

EUROPEAN INTEGRATION PROCESSES AND THEIR INFLUENCE ON THE DEVELOPMENT OF EDUCATION ЄВРОІНТЕГРАЦІЙНІ ПРОЦЕСИ ТА ЇХ ВПЛИВ НА РОЗВИТОК ОСВІТИ

UDC 378.147.091.33:004(430)

[https://doi.org/10.31652/3041-1203-2023\(1\)-7-13](https://doi.org/10.31652/3041-1203-2023(1)-7-13)

Teacher preparation for implementation of E-learning in the educational process of a German high school

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The authors declare no conflict of interest.

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Abstract

The article examines the problem of using electronic learning (E-learning) in the training of future teachers in German universities, which is a fairly new and at the same time promising direction of comparative pedagogy. This problem has gained particularly active development in recent years, which is largely due to the spread of digital forms of education, which were recognized in Germany as a special category of the latest educational technologies. It is assumed that the constant introduction of new pedagogical technologies will provide wider opportunities for the development of pedagogical universities in Germany and maintain competitiveness in the international market of educational services. It is believed that successful E-learning scenarios take into account the necessary didactic conditions of learning in different contexts, such as authentic or social learning contexts, and provide substantial digital support for learning materials. The authors consider the use of digital learning tools, which have a differentiated presentation and characterize the most widespread types of E-learning used in the training of future teachers in Germany, and cover the modern spectrum of posting event scenarios and lecture materials on the Internet for fully virtual teaching, namely: computer online computer training, internet training, blended learning, exclusively virtual training, and distance training on the Internet. An important aspect of E-learning is the tools and media for its implementation, which include software for portals, a system for managing administrative functions (personnel management and student management), course management, a learning platform, and tools for creating and collaborating on a network. E-learning is widely used in German universities; it supports learning processes through the use of various digital technologies that provide operations in various ways. Teachers are offered a choice of teaching and learning scenarios, and the e-semester reserve is aimed at further supporting classroom teaching.

Keywords: E-learning, distance learning, online computer learning, Internet learning, blended learning, exclusively virtual learning

Підготовка викладача до здійснення Е-навчання в освітньому процесі вищої школи Німеччини

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Анотація

У статті розглянуто проблему використання електронного навчання (Е-навчання) у підготовці майбутніх учителів в університетах Німеччини, що є достатньо новим і водночас перспективним напрямом порівняльної педагогіки. Особливо активного розвитку ця проблема набула в останні роки, що значною мірою обумовлено поширенням цифрових форм навчання, котрі були визнані у Німеччині особливою категорією новітніх освітніх технологій. Передбачається, що постійне впровадження нових педагогічних технологій надасть більш широкі можливості для розвитку педагогічних університетів Німеччини та підтримання конкурентоспроможності на міжнародному ринку освітніх послуг. Успішні сценарії Е-навчання враховують необхідні дидактичні умови навчання в різних контекстах, наприклад автентичний або соціальний контексти навчання та забезпечують суттєву цифрову підтримку навчальних матеріалів. Автори розглядають використання цифрових засобів навчання, що має диференційоване представлення та характеризують найбільш розповсюджені види Е-навчання, котрі використовуються у підготовці майбутнього вчителя в Німеччині та охоплюють сучасний спектр розміщення сценаріїв подій та матеріалів лекцій в Інтернеті для повністю віртуального викладання, а саме: комп'ютерне навчання в режимі онлайн, інтернет-навчання, змішане навчання (Blended Learning), виключно віртуальне навчання, дистанційне навчання в Інтернеті. Важливим аспектом Е-навчання є інструменти та медійні засоби реалізації Е-навчання, до яких відносять програмне забезпечення для порталів, систему управління адміністративними функціями (управління персоналом та управління студентами) та управління курсами, навчальною платформою, інструментами для створення та для спільної роботи в мережі. Е-навчання широко використовується в університетах Німеччини, воно підтримує процеси навчання завдяки використанню різних цифрових технологій, що забезпечують виконання операцій різними способами. Викладачам пропонується вибір навчальних сценаріїв викладання та навчання, а резерв електронного семестру спрямований на подальшу підтримку викладання в аудиторіях.

Ключові слова: Е-навчання; дистанційне навчання, комп'ютерне навчання в режимі онлайн, інтернет-навчання, змішане навчання, виключно віртуальне навчання

Statement of the problem. The digital revolution is a defining feature of modern higher education, opening up new opportunities for learning: online formats facilitate individual support, cultural exchange, and virtual mobility regardless of time or place, and international students gain additional opportunities. Digital learning tools, deployed as universal learning tools, require the teacher of a higher education institution to acquire new competencies.

Students must also adapt to take e-courses, acquiring knowledge, abilities, and skills remotely, participating in online discussions of specialized topics, and accessing the necessary materials, which in German pedagogy is defined by the concept of «use of ICT for learning» in

contrast to the previous concept of «learning to use ICT», which involved learning to use digital media as an end in itself. An important prerequisite for digital learning is either stationary computers or mobile end devices that can be used in very different ways [9].

In the case of using the latest digital learning tools, such as MOOCs, the main emphasis is on self-regulated learning. In this case, it complements the formal training of a higher education institution, which allows presenting the content in multimedia form. Germany also uses «flipped classroom models» that offer online knowledge sharing, such as using a video lecture as a means of preparing for class. Blogs, wikis, managers, and social

networks enable learning through social and collaborative learning.

Analysis of recent research and publications. In the conditions of Ukraine's entry into the European educational space, electronic learning (E-learning) is becoming a favorite in the general system of distance education due to the development of the Internet and the spread of various mobile devices. Successful E-learning is preceded by an understanding by each participant of the need for cognitive activity, their own ability for professional training, and their readiness to cooperate in educational online environments. Recently, intensive research and technological and practical electronic education have developed in the world and in Ukraine. The transformation was carried out step by step, in a small series of transitions: the intense information of information and communication technologies (ICT), the revolution in the use of Internet coverage and a significant simplification of the extension to the latter, the emergence of new technologies of web-based communal services of learning, and its organisation.

The works of Ukrainian scientists are devoted to issues of informatization of education, problems of comparative pedagogy, organisation of electronic, distance, and online learning, and didactic problems of introducing E-learning technologies in higher education, namely: Akimova O. [21], Dmitrenko N. [6], Drobakha L. [11], Gromov I. [21], Ihnatova O. [11], Kaplinskiy V. [1], Khamska N. [21], Kizim S. [6], Kobysia A. [15], Kolomiiets A. [21], Lazarenko N. [10], Nahorniak S. [6], Sapohov M. [2], Voloshyna O. [6], Zhovnych O. [10].

The purpose of the article is an overview of the process of preparing a future teacher for the use of E-learning in a higher education institution in Germany.

Summary of the main material. The experience of Germany shows the relevance of a mixed form of education when E-learning is integrated with digital content and classroom learning; that is, there is a combination of online and offline learning stages. This makes it possible to apply various teaching methods and supplement the social aspect of personal communication with the help of technical means. E-assessments and e-exams facilitate digital exam preparation with fast feedback. German scientists predict the inclusion of artificial intelligence, the integration of game elements (gamification), and 360-degree videos in the mixed form of education.

Studying the practical experience of Germany shows that higher education institutions use a large number of modern digital formats. For the most part, online offerings complement traditional day-time learning. Accordingly, students prepare for seminars using video, for example, by completing self-study programmes during classroom sessions or making group presentations using digital media. Some institutions of higher education do not sufficiently use the available potential. One of the pioneers in the field of digital learning is Aachen University (RWTH). The university promotes the entire range of E-learning formats in all faculties. As a result, video tutorials, virtual

labs, and interactive learning platforms, among others, are now part of everyday student life [7].

German scientists note [22] that digitization promises didactic innovations: electronic tools promote flexibility, methodological diversity, and motivation for learning. Another advantage, especially for international students, is the independence it provides in terms of place and time. Online formats are accessible from around the world, and chat rooms and forums facilitate virtual mobility and cross-cultural exchange. It is also easier to overcome language barriers with E-learning modules if they can be made available in different languages. In addition, digital education prepares students for practical activities, which are increasingly characterised by digitalization [22].

In the daily functioning of institutions of higher pedagogical education in Germany, there are a large number of electronic educational projects and entire networks of projects that receive significant state grants, investigate problems at the level of strategies, technologies, didactics and integration of educational programmes, marketing, legal management, and ensuring the quality control of education. Thus, the HIS-Projekt «Neue Medien – Nutzungs-, Planungs-, Organisationskonzepte» (HIS «New Media Schemes of Application, Planning, and Organisation») analyses measures to support the structural challenges faced by universities and ways to solve them [14].

The websites of the universities (Digitalisierung gestalten digital-made-in.de) indicate that the project is a review of federal and state funding strategies in the field of new media for universities in Germany. The task of the project at the first stage was a comprehensive presentation of current federal and state funding programmes and the identification of strategies for setting trends for federal states and universities regarding reorganisation, infrastructure development, management, and implementation of resources. Methodologically, in the format of expert discussions with specialists, cooperation with universities was carried out, and interviews were conducted with those responsible for the use of media technologies in the universities of the federal lands. The second stage was the use of media technologies in university teaching, which was based on long-term and temporary funding measures from the federal and state governments [5].

The rapid development of virtual forms in education and the development of a clear and sufficiently differentiated typology of virtual teaching are now purely propaedeutic in nature, so it is currently impossible to use a single system. According to R. Schulmeister, the use of elements of augmented reality in the educational process of a higher education institution can be implemented as follows: 1) face-to-face meeting (lecture or seminar) plus WWW «scenario» (WWW-Script); 2) face-to-face meeting (plus «script») plus communication platform; 3) an in-person seminar alternating with the use of a virtual textbook or conducting a virtual seminar; 4) a purely virtual workshop, or completely independent learning, limited by the structure according to the planned scenarios [19].

Since the use of digital learning tools has a differentiated presentation, let us characterise the most widespread types of E-learning used in the training of future teachers in Germany and cover the modern spectrum of posting event scenarios and lecture materials on the Internet for fully virtual teaching.

Online computer training The accelerated development of the field of automated teaching began with virtual forms of teaching, which are not included in E-learning in the narrow sense because they do not meet the criterion of network teaching, that is, teaching using offline educational materials or a computer based on CBT - Computer Based Trainings, which uses variable media. Compared to online teaching methods, learning materials for offline use have the advantage that the learner can use them regardless of the transmission speed available to him (broadband network, ISDN, or analogue modem). However, in the light of networked learning methods, a crucial shortcoming of these early digital learning materials is undoubtedly the fact that offline media does not fully support communicative interaction and collaboration [18].

Internet learning. The further development of offline learning and the whole paradigm, which offers wider opportunities to higher education institutions, is connected with the development of a special online form of teaching, which has acquired the name of web trainings (WBT - Web Based Trainings), which are implemented using the Internet. An advantage of networked learning is that content can be dynamically processed and continuously updated in network-supported learning modules. In addition to the interactive and multimedia preparation of educational content, feedback between the teacher and the student is included, which helps to strengthen the motivational support of didactic processes and reduce the risk of dropping out of the course. The researchers note that WBT is more suitable for the development of such skills as communication, teamwork, and problem-solving skills since these skills can be widely practiced using additional communication channels (e-mail, messengers, chats, and forums). Compared to CBT, the disadvantages of WBT are the dependence on Internet access, the level of multimedia content preparation, and the very high data transfer speed [14].

Blended Learning. Important forms of E-learning include «hybrid learning mechanisms», or mixed learning scenarios, and fully virtual learning scenarios. M. Kerres writes about this in the work «Multimediale und telemediale Lernumgebungen. Konzeption und Entwicklung» [13]. Blended learning is characterised by the author as a combination of face-to-face teaching with online courses, which requires methodical and didactic reorganisation of the content, new teacher qualifications, and appropriate technological means. Currently, blended learning is implemented in a large number of different scenarios, combining virtual and face-to-face components, synchronous and asynchronous organisational forms of learning, as well as phases of joint and individual work in various variations. One of the forms presented on the

website for participating universities (Digitalisierung gestalten digital-made-in.de) is face-to-face classes with additional digital elements, through which these E-learning elements become part of personal learning. Face-to-face meetings combined with digital elements adapt classical forms of teaching, such as lectures, seminars, practical or laboratory classes, and complement them with new computer-based elements, such as deepening levels, such as hypertext lexicons, small animations, simulations, and training exercises. This form of E-learning is possible with the use of a large number of different technical means, such as electronic boards («SMART-Board») or shared access to programmes and joint work on a file [5].

Widely used in German universities are the so-called «alternation scenarios», the essence of which is the alternation of real and virtual elements that form a certain unity of face-to-face meetings with online meetings. Such a sequential combination of the presence of on-line and off-line phases may contain both synchronous and time-shifted or asynchronous phases in the network. Such mixed learning scenarios are used, for example, in the sequential alternation of the self-study phase (self-study under the guidance of a teacher), the presence phase (seminars, workshops, trainings, laboratory classes), and the transfer phase (individual practical projects). It also uses sophisticated technical elements such as video conferencing technology (Microsoft NetMeeting with a sound card on the PC, a web camera, and a headset) or audio conferencing systems such as Centra or InterWise with a headset and an application sharing module. The advantage of combining face-to-face phases with virtual phases of teaching is that it facilitates communication between the teacher and the student, promotes the formation of groups, and increases the motivation of students [14; 19; 4].

Exclusively virtual learning and distance learning on the Internet. These forms of E-learning are based on classical forms of learning and are quite freely adapted to the requirements and possibilities of the Internet environment. The content should be structured according to the linear progression of the course or according to the free arrangement of materials. Expository approaches of classical frontal teaching are combined with exploratory, self-directed approaches to teaching, such as constructivism, characterised by the management of individual knowledge through knowledge forums. Self-determination, which became possible for the student due to the free choice of learning pace, as a rule, has a positive effect on the inclusion of new knowledge in previously acquired knowledge through the use of practically moderated seminars, similar to the scenario of a traditional video conference. Methods of two-way communication (chat, e-mail, video streams) or joint use of applications are also used, which allow intensive exchange of information between students and teachers. Due to the improved possibilities of communication on the Internet, the use of such forms of teaching as open and closed online discussions, online polls and voting, role-playing games, group reports, or training cycles

accompanying the project has also been recognised as effective [18; 20].

Virtual teaching leads to a shift in the role of teaching towards coaching, tutoring, and coaching, especially in the management of virtual courses. As for the organisation of virtual courses, they are usually held as individual courses or as a whole course of study in traditional face-to-face programmes, as well as in «virtual universities» (Virtuellen Hochschulen), such as a virtual university of applied sciences or teleakademie Furtwangen (der Teleakademie Furtwangen) [8]. This type of training is used not only in university training but also in upgrading the qualifications of graduates and employees. In terms of continuing education, online classes have the advantage that travel and accommodation costs are excluded, and the course can be arranged flexibly in terms of time and place of residence.

In this way, digitalization helps to make higher education institutions in Germany more influential and creates new ways of accessing education and connecting with schools. Digitization plays an important role in the strategic orientation of higher education institutions and regional and national research centres in Germany. The goal is for digitalization to contribute to the effective development of universities, not to transform classroom universities into online universities. All participants in the higher education system are called upon to formulate common goals and contribute to their realisation individually and collectively.

Digitization of the teaching process in higher education institutions facilitates access to education for target groups whose individual life situations do not allow offline education. Teachers in higher education institutions integrate digital technologies into the teaching process, as this supports the acquisition and development of comprehensive digital skills in the sense of the definitions of «computer skills» and «learning skills» of the European Framework of Reference for Key Competences for Lifelong Learning. For this purpose, university teachers should be able to identify current and future technological developments in view of the possibility of their application in the teaching-learning process [10, p. 540].

The analysis of the work experience of German higher education institutions proves that students' skills in working with and using digital technologies and tools are acquired and improved, in particular, through digital practice in teaching and research. Special opportunities consist of the use of digital technologies for intensive and interactive involvement of students in teaching and learning processes. The capabilities of digital tools can be used, in particular, in research-based learning and can have a beneficial effect on the process from question development to knowledge-seeking methodology, preparation, and presentation of results. First of all, it concerns the expansion of information skills related to research. When developing educational programmes, the opportunities and requirements of digitalization are taken into account; this applies in particular to STEM subjects

[17]. The autonomy of universities and the freedom of research and teaching, according to German scientists, are designed to continue, develop, and adapt educational programmes from the point of view of acquiring skills in the handling and use of digital technologies and tools. It is assumed that the further development of education will have a more technical nature, which will lead to significant changes in didactics and the organisation of training. Digital tools should help integrate science-oriented content into teaching, for example, virtual laboratories, research databases, digital simulations, and digitally supported collaboration (for example, in problem-based learning) [17].

Technical requirements are a benchmark for ensuring the quality of E-learning. For high-quality digital learning, it is crucial that digital technologies and didactics are connected. Quality assurance should extend to content, technology, and didactic concepts. And thanks to certification, mutual recognition between institutions of higher education can be facilitated. As a rule, quality assurance is carried out as part of the accreditation process. Therefore, during the discussion with the Accreditation Council, the prospects for digital courses are studied and areas of action are determined. Institutions of higher education play the role of a scientific companion to digital changes in the world of teaching and learning in schools and universities. Their task is, in particular, to check the effectiveness of digitization measures at individual stages of education and to contribute to the further development of digital education. Offering services and support for teachers is important for the spread of digitalization in higher education institutions [16].

The development and creation of digital media and E-learning scenarios, as well as their subsequent implementation and use, require additional resources and incentives. German higher education institutions have digitalized most of their administration and service delivery processes and have, for example, e-campus and learning management systems (e-administration). As digital platforms for E-learning processes, they serve to distribute content, communicate between teachers and students, and manage organisational processes. An important area of activity for further development is the creation of solutions for connecting e-campuses that will allow inter-university exchange.

Among other things, new digital methods and tools expand the possibilities of data collection and purpose and therefore require special attention to data protection and security requirements. As an institution for the storage and delivery of knowledge, university libraries are the central interface for the digitization of teaching and research. In order to take into account research information systems that support the research process or library systems that support the teaching process, care should be taken to ensure that different software systems can serve as interfaces between research and teaching [1, p. 8].

An up-to-date market overview and detailed product information on German-language educational software is provided by the joint service of the federal and state governments for the German education system or the educational software atlas of the Institute for Education in the Information Society (IBI – Instituts für Bildung in der Informationsgesellschaft, Berlin) and the Institute for Educational Resources of Mass Information (IfB – Instituts für Bildungsmedien, Frankfurt) [12]. In order to guarantee the searchability and evaluation of educational offers supported by the network, uniform metadata standards are needed, which are used to record all the characteristics of the relevant content related to the users and greatly facilitate the transfer of digital educational content. Currently, a large number of different metadata standards are used at the international level (for example, AICC, Ariadne, Dublin Core, FGDC, IMS, LMML, LOM, PMML, RDF, XML DTD, and SCORM) [14].

Currently, E-learning in German universities is characterised by a wide variety of offers and activities. Working groups of participating universities on E-learning (ELAK-E-learning -Arbeitskreis) are created to coordinate activities related to the development and implementation of projects to be used in many universities. The working group serves, on the one hand, for the exchange of experience and, on the other hand, for the development and implementation of projects to be used in many universities.

Modern technical infrastructure is important for the development of innovative teaching and learning scenarios, and the use of educational platforms plays a strategically important role. For most students and teachers, educational platforms are usually the first point of contact with E-learning. Pedagogical universities adhere to the open-source concept when choosing appropriate educational platforms. The most commonly used systems are Stud.IP, Moodle, and ILIAS, which provide for the exchange of data between management systems such as HIS-LSF and the educational platforms used. Thanks to Campus Connect, the universities of Baden-Württemberg aim to connect administrative systems with educational platforms. The aim is to simplify the administrative process of course creation and thus further support E-learning for university teaching [9].

Conclusions. Thus, E-learning is widely used in German universities; it supports learning processes through the use of various digital technologies that provide operations in different ways. Teachers are offered a choice of teaching and learning scenarios, and the e-semester reserve is aimed at further supporting classroom teaching.

References

1. Lazarenko, N. I., Hapchuk, Y. A. (2021). Elektronne navchannia u profesiinii pidhotovtsi maibutnikh fakhivtsiv: dosvid Nimechchyny [E-learning in the professional training of future specialists: the experience of Germany]. *Osobystisno-profesiine stanovlennia pedahoha: andrahochichniy vymir* pp. 3-14. [in Ukrainian].
2. Sapohov, M. V. (2020). Smart-navchannia yak tekhnolohiia intelektualnoi informatsiinoi komunikatsii v infrastrukturi khmarnykh obchyslen [Smart-learning as a technology of intelligent information communication in the infrastructure of cloud computing]. *BBK* 57, 442. [in Ukrainian].
3. Chernysh, V. V., Vaseiko, Y., Tkachenko, L., Kaplinskiy, V. & Bereziuk, J. (2020). Modern Methods of Training Foreign Language Teachers. *International Journal of Higher Education*, 9(7), 332-344. <http://dx.doi.org/10.5430/ijhe.v9n7p332>
4. Deutsche Bildungsserver. URL <https://www.bildungsserver.de>
5. Digitalisierung gestalten digital-made-in.de. <https://digitalstrategie-deutschland.de>
6. Dmitrenko, N. Y., Voloshyna, O. V., Kizim, S. S., Mnyshenko, K. V., & Nahorniak, S. V. (2023). Smart education in the prospective teachers' training. *CTE Workshop Proceedings*, 10, 414-429. <https://doi.org/10.55056/cte.568>
7. E-tools in teaching at German universities. <https://www.daad.de/en/study-and-research-in-germany/plan-your-studies/digital-learning/>
8. HFU Akademie Hochschule Furtwangen. <https://www.hfu-akademie.de/hfu-akademie/#{}1>
9. Hochschulforum Digitalisierung. <https://hochschulforumdigitalisierung.de/en>
10. Ihnatova, O., Lazarenko, N., Zhovnych, O., Melnyk, K., & Hapchuk, Y. (2021). Positive aspects and difficulties of teaching foreign languages in the blended learning course during COVID-19 pandemic. *Laplace Em Revista*, 538-547.
11. Ihnatova, O., Zhovnych, O., & Drobakha, L. (2022). The Effectiveness of Blended Learning in English Teacher Training. *Journal of Teaching English for Specific and Academic Purposes*, Vol. 10, No 3, 2022, pp. 377-388. <https://doi.org/10.22190/JTESAP22033771>
12. Instituts für Bildungsmedien. <https://www.bs-atlas.de/ibi>
13. Kerres, M. (2001). Multimediale und telematische Lernumgebungen. Konzeption und Entwicklung, 2. Auflage, München. <https://www.e-teaching.org/materialien/literatur/kerres-2001>
14. Kleinmann, B., Wannemacher, K. (2004). E-learning an deutschen Hochschulen. Von der Projektentwicklung zur nachhaltigen Implementierung: Bericht. Hannover: Poppdruck, Langehagen, 241S. https://his-he.de/fileadmin/user_upload/Publikationen/Projektberichte_alte_Website/Hochschulplanung/hp165.pdf
15. Kobysia, A. P. (2017). Information Educational Environment as a Platform for Implementing Blended Learning in Higher Education Institutions. *Information Technologies and Learning Tools*, 57(1), 75-82. <https://doi.org/10.33407/itlt.v57i1.1528>
16. Medienpädagogischer Forschungsverband Südwest (mpfs): JIMplus 2020. Corona-Zusatzuntersuchung. (2020). <https://www.mpfs.de/studien/jim-studie/jimplus-2020/>
17. Medienpädagogischer Forschungsverband Südwest (mpfs): JIM-Studie 2019. Basisuntersuchung zum Medienumgang 12- bis 19-Jähriger. (2019). https://www.mpfs.de/fileadmin/files/Studien/JIM/2019/JIM_2019.pdf