Digital Technologies as a Means of Improving the Efficiency of Higher Education

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***Abstract*—Today, the practical application of digitalisation in higher education and finding ways to optimize the use of digital technologies to improve the management of the educational process is a relevant issue for the modern research paradigm. This research aims to study the unique ways in which digital technologies are utilised in higher education and create a conceptual framework for their adoption to enhance the efficiency of the educational process. The study applied the method of expert assessments using a semi-structured questionnaire, with two groups of respondents acting as experts. The questionnaire responses were evaluated using the Likert scale, and the Student's t-test was used for statistical analysis of the research results. Both students and teachers recognise blended learning as the most effective method for organising the educational process since it combines traditional distance learning with the implementation of digital educational technologies. The respondents recognised the communicational aspect to be the most crucial advantage of digitalisation. The study findings are summarised into a conceptual model of digitalisation in higher education, comprising interconnected semantic blocks of generation, accumulation, and management of educational information.**

***Index Terms*—Digitalisation of education, educational process transformation, teaching and learning, technology efficiency**

I. Introduction

Digital information technology (DIT) has become integral to modern human life. According to UNESCO, DIT encompasses scientific, technological, and engineering disciplines studying efficient methods for information processing and storage, people and equipment management, and social, economic, and cultural activities. A corresponding change has taken place in education, the global trend of which is the digital transformation towards personalised forms of learning, improved management of the educational process, and a shift in the purpose and content of learning to make it more efficient [1].

The development of educational technologies, which has taken place over several decades, has led to a radical transformation in the methods and forms of university education and its philosophy [2]. The introduction of digitalisation in the educational process provides efficient and convenient access to the world's broad educational environment. Educational institutions are actively promoting advanced technologies in teaching and learning in their respective areas. However, the implementation of digital technologies requires consistency, continuity, and substantial funding, as well as support from teachers and management [3]. Despite such aspirations, there are many barriers to the digitalisation process in higher education. Firstly, there is a lack of sufficient opportunities for the maximum use of information and communication technologies in teaching, which can be challenging for teacher practitioners [4]. The problem of the practical application of digitalisation in higher education institutions and the expansion of the communication circle in acquiring knowledge remains relevant to the modern research paradigm [5, 6]. Therefore, finding ways to optimise digital technologies for managing the educational process is one of the most promising areas in modern higher education pedagogy.

The research aims to study the peculiarities of digital technologies in higher education and develop a conceptual model for their effective implementation in the educational process.

The following research questions (RQ) have been identified:

RQ1: How can the introduction of digital technologies in the educational process helps to tackle problems of improving the theory and methodology of higher education and contribute to its further development?

RQ2: Can the impact of digital technologies on the theory and methodology of the educational process in higher education be revealed through a conceptual model?

The answers to these questions are to help to understand how the digitalisation of the educational process affects the efficiency of the theoretical and learning methods in higher education. The study presents key indicators of the participants' adaptation to the need for higher education digitalisation, as well as professionals' training to be competitive in the labour market.

The scientific novelty of the study is to develop a conceptual model of the digitalisation process in higher education as a basis for theoretical and methodological support of its efficiency. The practical value of the research results is the possibility of using it to improve management in higher education and teachers' training and professional development in the context of educational digitalisation.

II. Literature Review

A. The Digitalisation of the Educational Process as Part of a Global Digital Culture Formation

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Digitalisation has affected all spheres of life, transforming the global economic environment [7]. The formation of digital culture worldwide exhibits unevenness, necessitating comprehensive study. Analysing the process of digitalisation is of interest to scientists as it provides a reliable tool for forecasting trends in the digital economy and the technologies that drive this process [8]. The digital society is characterised by an unimpeded exchange of information, creating a wide range of educational opportunities and fostering an environment of overall development [9]. Therefore, the development of digital technologies has gradually made them an integral part of the educational process. The COVID-19 pandemic accelerated the digitalisation of education, resulting in a large-scale revolutionary transition to online learning [10]. Digitalisation has become the foundation of new learning models that provide comprehensive information and communication support for students and teachers, both within and outside the classroom [11]. It contributes to the individualisation of learning and enhances accessibility for individuals with disabilities [12]. Today, the development of the state is directly related to transforming the education system through integrating digital technologies [13].

B. Transformation of the Educational Sphere under the Impact of Digitalisation

The spread of digital technologies has contributed to a radical change in the education sector [14]. The rapid development of information and communication technologies ensures the creation of a high-tech environment in education [15]. Researchers consider information and communication technologies as necessary pedagogical conditions for students to acquire skills in self-regulation and the keys to success in their professional self-realisation [16], [17]. Establishing dialogue and organising online interaction between students and teachers are essential factors in achieving effective learning and updating personal and professional qualities through the implementation of digital technologies [16, 18]. Students actively participate in implementing digital technologies in learning and, thereby, become co-authors in creating new knowledge [19].

C. Problems and Advantages of Digitalisation in the Educational Process

Among the problems directly associated with the integration of digital technologies into the educational process, researchers highlight the issues of excessive control, cases of manipulation, low security of copyright on intellectual property, and the uncertainty of criteria for assessing the quality of educational activities [15]. However, the digitalisation of higher education offers several advantages. First, it is worth highlighting that it expands the academic space and provides access to the best teaching practices worldwide. Digital technologies in higher education also allow to meet of the specific educational needs of each student through individualised approaches, provide convenience in organising the educational process without limitations of place and time, and transform students from consumers into creators of new educational resources [14]. Integrating digital technologies in higher education facilitates increased student interest in academic disciplines, fosters the development of intellectual abilities and creative potential development, and shapes students' professional competencies [7]. To effectively support students in acquiring professional competencies, teachers must possess a good command of digital educational technologies [20, 21]. Nevertheless, challenges such as an incomplete material and technical basis, insufficient teacher qualifications hence leading to low motivation for innovation, inconsistent educational content, and inadequate methodological and legal support hinder the development of digitalisation in higher education [7, 15]

D. Digital Technologies in Higher Education as the Basis of Education 4.0

Digital technologies are driving a massive transformation of the educational process and professional activities, serving as the foundation for Education 4.0 [22]. The digitalisation of education enables teachers to employ various approaches that facilitate student learning and increase motivation [23, 24]. In the new educational environment, learning practices involve extensive data management, which can give rise to new forms of managerial behaviour, such as 'machine behaviourism' [25]. Complex dialectical relationships are formed among digital technologies, innovation processes, and the formation of professional competencies in students, necessitating the adaptation of the learning environment to the digitalisation of educational space [26, 27]. Thus, a balanced combination of electronic and traditional forms of education becomes a universal approach in modern education [28].

E. Modelling the Digitalisation Process as a Basis for Ensuring the Efficiency of the Theory and Teaching Methods in Higher Education

The structural changes taking place in the educational environment under the influence of digitalisation primarily involve redefining the role of a teacher and promoting students' self-learning. The vitality, flexibility, and sustainability of this process coexist with the challenge of reconciling student expectations with the high demands of the global market. Therefore, the successful implementation of digital technologies requires effective management and responsible administration of educational institutions [29]. Given the dynamic changes in the academic environment, there is an urgent need to develop appropriate educational models to facilitate this process [30]. Researchers emphasize the importance of integrated teaching models in higher education to solve the problems of digitalisation in the education of students [31]. Additionally, some propose the adoption of a multilevel model, such as the "School-College-University-Enterprise" framework, which incorporates career guidance and aims to meet regional needs for qualified professionals in the context of digitalisation [32]. The concept of a digital university, serving as a software package that facilitates education, management, and communication, is also being considered [14]. Consequently, digital technologies have proven to be efficient tools for active learning, which is why digital education should be integrated into all models of educational process organisation [33]. Thus, the need for digitalisation of education is associated with the global processes of digital economic

transformation and the emergence of innovative learning models based on information and communication support for all participants in the educational process. The positive aspects of creating a high-tech environment in education include improving governance, expanding the educational space, ensuring an individualised approach, fostering students' independent work and self-management skills, organising online interaction between students and teachers, and engaging students in the creation of new knowledge. Nevertheless, the digitalisation of the educational process also presents challenges, including issues such as inadequate material and technical basis, low digital literacy among teachers, and insufficient methodological and legal support for the implementation of new technologies. These challenges highlight the research relevance for enhancing the efficiency of the educational process in the context of digitalisation.

III. Method

For a better understanding of the perspectives of students and teachers regarding the role of digital technologies in the educational process, we employed a combination of pragmatic and quantitative approaches. As the primary method to assess the attitudes of students and teachers to the digitalisation of education, a survey using a semi-structured questionnaire tailored to the research objectives was conducted. Additionally, a modelling method was employed to develop a conceptual model aimed at enhancing the efficiency of theory and methodology in higher education through the utilisation of digital technologies.

A. Design

The design of the study was implemented in several successive stages. During the initial stage, the preparation of theoretical foundations, teaching materials, and technical and advisory bases for the organisation of the educational process using digital technologies was undertaken. The analysis of data from scientific literature sources on the issue of the digitalisation of education was conducted. Additionally, we outlined the current challenges associated with the digitalisation of education and clarified the research purpose.

In the second stage, the researched university implemented the digitization of teaching disciplines in the fields of mathematics and socio-pedagogy. Specially developed educational and reference materials, tasks, and control tests were posted on all academic and informational electronic resources. Opportunities offered by educational platforms, social networks, mobile applications, software, etc., were involved in the educational process. At this stage, groups of respondents were surveyed regarding their attitudes towards using digital technologies in the educational process and assessing the quality of higher education.

In the third stage of the research, the questionnaire results were analysed. A conceptual model of digitalisation, serving as a theoretical and methodological basis for teaching in higher education, was developed based on these findings.

The fourth and final stage of the study involved summarizing, formulating conclusions, providing practical recommendations, and identifying promising areas for further research.

B. Sample

The study was conducted at V.O. Sukhomlynskyi National University of Mykolaiv (Ukraine). Students and teachers from the Faculty of Pedagogy and Psychology and the Faculty of Mechanics and Mathematics participated in the study. The selection of these faculties was based on their active implementation of digital technologies in the educational process. Respondents were chosen using simple randomisation. Initially, 160 copies of the semi-structured questionnaire were prepared, with 80 distributed to teachers and another 80 to third-year students at the bachelor's level from the selected faculties.

However, 12 teachers and 14 students declined to participate in the study at different stages. Additionally, during the questionnaire processing, it was discovered that 7 of them were left blank and, therefore, deemed irrelevant. As a result, the study, which lasted one semester in 2021, involved 64 students and 63 teachers.

C. Instrument

The primary research method used was expert assessments, with two groups of respondents: students and teachers, serving as the experts. A semi-structured questionnaire was provided to the respondents, ensuring its validity by aligning the content of the questions with the study objectives. The questions were directly aimed at addressing specific research issues.

The questionnaire was divided into three parts.

The first part consisted of questions regarding the preferred form of education for teachers and students to facilitate efficient learning. Teachers and students rated these forms on a 5-point Likert scale, ranging from 1 - "the least likely" to 5 - "the most likely."

The second part of the questionnaire included questions that assessed the frequency of using a specific set of high-tech tools and technologies in the educational process. Respondents rated their usage frequency on a 5-point Likert scale, ranging from 1 - "I never use it" to 5 - "I always use it".

The third part of the questionnaire aimed to identify the ratings of advantages and disadvantages associated with using digital technologies in higher education. Respondents rated the importance of these factors on a 5-point Likert scale, ranging from 1 – "It does not matter at all" to 5 - "It is important." A fragment of the questionnaire can be seen in Appendix A.

The survey was conducted using Google Forms, and the results were calculated using Microsoft Excel. Students and teachers answered the questionnaire questions in their spare time.

Statistical analysis of the survey results, comparing responses between teachers and students, was performed using Student's t-test in MS Excel.

D. Ethical Issues

Ethical issues in the research process were addressed through informed consent, ensuring anonymity and confidentiality of the received information, and adhering to other bioethics principles and academic integrity standards. The research was approved by the university's ethics

committee. No special funding was allocated for the study, and there was no conflict of interest.

IV. Results

Analysing the responses to the semi-structured questionnaire, we compared the assessments of students and teachers regarding different forms of education. Table I presents the questionnaire results as an average outcome calculated on the Likert scale, with a score range of 1 to 5, where 5 represents the highest score and 1 represents the lowest score.

TABLE I: Comparative Assessment by Students (A) and Teachers (B) of the Effectiveness of Education Forms at the University

Form of education	GPA		Student's t-test	*p*
	A	B		
Traditional	4.5±0.2	4.8±0.1	−2.32379	<0.05
Digitalised education	4.3±0.1	4.2±0.2	0.7746	>0.05
Blended	4.6±0.3	4.5±0.1	0.54772	>0.05

Teachers and students were unanimous ($p > 0.05$) when evaluating digital and blended forms of education, with a preference for the hybrid form. Students considered this form to be the most effective, while teachers exhibited more conservatism, placing traditional education as their top choice and ranking digital education as the least effective.

Table II illustrates the correlation between the popularity of different digital technologies and online platforms used for educational purposes among students and teachers.

TABLE II: Rating Assessment of the Use of Digital Educational Technologies by Students (A) and Teachers (B)

Digital technologies	GPA		Student's t-test	p
	A	B		
Google Meet, Google Classroom	4.8±0.1	4.8±0.2	−0.000	>0.05
ZOOM	4.4±0.3	4.6±0.2	−0.96077	>0.05
MOODLE	3.8±0.2	4.1±0.1	−2.32379	<0.05
Email	4.5±0.1	4.7±0.3	−1.09545	>0.05
Facebook	2.6±0.3	4.0±0.5	−4.15862	<0.05
Telegram	4.7±0.2	4.7±0.3	0.000	>0.05
Mobile applications, quizzes	4.9±0.1	4.6±0.2	2.32379	<0.05
Virtual Meeting, animation	3.6±0.3	3.5±0.1	0.54772	>0.05
Other	3.1±0.2	3.0±0.3	0.48038	>0.05

Table II indicates that teachers and students show similar preferences ($p > 0.05$) for the Google Meet platform, Zoom, Email, and Telegram. However, Facebook is more popular among teachers, while students tend to barely use it. Additionally, students exhibit greater engagement with mobile applications and quizzes compared to teachers.

Table III presents the survey results regarding the perceived advantages and disadvantages of using digital technologies in higher education. The average scores, determined by the Likert scale, demonstrate that both students and teachers evaluate the benefits of digital technologies in teaching equally ($p > 0.05$). However, notable differences emerge when examining the identified deficiencies between the two respondent groups. Teachers express more concern about academic workload, while students prioritize less the time invested in developing and implementing innovative distance learning programs. Moreover, students, in contrast to teachers, pay less attention to the economic aspects of implementing digital technologies and the high costs associated with high-tech projects.

TABLE III: Rating of Advantages and Disadvantages of the Use of Digital Technologies in Higher Education, Determined by Students (A) and Teachers (B)

Factors	GPA		Student's t-test	p
	A	B		
Advantages				
Possible distance education, teacher-student communication—accessible, flexible, safe	4.7±0.2	4.8±0.1	−0.7746	>0.05
Easier mastery of complex topics, you can repeat difficult moments	4.6±0.1	4.5±0.3	0.54772	>0.05
Wide access to popular modern and quite complex courses	4.3±0.5	4.6±0.3	−0.89113	>0.05
Improving the level of digital education, competencies of teachers and students	4.0±0.2	3.8±0.2	1.22475	>0.05
Expanding students' learning opportunities, free adjustment of time and space	4.5±0.3	4.3±0.1	1.09545	>0.05
Expanding the range of virtual contacts and opportunities for organising the educational process	4.1±0.2	4.4±0.2	−1.83712	>0.05
Disadvantages				
Extensive academic workload to create, implement and maintain a digitisation program	3.6±0.4	4.7±0.1	−4.62092	<0.05
Insufficient technical and technological equipment in educational institutions	4.5±0.2	4.6±0.3	−0.48038	>0.05
Disadvantages of technological infrastructure: low Internet bandwidth, outdated software, hardware	4.8±0.1	4.6±0.4	0.84017	>0.05
Inconsistency of course design, educational systems, and student knowledge	4.3±0.2	4.5±0.1	−1.54919	>0.05
High cost of high-tech projects	3.6±0.3	4.3±0.2	−3.36269	<0.05

The survey results indicated that all respondents recognized the significance of integrating digital technologies into contemporary higher education. Throughout the study, both teachers and students became aware of how digitalisation expands the possibilities of university education and enhances its efficiency.

V. Discussion

Digital technologies have been introduced in several Ukrainian universities since the early 2000s. As part of international programs, Eastern European higher education

has been actively involved in Ukraine's digitalisation and intellectualisation of education [13]. However, the implementation of digitalisation in the education system has encountered various complex barriers, such as insufficient digital literacy among teachers and students and challenges in managing innovative educational systems that are prevalent on a global scale [15, 22]. The active integration of information technology into higher education necessitated a specific adaptation process.

The COVID-19 pandemic, despite its negative social consequences, has acted as a catalyst, significantly accelerating the digitalisation of the education sector worldwide [21, 24]. The sudden and mandatory shift to distance learning necessitated a swift restructuring of the teaching process, which required appropriate theoretical and methodological support. The lack of scientific substantiation regarding the digitalisation of higher education prompted our pilot research to identify the benefits of digital technology in higher education, identify common problems, and propose ways to address them. The analysis and generalisation of the research results enabled us to present the digitalisation process of higher education through a conceptual model. Considering that the modern scientific community recognizes students as co-authors of innovative processes in education, we involve them, alongside teachers, as experts who evaluate the digitalisation process in the education system [17, 19].

Initially, it was crucial to understand how digital technologies influence the efficiency of the educational process, the development of students' professional competencies, and their acquisition of knowledge and skills [27]. Analysis of respondents' answers to a semi-structured questionnaire revealed that, despite acknowledging the irreversible nature of the digitalisation process, which is an integral part of modern higher education, respondents perceived its impact on training efficiency as insufficient [11, 33]. Both students and teachers rated the form of education that fully and mandatorily utilises digital technologies as the least effective, citing two main issues. These may arise from the teachers' conservatism, necessitating their full mastery of necessary computer technology and requiring more time and preparation for innovation, as well as the students' lack of self-learning skills necessary for digitalisation. This finding aligns with the research conducted by Guillén-Gámez [34], who claimed that variables such as age and gender influence the effectiveness of information and communication technologies, while the teacher's level of pedagogical competence does not have the same impact. Therefore, it is essential to consider these results and provide teachers with opportunities to acquire the necessary pedagogical competencies and didactics for effective teaching using information and communication technologies. The Google Meet platform appeared to be the most user-friendly and effective tool for both teachers and students. Offering free usage without time limitations, allowing to include a large number of participants, and facilitating the use of slideshows and videos, it is also relatively easy to connect to, which is especially important for older teachers who may have less computer proficiency compared to others. According to the respondents, Google Meet received the highest feedback among participants in the educational process. On the other hand, the MOODLE platform, despite its specific focus, is considered less popular among students compared to teachers. It is seen as cumbersome and not well-suited for direct communication, but it has proven more effective for evaluating knowledge rather than facilitating its acquisition. The crucial factor in determining the benefits of digital educational technology for students was the communication aspect, as they felt more supported by teachers. This finding aligns with the existing scientific literature emphasizing the importance of communication in distance learning [26, 33].

However, these results can be attributed to the inadequate preparation of teachers in utilising the MOODLE platform and the inefficient selection of pedagogical methods, which partially explains the limited usage of the platform [35, 36]. Previous studies have indicated that the MOODLE platform is primarily employed as a repository for materials and information, with limited pedagogical impact on students [37]. Therefore, there is a need to enhance the didactics and pedagogical approaches for teaching with the MOODLE platform to facilitate effective learning [38, 39]. These findings complement the research [40] on the selection of learning platforms and student satisfaction with their learning experiences. This may indicate students' adaptation to learning on different platforms, their desire to improve these platforms, and the selection of the best platforms according to certain criteria.

While teachers find Facebook popular, students perceive it as outdated and "unfashionable." The issue arises when teaching materials and relevant educational information posted by teachers on Facebook go unnoticed by students. Telegram, on the other hand, offers a solution by facilitating consensus between students and teachers, making it convenient for scholarly communication for both parties. Positive assessment of the digital technologies implementation in the educational process primarily concerns the communication aspect of distance learning, which allows students to receive educational information irrespective of distance and time. The availability of data and the flexibility of the educational process are crucial advantages of employing digital technologies in higher education. Additionally, respondents highlighted the potential for mastering complex topics, reviewing educational material, and analysing and correcting mistakes through the use of high-tech educational tools. Considering the significance emphasized by many researchers regarding the modelling of the educational process, we have created a conceptual model for the digitalisation of higher education, which presents all the main components of this process in the form of semantic blocks and reconciles them in dialectical unity [29–33].

Considering digital technologies in modern higher education as an essential basis for quality training and alluding to the survey conducted among teachers and students, we have developed a conceptual model for the implementation of digital technologies in modern university education, presented in Fig. 1.

In this model, digital technologies are regarded as technological components that are available and integrated within the higher education system. These technologies

facilitate the efficient and transparent transfer of knowledge, rapid acquisition of practical skills and competencies, and the development of professional expertise. Internet applications, developed through software and digital tools, enable organised and intelligent access to knowledge while ensuring the security aspects of such systems. The model also emphasizes the organisation of local area networks in creating a repository for generating knowledge.

Another component of the model is the Explicit Knowledge Organisation, which entails the management and systematisation of knowledge, including the generation, creation, and acquisition of knowledge utilising tools such as RDBMS (Relational Database Management System) and EDMS (Electronic Document Management System).

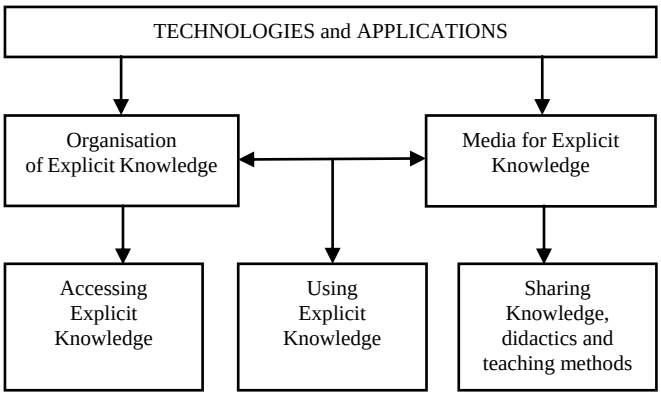

Fig. 1. Conceptual model of introduction of digital technologies in higher education.

Various learning tools can serve as organisational management systems and repositories of knowledge (Media for Explicit Knowledge): graphics, animation, audio, and video. Information stored in digital form can be accessed quickly and accurately from anywhere in the world.

Accessing Explicit Knowledge involves managing a system of information related to learning materials and knowledge. This can be facilitated through various technologies, including the Internet, Intranet, search engines, and more.

Using Explicit Knowledge should be accessible to all participants in the educational process. Knowledge and educational information should be conveniently organised for efficient use and easy retrieval. Decision support systems, databases, and data analysis tools (Decision Support Systems (DSS)) can be utilised for this purpose. These tools are available in the field of pedagogy and should be employed in the digitalisation of education.

Sharing Knowledge entails the exchange of information among groups of individuals. Traditional methods of communication, such as paper, faxes, and telephones, are synchronous but outdated, limited by space and geographical boundaries, and less efficient. Digital technologies offer more effective solutions, including email, video conferencing, virtual meetings, and document collaboration through messengers. This trend also highlights the importance of optimizing didactics and teaching methods when it comes to information exchange between teachers and students.

The study's limitations were associated with its focus on a single university. Nevertheless, for the method of expert assessments, the sample of respondents was deemed sufficient, and the randomisation procedure helped to ensure its relevance by minimising systematic errors. During the research, various obstacles and barriers were encountered, such as the significant expense of time required to complete the questionnaire, its validation, survey conduction, and results processing, which generally shift to the academic semester. Therefore, it is necessary to expand the research areas by involving students and teachers from other faculties and different courses. Additionally, comparing the data obtained at our university with the results from similar studies conducted in other educational institutions would provide valuable insights into the impact of digitalisation on education and aid in creating a conceptual model of digitalisation in higher education to enhance its efficiency. Furthermore, future research should be connected to the peculiarities of didactics and teaching methods when utilising information and communication technologies, exploring the advantages and disadvantages of project-based and problem-based learning approaches.

VI. Conclusions

The research results have revealed that all participants in the educational process have a positive perception of using digital technologies and modern communication tools in higher education. The assertive assessment of introducing digital technologies in the educational process primarily focuses on the communication aspect of distance learning, which enables students to receive educational information irrespective of distance and time. The availability of data and the flexibility of the educational process are considered essential advantages of using digital technologies in higher education. Respondents have also emphasized the possibility of effectively mastering complex topics, reviewing educational material, and analysing and correcting mistakes through the use of high-tech educational tools.

To provide theoretical and methodological support and ensure the efficiency of the digitalisation process in higher education, we have developed a conceptual model based on the results of our study. This model includes several mandatory components: Explicit Knowledge Organisation, Media for Explicit Knowledge, Accessing Explicit Knowledge, Using Explicit Knowledge, and Sharing Knowledge.

Appendix

A. Appendix A

Sample questions of the semi-structured questionnaire (Fragment)

Part 1

1. In your opinion, what form of education will suit you today? Please rate the following conditions of education from one – "the least likely" to 5 – "most accordingly":

A. Traditional (without active use of digital technologies

B. With the total and mandatory use of digital technologies

C. Blended (partial digitalisation of education)

2. What form of education causes you more difficulties? Please rate the following forms of education from 1 – "many difficulties" to 5 – "there are no difficulties":

A. Traditional (without active use of digital technologies
B. With the total and mandatory use of digital technologies
C. Blended (partial digitalisation of education)

3. Please rate the frequency of use of digital applications for effective communication from 1 – "I never use it" to 5 – "I always use it":

A. Traditional (without active use of digital technologies
B. With the total and mandatory use of digital technologies
C. Blended (partial digitalisation of education)

Part 2

Please rate the frequency of use of digital applications for effective communication (1 – I never use it; 5 – I always use it). *Details – in Table II.*

Part 3

Please rate the significance of the advantages and disadvantages of using digital tools in the educational process (1 – It doesn't matter at all; 5 – It is important). *Details – in Table III.*

Conflict of Interest

The authors declare no conflict of interest.

Author Contributions

ZS and VL conducted the research; DS collected and analysed the data; BH wrote the paper; ZH designed the research methodology, editing the paper; all authors had approved the final version.

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