas in digital form.

In France, training is organized on a modular system of education. This allows applicants for higher education in pedagogy to receive official documents that contribute to their entry into the labor market, even if they have not completed their studies in full. Programs of study at universities, art schools, and other institutions consist of specific blocks of disciplines that allow students to earn intermediate qualifying certificates after several years of study. These blocks are specifically designed to meet the basic training requirements of future education professionals (Prokopenko, 2021). This modular training system is flexible and can respond quickly to labor market needs. It also motivates young people to seek employment. The importance of curricula lies not only in their content but also in how they meet today's specific needs of employers (Muchacki, 2022). For example, the proportion of pedagogical practice in a program can vary from discipline to discipline, from 0 to 50 percent of the total educational period.

At the same time, the technology of level differentiation is a method of building the learning process, allowing maximum satisfaction of each participant, taking into account his ability to master the material. The technology of level differentiation in higher teacher education is a method of building the learning process, which provides an individual approach to each student of student, depending on his abilities, knowledge, skills, and interests (Bizami, Tasir & Kew, 2022).

The basic idea is to ensure the highest possible level of mastery of the learning material for each higher education applicant, regardless of their current level of knowledge. This is accomplished through a variety of approaches, such as dividing students into groups based on proficiency or providing different tasks that meet different levels of difficulty. For example, students with high levels of knowledge and skills may have more difficult tasks, while applicants with low levels of knowledge may have tasks simplified to help them learn the material (Bizami et al., 2022). Level differentiation technology can be useful in developing the individual abilities of each higher education applicant by helping them master the material at a level that is accessible and understandable to them. It can also help reduce dropout rates and improve learning outcomes.

EU countries place a great deal of emphasis on the technology of learning through the lens of inquiry. The main goal of this method is for students to gain research experiences that promote critical thinking and creativity. Many students devote the majority of their time to independent research. Learning through inquiry (or project-based) is an approach to teacher education in which students actively engage in research on a specific topic, problem, or project, usually using interactive technology. This method involves higher education students learning not only from books or the instructor but also independently acquiring knowledge and solving problems through research and projects (Cherlenyak et al., 2018). The main purpose of learning through research is to develop critical thinking, creativity, and independent information-handling skills (Gürsoy, 2021). This method also promotes teamwork skills, collaboration, and the presentation of research results. In learning through research, the role of the instructor as a mentor and advisor who helps students solve problems and teaches them research methods is important (Järvis, Tambovceva & Virovere, 2021). This learning approach allows students to absorb knowledge more effectively and develop skills that may be useful in the future.

For example, pedagogical science programs at German universities usually include theoretical and practical aspects of educational science, which may focus on different areas. These programs may focus on the development of pedagogical strategies for teaching or on research into the psychology and social behavior of students. Classes can take the form of lectures, seminars, and hands-on activities where students can gain the experience needed to work in education (Harte, Herrera & Stepanek, 2016). Students may also have the opportunity to participate in research projects or internships at schools or other educational institutions. In particular, the Department of Pedagogy, Psychology, and Sport at the University of Hamburg places great emphasis on the practical component of teaching, which ensures that highly qualified educators and professionals from different fields are properly trained.

Usually, teachers of pedagogical sciences at German universities are highly qualified and experienced in the field of education. They may be involved in conducting research and developing new pedagogical methods (Järvis et al., 2021). In general, German universities offer a wide range of educational science programs that can meet the needs of students with different interests and goals. The Department of Pedagogy and Social Work at the University of Hanover focuses on research in education, pedagogy, and social work, offering training for teachers, social workers, and other professionals in these fields. The Department of Pedagogy at the University of Freiburg specializes in research on child and youth education, development, and learning. Among the innovative training methods used at these institutions are project methods and E-learning technology (Lopes & Soares, 2022).

In the online learning system, European universities have created their own resources and e-learning (E-learning) platforms on which the learning process is conducted. In addition, European universities are developing special educational solutions for online visitors. The e-learning platforms created contain different topics and are designed for different target audiences (Lopes & Soares, 2022). Students visiting such resources or platforms work with didactically composed multimedia content. E-learning based on university platforms tends to have an impact on the implementation of continuous learning processes and length of attendance (Demiray, 2017). However, e-platforms allow users to actively participate in various international educational projects, creatively interact with other users and even create new content. Several European universities (from France, Germany, Austria, and other countries) have merged their e-learning platforms into one professional global service called web2.0. This allows applicants to actively interact and communicate as well as create new content. In addition, several educational games and quizzes can be found on the web pages of such universities. The use of online courses is an important innovative technology used in many European universities (Picht & Richter, 2022). In particular, the University of Latvia offers special online courses for student teachers to improve digital skills, media education, and others to help them acquire new knowledge at their convenience. At the same time, a common innovative technology at Sorbonne University is the use of electronic portfolios, which allows student-teachers to save their achievements and results and develop professional skills electronically. In addition, common innovative trends in European universities are the use of virtual reality, interactive whiteboards, social networks in the provision of educational services. The use of virtual reality facilitates practical experience through the use of virtual space (Tsekhmister et al., 2021). In order to ensure effective communication, European universities use social media. At the same time, the use of electronic whiteboards allows teachers to shape more effective lessons and interact with students in real-time.

4. Discussion

Contemporary researchers have focused prominently on the practical component of innovative learning (Papadakis, 2016; Gürsoy, 2021; Babych et al., 2022). At the same time, much attention in modern universities is paid to the theoretical component of the training of future teachers. We are talking about the most adaptive approaches to the formation of a highly qualified specialist. In particular, according to Glassner & Back (2020), an important area for discussion is heutagogy, an approach oriented to higher education applicants where they take control of their own learning, responding to criticism that learning is too dependent on instructors and at the same time relies little on independent, dynamic and challenging independent learning. According to Blaschake (2021) heutagogical practices are applied in various fields, including social sciences, nursing, medicine, and engineering, because they can be adapted to learning in Reflective practice is important to the success of heutagogy because it helps students reflect on what they have learned and put it into practice (Glassner & Back, 2020). Although heutagogy assumes that learning is a natural human condition, technological skills are necessary to support learning outside of the classroom and to ensure that knowledge is acquired independently (Blaschake, 2021). Thus, integrating the principles of heutagogy with online technological tools is critical to providing teachers and students with the technological competencies necessary for a successful heutagogical approach to teaching pedagogy.

Peeragogy or paragogy, another form of collaborative learning, has gained attention in higher education because of its unique concept. This pedagogy celebrates co-creation and collaborative learning with peers, sharing learning situations and experiences in a social, active, and continuous process (Prasetya, Nuraeni & Shabir, 2022). According to Bizami et al., (2022) in this approach, students are actively engaged in the process of knowledge formation through co-creation of the learning environment. The pursuit of co-creation, which includes power sharing, interactivity, collaboration, responsibility, meaning, and knowledge, promotes flexibility, reflection, and increased motivation for both students and teachers (Bizami et al., 2022). However, developing techno-socially feasible learning and teaching tasks can be a challenge to balance practicality with the non-linear, non-coercive modality of peer learning (Bērziņa, 2018). In order to establish peeragogical learning and teaching, it is crucial to consider the principles underlying peeragogy, especially because twenty-first-century pedagogy differs from previous centuries (Prasetya, Nuraeni & Shabir, 2022). Answering important questions, such as which technologies are appropriate for peer learning and how the functions of the tools respond to the role of co-teaching and coaching in a blended learning environment, are important to successful pedagogical efforts (Milanković Jovanov et al., 2022).

Cyber pedagogy, on the other hand, focuses on engaging students in an online environment to enhance their cognitive, emotional, and social learning. The best learning outcomes can be achieved by engaging students in all three levels of presence simultaneously. The cybergogy approach can be applied anytime and from anywhere as long as computers and the Internet are available (Pliushch & Sorokun, 2022). The cybergogical approach also supports community-based learning by activating students to participate in discussions, share ideas, and develop solutions with the community (See Figure 1).

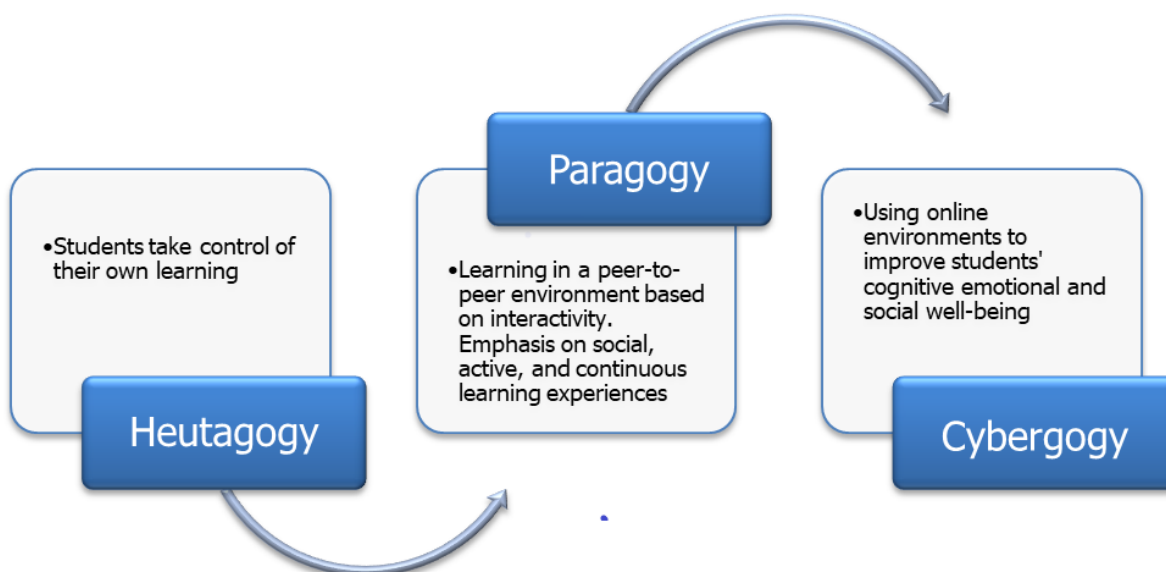


Figure 1. Little researched innovative areas of formation of the future teacher.
Article authors' development

According to Demiray (2017), this innovative pedagogy is unique in its application to online learning, and it has been widely used by educators who are proficient in the use of online

computer systems. However, it has also been used in the introduction of blended learning (Bizami et al., 2022; Shavel et al., 2021).

The limited use of this pedagogy is due to various factors, including digital illiteracy of teachers, limited time to learn, set up and create heutagogical applications, willingness to implement only with significant help and support, and treating pedagogy the same as physical instruction (Blaschake, 2021). Therefore, there is a need for detailed guidance on how to implement the cybergogical approach to learning and teaching that will allow for the widespread adoption of this pedagogy. In addition, the structure of curricula ready for future use for higher teacher education also does not provide guidance on how to effectively use this direction in teacher education.

We believe that teacher education in the future is likely to focus on the individualization of education and student development. This means that training will be directed to the needs and interests of each applicant individually, taking into account their level of knowledge, skills, and other characteristics. As technology becomes more accessible and advanced, we can expect it to be used to create interactive and innovative teaching methods (Lopes & Soares, 2022). Future pedagogy can also be expected to focus on the development of creative and critical thinking, the ability to work independently, and the ability to search for required information (Bizami et al., 2022). An important aspect of the pedagogy of the future will be the development of skills necessary for employment in today's digital environment, as well as preparation for career development in an ever-changing technology and labor market.

5. Conclusions

Innovative technologies in teacher training at European universities play a very important role. First of all, we are talking about using the possibilities of developmental, collaborative, interactive, and modular educational systems. Particularly popular is interactive learning, a feature of which is the close cooperation between the teacher and the applicant of higher education. In France, the modular system of education is more popular, which allows applicants for higher education in pedagogy to receive official documents that facilitate their entry into the labor market, even if they have not yet fully completed their studies. Important technologies of learning through research are also popular in EU countries. Their main purpose is for students to gain research experience that unlocks their critical thinking and creativity. Among other applied innovative methods of training, there is an appeal to E-learning technology.

A lot of attention in European modern pedagogical universities is paid to theoretical systems of training future specialists. First of all, they talk about heutagogy, a way of teaching in which the control of learning is entirely in the hands of applicants for higher education. Further integration of heutagogy with online technological tools will be crucial to technological competence. Peeragogy is about the importance of collaborative learning and shared creativity among peers. Cybergogy focuses on engaging students in an online environment to enhance their cognitive, emotional, and social learning.

Educator training in the future is likely to focus on individualizing education and student development. As technology becomes more accessible and advanced, we can expect it to be used to create interactive and innovative teaching methods. An important aspect of the pedagogy of

the future will be the development of skills necessary for employment in today's digital environment, as well as preparation for career development in a constantly shifting technology and labor market.

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