Informatisation of the Educational Environment of Higher Educational Institutions: Priorities and Development Deficits

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ABSTRACT

Aim. The aim of the study is to examine lecturers' attitudes toward the state of the information and educational environment in modern higher education institutions and their readiness to implement modern digital technologies in the educational process.

Methods. This study involved 150 lecturers, whose teaching experience ranged from 1 to 25 years, and participation was voluntary. The key method used was a questionnaire survey, the tools of which revealed the specifics of the content of the information and educational environment and reflected the lecturers' perception of the possibilities of didactic means based on information technologies, as well as the shortcomings in the development of the modern information and academic environment of higher education.

Results. Based on empirical study identified the content and information-related organisational issues of the academic environment of higher education institutions. The authors also identified barriers to the development of the information and educational environment. They include insufficient material and technical equipment, a lack of digital competence among lecturers, and a limited use of interactive technologies.

Conclusions. The informatisation of the educational process is aimed at the creation and optimal use of software, technological, and instructional-methodological developments. The implementation of didactic learning tools based on digital technologies will be more effective if an appropriate set of resources is developed for each discipline. The active integration of information technologies into the educational process leads to a significant transformation of teachers' roles toward those of researchers, organisers, consultants, and facilitators.

Keywords: higher education, innovative educational technologies, lecturers, informatisation, quality, information educational environment

Introduction

The pedagogical problem of human formation and development is closely related to the issue of environment (Twenge & Campbell, 2010), its impact on the individual, and ways of organising a special environment to achieve set social and pedagogical (Savitska & Livitska, 2022) goals. On the one hand, a specially created environment

shapes the personality, allowing society, with the help of educational institutions, to move closer to a particular social ideal of personality (García-Martín et al., 2023), regulating the manifestation of physiological characteristics (Fil'a et al., 2024), and on the other hand, it creates opportunities for the development of individual characteristics. A high-quality educational environment is personality-oriented. It ensures the satisfaction of work needs (Valachova et al., 2024), for maintaining and increasing self-esteem, for the development of cognitive needs, and for the independent structuring of a worldview (Svoboda et al., 2024).

Contemporary development trends are shaped by processes that emerged at the turn of the millennium and gained significant momentum in the early 21st century. These include the transition to a knowledge-based economy and the formation of an information society, as well as the intensification of informatisation and digitalisation, which define economic and social models of development at both national and global levels (Barker, 2021; Helsper, & Eynon, 2010), as well as in specific regions and cities (Tkacova et al., 2025). In response to the rapid advancement of information technologies, the educational sector is gradually shifting towards digitalisation and informatisation (Mansurjonovich, 2022; Mashrabjonovich, 2023). Achieving the objectives of informatisation requires an active and strategic role of the education system (Ugur, 2020).

The integration of information technology into education has brought about comprehensive innovations in educational models, teaching methods, and management approaches (Sitar-Taut & Mican, 2021). The process of informatisation in education not only improves the quality of education but also directly affects a country's innovative capacity and international competitiveness (Ulatowska et al., 2024). The rapid advancement of information technologies, particularly the Internet, big data, artificial intelligence, and the Internet of Things, is extensively utilised in education, presenting unprecedented opportunities and challenges (Rodríguez-Abitia & Bribiesca-Correa, 2021). The informatisation of education is no longer just a technological innovation, but a fundamental shift in educational concepts, teaching methods, learning approaches, and even the overall educational environment (Macías-Galeas, 2024). Effectiveness of this process is determined not only by the availability of modern It solutions, but above all by the quality of their implementation, integration, and pedagogical appropriateness.

The development of the information and academic environment in modern conditions is becoming one of the key trends in changing the educational landscape of higher education. Modern digital transformations are positioned as an effective tool for ensuring the scalability of education services, increasing the competitiveness of higher education institutions (HEIs), and modernising pedagogical approaches. According to Anouar El Kasri and his colleagues, the level of informatisation in the educational environment is becoming a key factor in attracting applicants. It also influences the ranking of HEIs both nationally and internationally (El Kasri et al., 2025).

Digital transformations impact all aspects of the educational environment, including learning technologies, knowledge assessment, communication between lecturers

and students, teaching methods, and learning psychology. Fayiz Aldhafeeri and Asmaa Alotaibi explain that the digital shift transforms how we perceive the development of the informational and educational environment in HEIs. It emphasises on the importance of integrating information and communication technologies into the educational process (Aldhafeeri & Alotaibi, 2023). The paradigm shift in higher education in the context of informatisation highlights the need to study the specific characteristics of the development and quality of information and educational environment (IEE) in HEIs.

Research Questions of the Study

At the beginning of the study, the relevance of creating an IEE in HEIs was taken into account, which is simultaneously determined by the need for lecturers and students to freely and quickly access various information and educational resources, and on the other hand, by the organise to planning and implement educational activities in HEIs at an appropriate level that corresponds to the latest achievements in science and technology.

This article aims to examine lecturers' attitudes towards the state of the IEE in modern HEIs, as well as their readiness to adopt contemporary digital technologies in the educational process.

Research questions: How exactly do lecturers use the capabilities of the IEE when teaching social sciences and humanities disciplines? What problems and shortcomings do lecturers encounter when working in the IEE? What limitations restrict the development of the IEE of HEIs?

In this study, the authors test the following hypotheses:

- The positive attitude of social sciences and humanities lecturers towards the IEE of HEIs is determined by their level of digital competence.
- Communication deficits (little time to communicate with students) become a key barrier to the formation of a positive perception of digital transformations in the IEE of HEIs.

The study's limitations arise from the random selection of the sample. The findings do not apply to lecturers who exclusively work in a distance learning format.

Literature Review

The concept of informatisation

In recent years, educational informatisation has been experiencing rapid growth. Educational institutions at all levels actively promote the use of educational manage-

ment information systems and online platforms to enhance the efficiency and quality of learning. Informatisation should be understood not as an isolated process driven solely by internal needs, but as an objective reality shaped by social progress, economic transformations, and innovative educational technologies. The goal of informatisation in higher education is to improve students' information literacy and ensure the high quality of their professional training. George Bucăța et al. (2022) argue that overcoming systemic educational crises requires a comprehensive informatisation, which would consist of four interrelated elements: political, technological, and humanitarian-legal. Such a policy should guide the practical implementation of informatisation in higher education.

Advances in science and technology enable the use of diverse tools in higher education, including social networks, video resources, interactive Web 2.0 services (e.g., LearningApps.org; Zenelaga et al., 2024), and mobile technologies. Integrating these digital and information-based elements into teaching can effectively address current educational challenges. Specifically, it can increase students' cognitive engagement, support lifelong learning, and foster independent work skills.

A review of the relevant literature (Förster et al., 2018; Leka et al., 2024) has made it possible to identify the main directions of informatisation of higher education:

Using various information and digital technologies (online services, interactive resources, mobile applications, the Kahoot! digital service) to improve the quality of educational outcomes and stimulate students' learning and cognitive activities.

- Application of innovative pedagogical technologies (3D games, podcasts, social networks) in the professional activities of lecturers (in working with students; for the implementation of electronic, distance, and blended learning in HEIs).
- Training future lecturers to develop and apply digital services to carry out activities in accordance with professional standards.

Concepts and Possibilities of the Information Educational Environment

The educational information environment is formed through a combination of diverse resources, modern communication technologies, and pedagogical methods (Alenezi & Akour, 2023). Greta Gudmundsdottir and Ove Hatlevik (2018) emphasise that contemporary research on the development of information educational environments in HEIs primarily focuses on the transformation of the lecturer's role.

Viktoriia Savitska, Nataliia Matveieva, et al. (2025) highlight that modern challenges require lecturers to expand their pedagogical practices, adopt a reflective stance, and integrate rational and emotional-personal approaches when using information technologies. Complementing this perspective, Eva Mårell-Olsson (2021) concludes

that gamification and digital games within the HEI environment improve students' academic performance, foster analytical skills, and reduce stress and psychological tension during learning.

Incorporating an information-based educational environment into the learning process provides new opportunities, including the development of effective learning methods, increased flexibility within the educational framework, and the use of open educational resources created by other educators. Andrej Šorgo et al. (2017) recommend implementing technological solutions used in leading universities to enable rapid integration between partner HEIs, commonly through e-learning platforms such as Moodle and Blackboard. Additionally, Linda Pospíšilová and Lucie Rohlíková (2023) highlight the importance of integrating a HEI's information environment with a national authentication system (e.g., University of Bern: SWITCHaai platform), ensuring secure access to electronic resources across partner institutions.

The IEE in HEIs transforms information and methodological activities, activities related to planning the educational process and resource provision, storage and placement of educational materials, monitoring, distance learning, and interaction between all participants in the educational process.

This indicates the need for a systematic understanding and organisation of activities related to the informatisation of the educational environment of HEIs in three interrelated areas:

- formation and development of a technological basis – the infrastructure of the information educational environment;
- formation and development of the content base – information educational resources for the creation of comprehensive and structured educational portals, databases in various education fields, with a developed user interface and freedom of access;
- formation and development of a methodological (procedural) basis for the information training of education subjects (teachers, students, scientific and pedagogical workers) as competent users to provide the higher education system with the necessary software and technical means.

Methods

The research objectives were achieved using a combination of research methods:

- Analysis and generalisation of theoretical provisions to determine the state of research on the informatisation of higher education;
- Questionnaire method – survey of social sciences and humanities lecturers regarding the analysis of the quality of informatisation of the educational environment of HEIs and the implementation of didactic tools based on information and digital technologies. The survey involved 150 lecturers of social sciences and humanities from various universities. The sample was formed on the basis of stratified random sampling: first,

universities were grouped according to regional and typological criteria (state/private, large/small), then lecturers in social sciences and humanities were randomly selected from each university. Inclusion criteria: at least one year's teaching experience, teaching social sciences and humanities in the current academic year, willingness to participate in the study. Exclusion criteria: no direct involvement in teaching these subjects over the last two semesters, refusal to participate. Data collection was conducted from March to June 2025. Recruitment procedure: the survey was conducted online using Google Forms, and the questionnaires were sent via the university's corporate email accounts. The teaching experience of the respondents varies from 1 to 25 years (1-10 years: 60 lecturers (50%); 10-20 years: 75 lecturers (40%); more than 20 years: 10%).

The survey contained questions aimed at assessing the relevance of using information and educational resources within the university learning process. It explored teachers' personal perceptions of innovative pedagogical technologies and methods, their views on the necessity of implementing them in higher education, and their evaluation of the importance of such innovations for students. The questionnaire was developed based on an analysis of current research into the informatisation of higher education and recommendations from experts in the fields of pedagogy and information technology. To ensure the validity and reliability of the instrument, the following procedures were carried out:

- Content validity: the questionnaire was reviewed by a group of five experts – lecturers and teaching methodologists – who assessed the alignment of the questions with the research objectives, the clarity of the wording and the comprehensiveness of the topic coverage.
- Pilot testing: the questionnaire was tested on a sample of 15 lecturers from various universities, which allowed for an assessment of the clarity of the questions, the logic of their sequence, and the time required to complete it.
- Reliability: Cronbach's alpha was used to test internal consistency; for the main sections of the questionnaire, this was 0.82, indicating a high level of reliability.
- Assessment of respondents' perceptions: following the pilot survey, respondents provided feedback on the clarity and accuracy of the wording, which allowed for adjustments to be made.

As a result, the study clarified instructors' attitudes toward information and educational technologies and identified the need for both lecturers and students to develop collaborative skills in working with digital tools.

The following norms and principles of scientific research ethics were observed in the course of the study: respect for the human dignity of respondents; obtaining voluntary informed consent to participate in the survey; ensuring confidentiality (anonymisation of data) and protection of personal information; minimisation harm (no potential risks for research participants); prohibition of manipulation of data and research results; adherence to the principles of fairness, honesty, and impartiality in conducting research; refusal to selectively report results and distort them.

Results

To identify the most important aspect in the organisation of teaching, respondents were asked to choose the stage of professional activity to which they dedicate the most attention and time. The results are presented in Table 1.

Table 1
Time Allocation for Teaching Activities (per Week)

Stage	Duration			
	Less than 1 hour	1-3 hours	3-5 hours	More than 5 hours
Lection planning	12	45	63	30
Organisation of educational activities	8	52	58	32
Results analysis stage	20	60	45	25

Source. Own research.

The findings indicate that lecturers with less teaching experience focus primarily on the organisation of educational activities. This is because they do not have a fully confident grasp of the content of the subjects they teach and experience difficulties in communication and self-presentation, whereas greater teaching experience shifts the emphasis towards lesson planning and the analysis of results in order to improve teaching. This finding confirms that the level of professional experience influences the approach to organising the teaching process, which is consistent with Hypothesis 1 regarding the impact of competencies on attitudes towards the educational environment.

Respondents rated their knowledge of information technology on a five-point scale, where 5 is the highest quality and 0 is the absence of quality. An average score was determined for each indicator proposed in the questionnaire. The results of the answers to this question are presented in Table 2.

Table 2
Self-assessment of competencies and skills in the field of information technology

List of competencies and skills in the field of information technology	Average score
I understand the capabilities of computers and the Internet in the educational process.	5
I am a skilled user. I can use computers and the Internet reasonably and in accordance with professional needs.	4,8
I am able not only to find the necessary information, but also systematise it and use it to produce a teaching guide (Word document) for educational purposes	4,7
I am proficient in using computers and the Internet to make pedagogical decisions and create electronic teaching aids.	3,9

List of competencies and skills in the field of information technology	Average score
I publish my own materials, projects, and other work results on the Internet, on the websites of various professional and pedagogical communities.	1,6
I have skills in working with various types of computer editors (graphic, text, etc.), wiki encyclopedias, training simulators, social services, telecommunications programmes, and software shells such as Moodle, e-learning etc.	2,8

Source. Own research.

A higher level of digital competence among respondents correlates with the frequency of use of digital teaching tools. This confirms Hypothesis 1: a positive attitude towards the IEE is determined by the level of digital competence.

Table 3 presents detailed information on didactic tools based on information technologies and respondents' attitudes toward their use. Respondents indicated how often they use specific didactic tools in their educational activities.

Table 3

The use of Didactic Tools in the Information Educational Environment

Methods / Objectives	Never		Rarely		Sometimes		Often		Regularly	
	NL	%	NL	%	NL	%	NL	%	NL	%
Educational – knowledge transfer	0	0	15	10,0	25	16,7	60	46,1	50	38,5
Trainers – skill practice	29	19,3	29	19,3	29	19,3	46	30,7	17	11,3
Information search and reference – develop skills in systematising and summarising material	0	0	25	16,7	63	42,0	62	41,3	25	16,7
Demonstration – visualise objects and phenomena under study	0	0	24	16,0	24	16,0	84	56,0	18	12,0
Simulation – reflects aspects of reality to study its characteristics and properties	13	8,7	50	33,3	62	41,3	25	16,7	0	0
Laboratory – involves conducting experiments on special equipment	69	46,0	38	25,3	19	12,7	12	8,0	12	8,0
Modeling: modeling objects, phenomena, processes	53	35,5	39	26,0	34	22,7	24	16,0	0	0

Methods / Objectives	Never		Rarely		Sometimes		Often		Regularly	
	NL	%	NL	%	NL	%	NL	%	NL	%
Calculation: automate calculations and routine operations	50	33,3	31	20,7	38	25,3	25	16,7	6	4,0
Educational games: creating educational situations based on game activities	13	8,7	25	16,7	50	33,3	56	37,3	6	4,0

Note. NL – number of lecturers

Source. Own research.

The data presented in Table 3 characterises the low rate of application of didactic tools based on information and digital technologies in the educational process of HEIs. Preference (answers "often" and "regularly") is given to the communication and search for knowledge using search engines and the demonstration (visualisation) of material; simulators, calculation, educational games, and simulation tools are used to a lesser extent, and modeling and laboratory tools are used very rarely. Of course, the selection of teaching aids relies on the characteristics of social sciences and humanities, as well as the content of specific teaching materials (not every discipline entails calculations, laboratory work, or skill practice on a simulator). Therefore, the use of digital content depends on the teacher's competence and the time they can devote to communicating with students. This directly relates to Hypothesis 2: limited time for communication restricts the implementation of digital innovations.

The structure of the information educational environment in all HEIs is practically the same, and its level of content depends more on the lecturers who fill it. Table 4 shows the various applications of digital educational content that lecturers use.

Table 4

Digital Content Used by Lecturers

Digital content used	Number of lecturers	%
Electronic publications	67	44,67%
Own developments	60	40,00%
Video recordings of own lectures	26	17,33%
Links to open online resources	28	18,67
Tests	100	66,67
Chats	32	21,33
Forums	52	34,67

Source. Own research.

The results indicate that approximately half of the lecturers utilise digital learning programmes, online repositories for learning materials, tools, and content management system.

Most lecturers report that more than 20% of the materials they use are digital. It is important not only to assess respondents' current attitudes towards the use of IT-based teaching tools but also to predict the future implementation of technology in higher education. This prediction should consider the barriers that teaching staff at HEIs perceive in this process. Table 5 outlines the main challenges faced by lecturers in their methodological work.

Table 5

Challenges Faced by Lecturers in their Methodological Work

Type of activity	No difficulties		Sometimes difficult		Always difficult	
	NL	%	NL	%	NL	%
Preparation of lecture materials	133	88,67	17	11,33	0	0,00
Design and improvement of course programmes	120	80,00	31	20,67	0	0,00
Designing training modules	110	73,33	31	20,67	9	6,00
Developing training and methodological manuals	96	64,00	51	34,00	3	2,00
Developing visual aids	120	80,00	30	20,00	0	0,00
Designing various forms of training sessions	69	46,00	69	46,00	12	8,00
Applying basic methods of pedagogical diagnostics	75	50,00	53	35,33	22	14,67
Work in cycle commissions	63	42,00	46	30,67	41	27,33
Self-analysis of the quality of methodological work	92	61,33	58	38,67	0	0,00
Analysing the quality of methodological work of other lecturers	98	65,33	35	23,33	17	11,33
Examining methodological support	52	34,67	31	20,67	67	44,67
Examining methodological assistance	38	25,33	69	46,00	43	28,67
Participation in scientific and methodological seminars	104	69,33	46	30,67	0	0,00
Improvement of professional qualifications	150	100,0	0	0,00	0	0,00
Passing the final certification	131	87,33	19	12,67	0	0,00
Making presentations for classes	138	92,00	12	8,00	0	0,00
Making tests	120	80,00	30	20,00	0	0,00
Correction of the learning process	125	83,33	25	16,67	0	0,00
Application of activation techniques	110	73,33	35	23,33	5	3,33
Implementation of new educational technologies	35	23,33	87	58,00	28	18,67

Note. NL – number of lecturers

Source. Own research.

The analysis of data in the table indicates that the most significant challenges arise from developing and designing various forms of educational activities that consider the individual characteristics of students (46%) and implementing innovative educational technologies into the educational process (58%). This aspect was the subject of our study and proved to be the most difficult for the lecturers of HEIs who participated in the survey. The data obtained confirms the need to organise targeted work on the informatisation of higher education, an important part of which is to improve the information and methodological competence of lecturers. Lecturers encountered the greatest difficulties when introducing new technologies and designing lessons, which supports Hypothesis 2: communication and methodological barriers limit the positive perception of digital transformation.

The key barriers to the development of the informational and educational environment at HEIs are summarised in Table 6. Respondents identified them in their answers to the last question of the questionnaire (choosing no more than five of the proposed items).

Table 6

The Deficits in the Development of the IEE in HEIs

Deficiency category	Manifestation or problem	Percentage (%)
Infrastructure deficit	Lack of sufficient material and technical resources for the implementation of digital innovations	31,1%
Staff shortage	Low digital competence of lecturers and insufficient preparedness for distance learning	41,5%
Psychological barrier among lecturers	Feeling uncomfortable using digital resources	13,3%
Psychological stress among lecturers	Digital learning causes stress for some students	10,5%
The educational process does not meet the needs of students	Online learning does not meet the needs of young people; information and digital technologies are not being used to their full potential	60,3%

Source. Own research.

Respondents identified a lack of infrastructure and human resources as the main barriers to the development of the IEE in higher education institutions. Against the backdrop of these shortcomings, it is only natural that the characteristics of the environment do not sufficiently meet the needs and interests of students. Despite digital optimism, some lecturers experience psychological discomfort and stress when using digital technologies in the educational process. These results validate the research hypothesis concerning communication deficits within the information and education environments of HEIs, as well as their effects on lecturers' perceptions of digital transformations in higher education.

Discussion

While the perception of informatisation in higher education is generally positive, the survey results and analysis of scientific literature reveal the emergence of social and pedagogical risks associated with large-scale. According to Rani Van Schoors et al., the spread of "unmanned technologies" and the reduction of time for live communication may lead to a decline in communication skills and overall knowledge levels (Van Schoors et al., 2023). The study revealed ambiguous assessments of personnel and infrastructure deficits in the development of the IEE at HEIs.

The results of empirical research have led to an interesting conclusion: lecturers with a high level of digital competence are more likely to experience communication deficits. A detailed analysis of lecturer-student interactions influenced by digitalisation is present in various studies. Sara Willermark concludes that the intensification of the use of information and digital technologies has led to the formation of a wide range of lecturer behaviour patterns – from increased contact work to minimised communication (Willermark, 2021). Frantisek. Petrovic et al. include information stress and anxiety among students and a low level of adaptation to changes in the educational landscape among the consequences of informatisation and digitalisation (Petrović et al., 2024). The development of the digital learning environment in HEIs opens up significant opportunities for students to access learning resources, whilst at the same time requiring tighter controls and the implementation of appropriate standards for the organisation of the educational process. Denise Mifsud and Deniz Orucu point out that investments in digital platforms for HEIs should not be seen as a sure-fire recipe for increased efficiency (Mifsud & Orucu, 2025); it is necessary to take into account the human factor and possible changes in the interaction of key actors in the educational space (Savitska, Gomotiuk et al., 2025).

The authors of the article suggest that the digital vector of higher education development transforms not only the material and physical attributes of education, but also behavioural models. The increased workload on lecturers, taking into account the new requirements for their digital competencies, and the complexity of tasks related to filling the IEE of HEIs, may lead to both professional burnout among lecturers and a search for opportunities to minimise time spent in other areas, particularly in communications with students. It is essential to recognise that this conclusion requires further reflection and more detailed verification in qualitative studies.

Conclusions

The results obtained formed the basis for the following conclusions:

- The informatisation of the educational process in HEIs is aimed at creating and optimally using software, technological, pedagogic, and methodological developments to improve the quality of training for future specialists.

- The current stage of informatisation of education is characterised by a general tendency to integrate various didactic teaching aids based on digital technologies (electronic textbooks and reference books, educational programmes, simulators, automated knowledge control tools) into unified complexes (software and methodological, educational electronic publications, educational electronic resources).
- The implementation of teaching aids based on digital technologies in the information educational environment will be more optimal if a corresponding set of tools is developed for each discipline. The structure of the complex is a set of reference, informational-educational, training, and control modules, which will ensure the improvement of student learning effectiveness by activating their educational activities. The development of such a set is determined by the specifics of the discipline and the level of methodological competence of the teacher, therefore, to increase the effectiveness of work in a given direction, it is necessary to specifically organise activities at the departments within the framework of a scientific and methodological problem-solving seminar or a subject-cycle commission that brings together lecturers from one or several related disciplines.
- Technologically, the implementation of teaching aids based on digital technologies is linked to the optimisation of the IEE of HEIs, which is based on expanding the possibilities for choosing and using organisational forms, methods, and means of teaching: the organisational forms of the educational process in HEIs must be modified, the amount of independent work by students must be increased, and the number of practical and laboratory classes of a research nature.
- The active introduction of information technologies into the educational process leads to a significant change in the functions of lecturers, i.e., their transformation into researchers, organisers, consultants, and facilitators. It is essential to enhance the qualifications in mastering modern teaching tools that utilise information and digital technologies in the educational environment of HEIs. The authors of the article suggest that the training of lecturers in the creation and use of digital technologies in the educational process should be carried out in three interrelated areas: technical and technological, psychological and pedagogical, and content and methodological. This will contribute to the informatisation of higher education, increase the effectiveness of training future specialists, and provide pedagogical support for the formation of professional competence as a result of learning in HEIs.

Further areas of research could include: the needs and expectations of students and teachers regarding the further development of the IEE of HEIs; analysis of teachers' motivation and readiness to fill communication gaps among students in the context of informatisation; research into the needs, expectations, and role models of teachers with a high level of digital competence.

Limitations and Implications for the Research

The study's results may be subject to dispute due to the limited sample size. The results of the study rely solely on one group of sample respondents and experts. The quasi-experimental design of the research and the number of variables studied were also limitations of this study.

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