

DOI Link: <https://doi.org/10.82044/EPX58>

Vol.412, Issue.4, Part.1, Apr 2026, PP.253-283

Received December 2025 Accepted March 2026 Published April 2026

A Framework for Shaping the Quality of University Distance Learning in Ukraine and Poland

Svitlana O. Didkivska¹[0000-0002-4004-6631], Grażyna Paliwoda-Pękosz²[0000-0002-0615-5535], Tetiana A. Vakaliuk^{3,4,5,6*}[0000-0001-6825-4697]

¹ University of the National Education Commission, Podchorążych 2, 30-084 Kraków
didkivss@gmail.com

² Krakow University of Economics, 27 Rakowicka Str., Kraków, 31-510, Poland
paliwodg@uek.krakow.pl

³ Zhytomyr Polytechnic State University, 103 Chudnivska str., Zhytomyr, 10005, Ukraine
tetianavakaliuk@gmail.com

⁴ Institute for Digitalisation of Education of the National Academy of Educational Sciences of Ukraine, 9 M. Berlynskoho Str., Kyiv, 04060, Ukraine

⁵ Kryvyi Rih State Pedagogical University, 54 Universytetskyi Ave., Kryvyi Rih, 50086, Ukraine

⁶ Academy of Cognitive and Natural Sciences, 54 Gagarin Ave., Kryvyi Rih, 50086, Ukraine

*Corresponding author: tetianavakaliuk@gmail.com

Abstract

Background. The realities of Ukraine and Poland, including the COVID-19 pandemic and the war in Ukraine, have significantly impacted the form and methods of distance education in both countries. With the increased use of distance learning (DL) in higher education, the quality of DL has attracted particular attention, prompting a reconsideration of approaches to its assessment.

Objectives. The research aims to identify the key parameters of DL quality in Ukraine and Poland, based on the relevant literature, key stakeholders' views, and experts' opinions, and to develop recommendations for improving educational services.

Methods. A design-based research approach was applied, dividing the research into three stages: First, research objectives were identified through literature review and document analysis; second, a pilot framework was developed through qualitative analysis of semi-structured interviews with key stakeholders conducted at the Krakow University of Economics, Poland and Zhytomyr Polytechnic, Ukraine; third, the framework was evaluated using quantitative data from a survey conducted among 30 experts from 20 different universities across Poland and Ukraine, using ranking methodology and Likert scale evaluation.

Results and Conclusions. The study identified 17 quality parameters for distance learning, categorised into technical, methodological, and organisational. The study proposed separate frameworks for assessing the quality of university distance learning in Ukraine and Poland, reflecting national distinctions in prioritising quality parameters. The proposed evaluation system allows for adaptation to institutional needs, promoting a dynamic, context-sensitive approach to quality assurance in distance learning.

The scientific novelty of the study lies in the development of a comprehensive framework for shaping the quality of distance learning in higher education, based on the triangulation of literature review, qualitative stakeholder research, and quantitative expert assessment, which resulted in the identification and systematisation of 17 quality parameters across technical, methodological, and organisational categories. For the first time, a comparative analysis of the prioritisation of these parameters between Ukraine and Poland was conducted, revealing both shared priorities and significant contextual differences, including the impact of the military conflict on educational quality assurance priorities in Ukraine.

1 Introduction

Ukrainian and Polish realities have made an impact on the form and methods of distance education in these countries (Vynoslavska, Kononets, & Mazurek, 2024). Both the COVID-19 pandemic and the war in Ukraine have influenced the perception of distance learning (DL) in higher education (Łaszczyk, 2020; Didkivska, 2024; Baruth, Gabbay, Cohen, Bronshtein, & Ezra, 2021). With an increase in DL usage, the quality of DL has attracted particular attention, underscoring the need to reconsider approaches to its assessment.

DL can be understood as a process of acquiring knowledge without the need for physical presence in a classroom, instead relying on communication tools that facilitate interaction in a remote format. It can be conducted in a synchronous or asynchronous form, which helps customise education to suit personal educational needs (Dziewulak, 2012). The development of information and communication technologies (ICT) became a key factor in enabling this type of education by providing access to effective, diverse learning resources and supporting online interaction (Ferreira, do Couto, de Melo Baptista Domingues, & Saporetti, 2025; Kumi-Yeboah, Kim, Mohammed, & Amponsah, 2025).

During the pandemic, DL played a vital role in ensuring the continuity of education while maintaining safety (Łaszczyk, 2020; Maynard do Lago, Fernandes, & Rampersad, 2025). The advantages of DL include: flexibility in choosing the place of study (and in the asynchronous form – the time), saving time and cost on commuting, and access to online information resources (Pogorilyj, Dudikova, Yakymenko, Poyda, & Koval, 2020; Favale, Soro, Trevisan, Drago, & Mellia, 2020; Markova, Glazkova, & Zaborova, 2017; Sammarro, 2022). However, we should not forget about the disadvantages that DL might bring to participants, i.e. difficulties with concentration, a large number of assignments for individual work, financial inequality in

access to ICT and potential low motivation and conservatism in using remote technology, bureaucracy, and resistance to learning new tools and methods (Nenko, Kybalna, & Snisarenko, 2020; Favale, Soro, Trevisan, Drago, & Mellia, 2020; Moloi, Lebelo, Isabirye, & Molo, 2024).

This work aims to identify the main parameters of DL quality in Ukraine and Poland, based on the views of key stakeholders and relevant literature, to develop recommendations for improving educational services. The framework was developed following some principles of design-based research, including the identification of the research objectives, the development of a pilot framework, the evaluation of the pilot framework, and the proposal of the framework.

The paper is organised as follows. The next section contains the research framework. The following chapters are organised according to the stages of the adopted design-based research, i.e., problem identification, including a literature review, development of a pilot framework, evaluation of the pilot framework, and final proposition of the framework. The paper concludes with a summary of the research and its limitations.

2 Research framework

The study is based on the design-based approach (Figure 1).

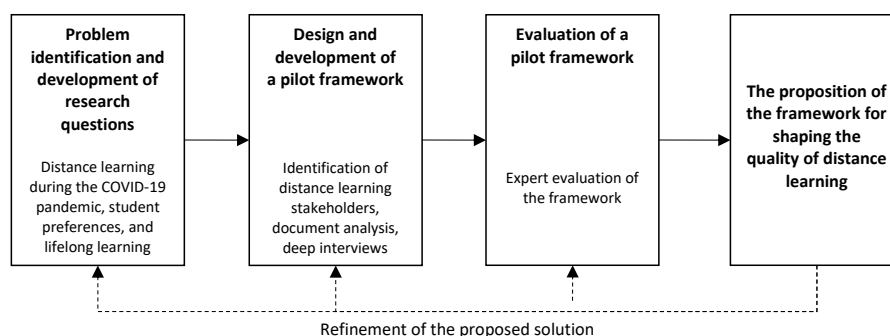


Figure 1: Design research approach of the study, based on (Reeves, 2006)

First, we identified the problem and formulated the research questions (section 3). Secondly, we designed and developed a pilot framework based on the literature review and qualitative research results (section 4). Then, we evaluated the pilot framework using quantitative research results (section 5). Finally, we proposed the framework (section 6). The research methodology applied to qualitative and quantitative research is described in appropriate sections.

The qualitative research, which resulted in a pilot framework proposition, was conducted at the Krakow University of Economics, Poland (KUE) and Zhytomyr Polytechnic, Ukraine (ZP).

The evaluation of the pilot framework was performed by domain experts from different universities in Poland and Ukraine to obtain a broader national perspective.

3 Problem identification and development of research questions

3.1 Ukrainian and Polish perspectives

In Ukraine, formal regulation of distance education began in the early 21st century (Prime Minister of Ukraine, 2003). This established the basic rules, norms, and supervisory bodies for DL. Later documents further integrated DL into Ukraine's education system, especially emphasising its role for inclusive education (President of Ukraine, 2007; President of Ukraine, 2013). The ZP began implementing elements of DL as early as 2014 through an educational portal. However, initially, it served as a supplement rather than a full-fledged alternative to traditional in-person education.

The regulation of DL in Poland was significantly influenced by European Union directives, starting with the "Maastricht Treaty" of 1992, which promoted the development of distance education (Publications Office of the European Union, 1992). Later documents further emphasised the importance of DL systems as platforms for inter-university cooperation (Commission of the European Communities, 2004). Poland's national strategy in the field of DL began with the ePolska Action, which focused on providing schools with computer infrastructure, training teaching staff, and developing multimedia resources (Ministerstwo Łączności, 2001). The Higher Education Act of 2005 established that DL could account for up to 60% of the total number of instructional hours in educational programs. KUE established the E-learning Centre in 2006 and adopted a comprehensive DL education strategy in 2009, which classified e-learning activities into four types: support of traditional learning (20% of hours), supplementing traditional learning (40%), additional learning (60%), and full DL (100%). In 2012, KUE launched the Moodle e-learning platform (Ministerstwo Nauki i Szkolnictwa Wyższego, 2005; Ministerstwo Nauki i Szkolnictwa Wyższego, 2007; Senat UEK, 2009). Findings from research data and literature analysis revealed that, although Polish higher education institutions had a satisfactory level of technological preparedness before the pandemic, the sudden, large-scale shift to remote education exposed new demands that exceeded prior evaluations (Kucharska & Rostek, 2021).

In March 2020, both Poland and Ukraine implemented similar measures in response to the COVID-19 pandemic by closing educational institutions and transitioning entirely to DL. At KUE, classes remained predominantly online until September 2021, when universities transferred to a hybrid model. Similarly, at ZP, classes moved online in March 2020, with a brief return to in-person learning for various student groups during the 2020–2021 academic year. Both countries alternated between distance and face-to-face learning during the pandemic, depending on the infection rates, with a gradual transition to hybrid models by the end of 2021.

Following the full-scale Russian invasion in February 2022, Ukraine's higher education system faced unprecedented challenges. The Ministry of Education issued regulations on educational processes under martial law, including provisions for student relocation and retention of faculty salaries regardless of location. The legislation in 2023 (Laws No. 3062-IX and 2940-IX) focused on maintaining the quality of education during DL and providing support for displaced students (Прес-служба Апарату Верховної Ради України, 2023; Комітет Верховної Ради України, 2023). ZP responded by implementing comprehensive DL solutions, adjusting the academic calendar, and offering psychological support to both students and faculty (Житомирська політехніка, 2023; Житомирська політехніка, 2022).

3.2 Quality of distance learning

A key factor in improving educational quality through the use of DL is the adoption of innovative digital teaching methods to build a healthy, effective, and communicative learning environment in higher education (Osova, Vakaluik, Panchenko, Didkivska, & Kontsedailo, 2021). These teaching methods use ICT, which offer essential tools enabling DL and serve as a crucial element of effective online education and learning overall (Adarkwah, 2021; Paliwoda-Pękosz, Stal, & Wojtowicz, 2015; Stal & Paliwoda-Pękosz, 2019).

In literature, there are different approaches to the quality of DL, often based on various factors that are taken into evaluation, e.g.:

- five fundamental pillars of quality in DL: Learning Effectiveness, Student Satisfaction, Faculty Satisfaction, Cost Effectiveness, and Access (Lorenzo & Moore, 2002),
- a fuzzy multicriteria evaluation method that breaks the e-learning process into components assessed by experts using qualitative descriptors and fuzzy numbers, taking into account the weight of each criterion (Stefanovic, Tadic, Arsovski, Arsovski, & Aleksic, 2010),
- a framework focusing on quality assurance in virtual institutions, emphasising institutional processes and continuous improvement (Masoumi & Lindström, 2012),
- evaluation through students' overall satisfaction and their attitudes toward online education (Markova, Glazkova, & Zaborova, 2017),
- an international standard that provides a comprehensive Quality Reference Framework for the design, development, and delivery of e-learning (ISO, 2017),
- a standard offering guidelines for managing educational organisations, aimed at improving the effectiveness and consistency of educational services (ISO, 2018),
- a model for evaluating open education quality, based on the ISO/IEC 40180 standard, which defines reference processes for e-learning (Stracke, 2019; ISO, 2017),
- a standard which provides specific requirements for DL services, including key issues such as the availability of learning materials and procedures for monitoring and evaluating services (ISO, 2021).

Besides, the ISO/TR 29996:2024 document was published in 2014. This technical report offers not requirements, but real-world case studies and practical solutions for implementing ISO standards in distance and digital learning services, thereby serving as a reference for providers aiming to enhance quality (ISO, 2024).

Summing up, existing frameworks often lack a comprehensive perspective that includes all stakeholders and cultural contexts. We would like to fill this research gap by developing a framework based on a literature review and empirical data.

3.3 Research questions

The increased usage of DL, followed by the need to ensure the high quality of teaching and the lack of a comprehensive framework for shaping the quality of DL, motivated us to formulate the following research questions:

RQ1: What are the main parameters of distance learning quality important to key stakeholders?

RQ2: How might these parameters be effectively managed?

4 Design and development of a pilot framework

4.1 Methodology of the pilot framework development

The framework development methodology was based on a triangulation of research methods for data collection and analysis to provide an understanding of the quality of DL in the context of higher education in Poland and Ukraine. The data collection methodology included a literature review, both narrative and systematic, an analysis of official documents (regulatory acts at the level of the two countries and at the level of the two universities), as well as interviews with stakeholders from both universities (Didkivska, 2024, pp. 46-53). The framework development process consisted of the three main stages (Figure 2).

At the first stage, the initial parameters were determined based on a review of the literature and official documents, as a result of which the state-of-the-art approaches to the quality of educational services and DL, as well as the factors determining the quality of DL, were identified (Didkivska, 2024, pp. 34-44). The analysis of official documents allowed us to familiarise ourselves with the realities of DL in educational institutions in Ukraine and Poland at the country level, as well as in ZP and KUE. In particular, the DL policies of both universities and the procedures for action in various emergency situations (COVID-19 pandemic, war in Ukraine) were studied (Didkivska, 2024, pp. 45-46).

Stage 1: Identification of initial parameters through literature review and document analysis

- Identifying state-of-the-art approaches to educational services quality;
- Analyzing literature and official documents to create an initial list of quality factors in distance learning and cultural context.

Stage 2: Identification of parameters important to key stakeholders in Polish and Ukrainian context with the help of qualitative research

- Analyzing visions of the key stakeholders in Poland and Ukraine on distance education quality;
- Identifying quality factors from stakeholder perspectives.

Stage 3: Pilot framework development

- Creation of a comprehensive model that will consider factors gathered at previous stages;
- Adding to model relevant evaluation methods and responsibility distribution between stakeholders for parameters.

Figure 2. Stages of the pilot framework development.

The second stage involved the identification and analysis of stakeholders' (who were identified based on their roles in DL) opinions on DL. Snowball sampling was used when initial participants referred others from their networks (e.g., students), while purposive sampling was used to select participants with relevant expertise or involvement in DL. Semi-structured interviews were conducted between autumn 2021 and autumn 2023 and took place in person or online (via Microsoft Teams, Zoom, Google Meet), depending on the location and availability. The guided interview questions are listed in Appendix 1. All interviews were recorded (when permitted), transcribed, anonymised, and stored securely to ensure data confidentiality. A total of 91 people were interviewed. In particular, interviews were conducted with 51 students (24 from the KUE, 27 from the ZP), 20 teachers (10 from each university), 2 employees of the e-learning department (1 from each university), 5 employees of the IT department (4 from the KUE, 1 from the ZP) and 13 employers (10 from Poland, 3 from Ukraine). The collected data underwent thematic analysis to identify recurring themes and stakeholder perspectives on DL quality. It included: familiarisation with the data; generating initial codes; generating themes; reviewing potential themes; defining and naming themes; and producing the report (Braun & Clarke, 2023). Next, all responses were analysed from different stakeholder perspectives. Data supporting the findings of this study are available at Zenodo (Didkivska, Paliwoda-Pękosz, & Valaliuk).

At the final stage, the results were synthesised into a comprehensive framework that considers Polish and Ukrainian perspectives (Didkivska, 2024, pp. 119-127).

4.2 Identification of initial parameters through literature review and document analysis

The literature review was conducted in two stages: an initial systematic review in March 2021, covering publications from 2020 to 2021, followed by a narrative review in March 2024 to update the research work overview from 2022 to 2024.

During the literature review, the following main stakeholders of DL were identified: academic staff, students, e-learning departments, IT departments, and employers. Besides, parameters of DL quality were identified and grouped into three categories: technical, methodological, and organisational. Technical aspects included: methods for quality control of educational software, high-quality computer telecommunications supply, and technological and organisational infrastructure, which was further supplemented by personal data protection, as mentioned in official regulations. Methodological aspects cover optimal cognitive load (based on organisational effectiveness and flexibility), effective knowledge gain and control, contemporary materials and methods, pre-sorting of students into groups according to their level of knowledge, psychological and academic preparedness, equivalence of educational outcomes, student-lecturer common vision for an effective learning environment, engagement and focus from academic staff and students. Organisational aspects include student support services, feedback systems for quality control, and environmental aspects. Most of the parameters (except the environmental impact and pre-sorting students into groups according to their level of knowledge) remained unchanged in both the 2020–2021 and 2022–2024 literature reviews, indicating their continued relevance in DL quality assurance systems.

4.3 Identification of parameters with the help of qualitative research

During this stage, semi-structured interviews with key stakeholders were conducted. Table 1 shows the most important quality parameters identified by them. Results gathered at this stage show many common perceptions between stakeholders' opinions and results from the previous stage – literature and official documents review. However, there were answers mentioned only in this stage of research, such as the need for the creation and regular adaptation of Official University Regulations for DL (for example, clear regulations concerning camera usage during online classes) or Schedule Effectiveness and Flexibility (for example, conducting remote classes on different days than on-site classes). It should be noted that several parameters, such as the need for feedback systems for quality control, ecological and environmental aspects, personal data protection, and pre-sorting students into groups according to their level of knowledge, were not mentioned by stakeholders despite being presented in the literature.

Quality Parameter	Academic Staff	Students	E-Learning Department	IT Department	Employers
Autonomy Possibility With Academic Support For Students	✓	✓	✓		
Effective Knowledge Gaining And Control	✓	✓	✓	✓	✓
Engagement And Focus From Academic Staff And Students	✓	✓	✓		
Equivalence Of Educational Outcomes	✓	✓	✓	✓	✓
High Quality Of Computer Telecommunications Supply	✓	✓	✓	✓	✓
Official University Regulations	✓	✓	✓	✓	
Optimal Cognitive Load	✓	✓	✓	✓	✓
Psychological And Academic Preparedness	✓		✓		
Relevance Of Education To Modern Times	✓				✓
Schedule Effectiveness And Flexibility	✓	✓	✓	✓	✓
Student-Lecturer Common Vision For Effective Learning Environment Creation	✓	✓	✓		
Technological And Organisational Infrastructure	✓	✓	✓	✓	

Table 1. Distance learning quality parameters identified by both stakeholders of ZP and KUE.

ZP stakeholders showed a more positive attitude toward DL technologies (74.1% of academic staff and 75.8% of students) than respondents from KUE (51.4% of academic staff and 50% of students). Polish respondents emphasised the need for interpersonal connections and non-verbal communication (19.4% identified this as the main issue), which cannot be provided that effectively in DL. Ukrainian participants also acknowledged this loss but did not emphasise it as strongly. Respondents from both countries highlighted the importance of student-teacher collaboration as a central element of quality education. Polish students expressed greater concern regarding personal focus and individualised learning experiences, while Ukrainian students were more focused on the functionality and accessibility of DL systems. Polish respondents pointed to the loss of opportunities to build interpersonal connections available in

face-to-face education. In contrast, Ukrainian stakeholders emphasised maintaining connections despite displacement caused by the full-scale invasion. Employers in both countries expressed similar expectations for graduates, valuing practical skills and adaptability more than theoretical education.

Generally, Ukrainian respondents placed particular emphasis on safety, reflecting Ukrainians' collective response to threats and underscoring how the war has reshaped educational priorities. In contrast, respondents in Poland focused more on the economic efficiency of this approach.

4.4 A proposition of a pilot framework

After analysing all gathered data from the literature, official documents, regulations, and stakeholders' opinions, the pilot framework for shaping the quality of DL was proposed (Table 2).

Quality Parameter	Responsible Stakeholder	Evaluation Method
Technical aspects		
High Quality of Computer Telecommunications Supply	University Management, Academic Staff, Technical Support, IT Services, Internet Providers, Students, State	Internet service performance based on user logs, speed tests, user feedback surveys
Technological and Organisational Infrastructure	University, Technical Support, E-Learning Department	System performance reviews, user feedback surveys, maintenance logs
Personal Data Protection	University Management, Technical Support, Service Providers	IT Department feedback (security audits, data breach monitoring), user feedback surveys
QC Methods for Educational Software	E-Learning Department, Technical Support	User feedback surveys, IT Department feedback
Methodological aspects		
Optimal Cognitive Load (based on Organizational Effectiveness and Flexibility)	Academic Staff, E-Learning Department	Student feedback surveys, academic performance monitoring
Effective Knowledge Gain and Control	Academic Staff, E-Learning Department, Students	Employers' surveys, Student feedback surveys, academic performance monitoring
Materials and Methods Relevant to Modern Times	University Management, Employers, Academic Staff, Students	Curriculum relevance review, Employers feedback surveys

Pre-sorting of Students into Groups According to their Level of Knowledge	University Management, Academic Staff	Academic performance monitoring, Student and Academic Staff feedback
Psychological and Academic Preparedness	University Management, Academic Staff, E-Learning Department, Students	Academic Staff feedback surveys, Student feedback surveys
Equivalence of Educational Outcomes	University Management, Academic Staff, E-Learning Department, Students	Academic results comparison, curriculum consistency evaluation, Employers feedback surveys, Student feedback surveys
Student-Lecturer Common Vision for Effective Learning Environment	Academic Staff, Students	Academic Staff feedback surveys, Student feedback surveys
Engagement and Focus from Academic Staff and Students	Academic Staff, Students	Academic Staff feedback surveys, Student feedback surveys
Organisational aspects		
Autonomy Possibility with Academic Support for Students	Academic Staff, University Management, Students	Student feedback surveys
Need of Feedback for Quality Control	University Management, Academic Staff, E-Learning Department, Students	Feedback surveys (with regular feedback cycles and focus groups)
Official University Regulations for DL	University Management, Academic Staff	Feedback surveys
Schedule Effectiveness and Flexibility	University Management	Feedback surveys
Environmental impact	University Management	Assessment of environmental impacts

Table 2. A proposition of a framework for shaping the quality of DL.

All DL quality parameters were divided into categories, and the potentially responsible stakeholders for maintaining each parameter were selected. The methods for evaluation of the current state of each parameter described in literature were proposed: Internet service performance based on user logs (Akhigbe, 2020), speed tests (Hawthorne, 2020), maintenance logs (Yu, Sheng, & Zhang, 2023), monitoring of academic performance (Waheed et al., 2020), academic outcomes comparison (Ababneh, Al-qdah, & Almutairi, 2023), curriculum consistency evaluation (Chochól & Hnatyszak, 2021), assessment of environmental impacts (Genta, Favaro, Sonetti, Fracastoro, & Lombardi, 2022), user feedback surveys, including users' feedback on technological infrastructure (Birch-Jensen, Gremyr, & Halldorsson, 2020), feedback surveys for the direct participants of the educational process (Alderman, Towers, &

Bannah, 2012), employers' feedback (Finley, 2021), all of them for achieving better results with the continuous feedback loop (Meikleham & Hugo, 2020) and system performance reviews (Ma & Wang, 2023).

5 Evaluation of the pilot framework

5.1 Methodology of the pilot framework evaluation

An expert evaluation method was used for evaluation of the pilot framework that involved: (1) ranking the proposed indicators according to their perceived importance (Vakaliuk, Spirin i Kontsedailo, 2021; Manzoor, Othman, Gardezi, Altan i Abdalla, 2021) and (2) assessing the importance of each quality indicator. After careful rethinking of the quality parameters and discussions with experts, it was decided to split the "Methodological aspects" category into "Methodological-didactic aspects" and "Methodological-psychological aspects" (see Table 3).

The expert panel included heads of quality assurance departments, heads of academic and methodological offices, faculty deans, vice-rectors for academic affairs, and other experienced professionals in the field of DL quality who are directly responsible for the educational process involving DL at their universities, which makes their opinions particularly valuable.

In the first stage, the experts were provided with a ranking questionnaire (see Appendix 2, 3). A points-based evaluation system was used: for N indicators, the value N was assigned to the most important indicator in terms of its contribution to the overall quality assessment, while a score of 1 was assigned to the least important. The results were compiled in a matrix, with columns representing the indicator numbers and rows corresponding to individual experts. To minimise psychological bias that could influence the ranking process, the indicators in the evaluation form were listed in alphabetical order. However, total ranks can be considered objective only if there is a sufficient level of agreement among the experts. The degree of this agreement was measured using Kendall's coefficient of concordance. Based on experimental data, we obtained a certain value W (if the resulting value significantly differs from zero, it can be concluded that there is a statistically meaningful agreement among the experts).

In the second stage, the experts evaluated the importance of each indicator on the Likert scale (see Appendix 4). Each Likert-scale indicator, from "not important at all" to "very important", was converted to a numerical value from 0 to 1, with a step of 0.25. The analysis of the results was performed using the basic descriptive statistical measures: Variance, Standard Deviation, and Coefficient of Variation.

The survey was conducted during April-May 2025 among 15 experts from Ukraine and 15 experts from Poland. Ukrainian experts come from 11 different higher education institutions, located in various regions: Hryhorii Skovoroda University in Pereiaslav, Kryvyi Rih State Pedagogical University, Drohobych Ivan Franko State Pedagogical University, Pavlo Tychyna Uman State Pedagogical University, National University of Life and Environmental Sciences

of Ukraine, ZP, Municipal Establishment „Kharkiv Humanitarian-Pedagogical Academy” of the Kharkiv Regional Council, Oleksandr Dovzhenko Hlukhiv National Pedagogical University, Kamianets-Podilskyi Ivan Ohienko National University, Dragomanov Ukrainian State University, Borys Hrinchenko Kyiv University.

Polish experts came from 9 universities: University of Gdansk, KUE, University of Lodz, University of Economics in Katowice, West Pomeranian University of Technology, University of Wroclaw, The State University of Applied Sciences in Jaroslaw, Opole University of Technology, Bydgoszcz University of Science and Technology.

5.2 Results and analysis

5.2.1 Ukraine

Kendall's coefficient of concordance for Ukrainian experts was 0.72 (see Appendix 4). Since this value differs significantly from zero, we may conclude that a substantial level of agreement exists among the experts and that the aggregated rankings are adequately objective.

Table 3 presents the basic statistical indicators for 17 quality parameters. As we can see, almost all statistical indicators are within the accepted range (Coefficient of Variation $<1/3$) (Bakhrushin, 2011, p. 19).

Quality Parameter	Mean	Variance	Standard Deviation	Coefficient of Variation	Mean Absolute Deviation
Technical aspects	0,88	0,02	0,13	14%	0,12
High Quality of Computer Telecommunications Supply	0,88	0,02	0,13	15%	0,12
Technological and Organisational Infrastructure	0,85	0,02	0,13	15%	0,12
Personal Data Protection	0,92	0,01	0,12	13%	0,11
QC Methods for Educational Software	0,85	0,02	0,12	15%	0,12
Methodological-didactic aspects	0,78	0,02	0,14	18%	0,11
Optimal Cognitive Load (based on Organizational Effectiveness and Flexibility)	0,82	0,01	0,11	14%	0,10
Effective Knowledge Gain and Control	0,85	0,02	0,13	15%	0,12

Materials and Methods Relevant to Modern Times	0,82	0,02	0,13	15%	0,12
Pre-sorting of Students into Groups According to their Level of Knowledge	0,67	0,03	0,18	27%	0,14
Equivalence of Educational Outcomes	0,72	0,02	0,13	18%	0,09
Methodological-psychological aspects	0,78	0,01	0,11	14%	0,07
Psychological and Academic Preparedness	0,75	0,02	0,13	18%	0,07
Student-Lecturer Common Vision for Effective Learning Environment	0,78	0,01	0,09	11%	0,06
Engagement and Focus from Academic Staff and Students	0,82	0,01	0,11	14%	0,10
Organisational aspects	0,75	0,03	0,16	21%	0,12
Autonomy Possibility with Academic Support for Students	0,82	0,02	0,15	18%	0,12
Feedback Need for Quality Control	0,85	0,02	0,13	15%	0,12
Official University Regulations for DL	0,72	0,03	0,16	22%	0,12
Schedule Effectiveness and Flexibility	0,73	0,02	0,15	20%	0,09
Environmental Impact	0,65	0,04	0,21	32%	0,17

Table 3 Statistical indicators of each quality parameter according to the estimates of Ukrainian experts.

In response to the optional question, the experts did not suggest any new parameters but provided more detailed insights into some existing ones. For example, regarding Materials and Methods Relevant to Modern Times, the need was highlighted to ensure the "involvement of employers in the design, implementation, and evaluation of the educational program." Another expert emphasised the importance of tracking students' further paths, specifically "graduate employment and career development." To ensure Equivalence of Educational Outcomes, attention should be given to "the quality of organising students' practical training, including all types of internships and the arrangement of laboratory and practical classes."

Finally, one of the most crucial parameters in the context of the war in Ukraine, noted by several experts, concerns the psychological state of participants in the educational process, as part of the Psychological and Academic Preparedness parameter. Experts stressed the significance of

the “psychological well-being of participants in the educational process – both teachers and students.” Given the circumstances, Ukrainian universities must also consider the necessity of a “trauma-informed approach to education”.

5.2.2 Poland

Kendall’s coefficient of concordance was 0.51 for Polish experts (see Appendix 4). Table 4 presents the results of the evaluation of the quality parameters.

Quality Parameter	Mean	Variance	Standard Deviation	Coefficient of Variation	Mean Absolute Deviation
Technical aspects	0,70	0,03	0,18	27%	0,12
High Quality of Computer Telecommunications Supply	0,87	0,05	0,23	26%	0,18
Technological and Organisational Infrastructure	0,88	0,03	0,19	21%	0,16
Personal Data Protection	0,52	0,02	0,15	29%	0,06
QC Methods for Educational Software	0,53	0,03	0,16	30%	0,09
Methodological-didactic aspects	0,77	0,03	0,16	22%	0,13
Optimal Cognitive Load (based on Organizational Effectiveness and Flexibility)	0,83	0,03	0,18	22%	0,16
Effective Knowledge Gain and Control	0,88	0,03	0,16	18%	0,14
Materials and Methods Relevant to Modern Times	0,90	0,02	0,13	14%	0,12
Pre-sorting of Students into Groups According to their Level of Knowledge	0,47	0,02	0,13	28%	0,09
Equivalence of Educational Outcomes	0,77	0,04	0,20	26%	0,12
Methodological-psychological aspects	0,81	0,04	0,20	25%	0,16
Psychological and Academic Preparedness	0,80	0,04	0,19	24%	0,16
Student-Lecturer Common Vision for Effective Learning Environment	0,75	0,04	0,21	28%	0,17

Engagement and Focus from Academic Staff and Students	0,88	0,04	0,21	24%	0,16
Organisational aspects	0,66	0,03	0,18	28%	0,13
Autonomy Possibility with Academic Support for Students	0,85	0,04	0,21	24%	0,16
Feedback Need for Quality Control	0,77	0,04	0,20	26%	0,16
Official University Regulations for DL	0,68	0,04	0,20	29%	0,17
Schedule Effectiveness and Flexibility	0,77	0,03	0,18	23%	0,12
Environmental Impact	0,25	0,01	0,09	38%	0,3

Table 4. Statistical indicators of each quality parameter according to the estimates of Polish experts.

The level of consistency among experts' points of view is lower than in Ukraine, but all indicators, except environmental impact, are within the accepted range.

Polish experts also did not mention any new parameters, but commented on existing ones. For example, while discussing Optimal Cognitive Load, some suggested comparing "Workload during DL – the amount of time spent on the teaching process in this form, comparison of achieved outcomes in face-to-face and DL formats". Describing Psychological and Academic Preparedness, Polish experts were focused on the importance of the second one: "mandatory training for instructors (on methodology for designing and conducting e-classes) and for students (on independent learning and self-motivation), directly translates into the quality and effectiveness of classes at the university".

6 The proposition of the framework for shaping the quality of distance learning
Although it was initially planned to develop a single framework for Ukraine and Poland, the study based on experts' views showed differences in the prioritisation of parameters (see Table 5).

Quality Parameter	Ukraine	Poland
Technical aspects		
High Quality of Computer Telecommunications Supply		
Technological and Organizational Infrastructure		
Personal Data Protection		
QC Methods for Educational Software		
Methodological-didactic aspects		
Optimal Cognitive Load (based on Organizational Effectiveness and Flexibility)		
Effective Knowledge Gain and Control		
Materials and Methods Relevant to Modern Times		
Pre-sorting of Students into Groups According to their Level of Knowledge		
Equivalence of Educational Outcomes		
Methodological-psychological aspects		
Psychological and Academic Preparedness		
Student-Lecturer Common Vision for Effective Learning Environment		
Engagement and Focus from Academic Staff and Students		
Organizational aspects		
Autonomy Possibility with Academic Support for Student's		
Feedback Need for Quality Control		
Official University Regulations for DL		
Schedule Effectiveness and Flexibility		

Note: The bars display the importance of each of the parameters (mean from Tables 3 and 4).

Table 5. The importance of DL quality parameters in Ukraine and Poland.

Quality Parameter	Responsible Stakeholder	Evaluation Method
Technical aspects		
High Quality of Computer Telecommunications Supply	University Management, Academic Staff, Technical Support, IT Services, Internet Providers, Students, State	Internet service performance based on user logs, speed tests, user feedback surveys
Technological and Organisational Infrastructure	University, Technical Support, E-Learning Department	System performance reviews, user feedback surveys, maintenance logs
Personal Data Protection	University Management, Technical Support, Service Providers	IT Department feedback (security audits, data breach monitoring), user feedback surveys
QC Methods for Educational Software	E-Learning Department, Technical Support	User feedback surveys, IT Department feedback
Methodological aspects		

Optimal Cognitive Load (based on Organizational Effectiveness and Flexibility)	Academic Staff, E-Learning Department	Student feedback surveys, academic performance monitoring
Effective Knowledge Gain and Control	Academic Staff, E-Learning Department, Students	Employers' surveys, Student feedback surveys, academic performance monitoring
Materials and Methods Relevant to Modern Times	University Management, Employers, Academic Staff, Students	Curriculum relevance review, Employers feedback surveys
Pre-sorting of Students into Groups According to their Level of Knowledge	University Management, Academic Staff	Academic performance monitoring, Student and Academic Staff feedback
Equivalence of Educational Outcomes	University Management, Academic Staff, E-Learning Department, Students	Academic results comparison, curriculum consistency evaluation, Employers feedback surveys, Student feedback surveys
Methodological-psychological aspects		
Psychological and Academic Preparedness	University Management, Academic Staff, E-Learning Department, Students	Academic Staff feedback surveys, Student feedback surveys
Student-Lecturer Common Vision for Effective Learning Environment	Academic Staff, Students	Academic Staff feedback surveys, Student feedback surveys
Engagement and Focus from Academic Staff and Students	Academic Staff, Students	Academic Staff feedback surveys, Student feedback surveys
Organisational aspects		
Autonomy Possibility with Academic Support for Students	Academic Staff, University Management, Students	Student feedback surveys
Feedback Need for Quality Control	University Management, Academic Staff, E-Learning Department, Students	Feedback surveys (with regular feedback cycles and focus groups)
Official University Regulations for DL	University Management, Academic Staff	Feedback surveys
Schedule Effectiveness and Flexibility	University Management	Feedback surveys

Table 6. The framework for shaping DL quality.

7 Discussion

7.1 Ukrainian and Polish perspectives

Based on the results, we can see that the most important parameters in both countries are: High Quality of Computer Telecommunications Supply, Technological and Organizational Infrastructure, Optimal Cognitive Load (based on Organizational Effectiveness and Flexibility), Effective Knowledge Gain and Control, Materials and Methods Relevant to Modern Times, Engagement and Focus from Academic Staff and Students, Autonomy Possibility with Academic Support for Students. All of the above parameters were considered important in both countries, received an index above 0.8, and are approximately the same (the difference does not exceed 0.08).

The following parameters: Equivalence of Educational Outcomes, Psychological and Academic Preparedness, Student-Lecturer Common Vision for Effective Learning Environment, Feedback Need for Quality Control, Schedule Effectiveness and Flexibility, and Official University Regulations for DL are next in priority (from 0.68), and the difference in scores between both countries also does not exceed 0.08.

However, the study revealed parameters that showed differences in expert evaluations between Poland and Ukraine, with notably higher values observed in the latter country. The Personal Data Protection parameter was rated the highest in Ukraine, with a score of 0.92, while in Poland it received only 0.52. This may be related to the full-scale Russian invasion of Ukraine, which includes an information warfare component and puts Ukrainian citizens' personal data at risk. An analysis of media reports enabled tracing the origins of this trend by examining the history of cyberattacks targeting various elements of Ukraine's information infrastructure. These attacks began even before the full-scale invasion and continued both during and after the period in which the study was conducted (Savchuk, 2024). Among the most notable incidents was a large-scale disruption on 12 December 2023 that affected one of Ukraine's largest mobile operators, Kyivstar, as well as banking systems (Monobank). The "Solntsepyok" hacker group claimed responsibility for the attack, while the Security Service of Ukraine identified traces of the Sandworm malware, associated with Russian hackers (BBC News Україна, 2023). Subsequently, on 19 December 2024, a cyberattack targeted state registers, resulting in the suspension of the Unified and State Registers of the Ministry of Justice of Ukraine (The Security Service of Ukraine, 2024).

Also in Ukraine, where the QC Methods for Educational Software parameter scored 0.85 (compared to 0.53 in Poland), the majority of surveyed experts from educational institutions were located in frontline zones or under frequent missile attacks. These conditions often force universities to switch to remote learning (including asynchronous modes), making the quality of educational software critical for the teaching process.

The following two parameters - Pre-sorting of Students into Groups According to their Level of Knowledge (0.67 and 0.47) and Environmental Impact (0.65 and 0.25) - although showing considerable differences in expert ratings between the two countries, were identified as the least important in both Poland and Ukraine. Moreover, the Environmental Impact parameter was a subject of debate among experts, displaying a high Coefficient of Variation (32% and 38%), and was not referenced in the literature during a subsequent review aimed at updating sources. As a result, a decision was made to adjust the final framework by excluding this parameter in both countries.

7.2 Implications for research and practice

The paper contributes to research on shaping the quality of DL by proposing a framework developed through the triangulation of data sources and research methods. We conducted a comprehensive literature review and semi-structured interviews with the main DL stakeholders to obtain a broad yet hands-on perspective on the parameters that shape DL quality. Besides, we also asked experts to evaluate the framework.

Each university can develop its own framework, considering its specific context. However, it is recommended to retain as mandatory those indicators that received the highest rating in the respective country. Indicators with lower rates are important but may be adjusted at each university's discretion.

7.3 Limitations and further research

The framework was developed based on data from only two countries. In future research, we might extend our research to other countries.

8 Conclusions

This study proposed a framework for assessing the quality of university DL in Ukraine and Poland, developed through both qualitative and quantitative research involving key stakeholders and experts. The findings reveal that while some quality parameters, such as technological infrastructure, cognitive load, and engagement, are universally important, the prioritisation of other elements differs between the two countries. In Ukraine, the context of war emphasised participants' psychological well-being and resilience, whereas in Poland, greater emphasis was placed on pedagogical preparedness and technological efficiency. Consequently, separate frameworks were created to reflect these national distinctions. The proposed evaluation system allows for adaptability to institutional needs, promoting a dynamic and context-sensitive approach to quality assurance in DL.

The scientific novelty of the study lies in the fact that, for the first time, a framework for shaping the quality of distance learning in higher education institutions has been developed, based on the triangulation of data collection methods – a systematic review of the literature, qualitative research (semi-structured interviews with five groups of stakeholders) and

quantitative expert assessment – unlike existing models, which are mainly based on individual approaches or a limited range of participants. As a result, 17 parameters of distance learning quality were identified and systematised, classified into three categories (technical, methodological, organisational). For the first time, a comparative analysis of the priority of distance learning quality parameters between Ukraine and Poland was carried out based on expert assessments (15 experts from each country), which allowed us to identify both common priorities (technological infrastructure, optimal cognitive load) and significant differences. In addition, the impact of the military conflict on the priorities for ensuring the quality of distance education was identified, as it was established that in the conditions of war in Ukraine, the importance of such parameters as personal data protection, methods of quality control of educational software, and the psychological readiness of participants in the educational process significantly increases.

Acknowledgements

The author thanks the administrations and distance learning experts of the participating universities for their valuable support and contribution to this research.

Ethical Approval

Based on the nature of the study, which involved voluntary participation of university stakeholders and academic experts and did not include sensitive personal data or any form of intervention, formal ethical approval was not required.

Informed Consent

All participants were informed about the purpose of the study, its procedures, and the voluntary nature of participation. Informed consent was obtained from all participants prior to their involvement.

Statement Regarding Research Involving Human Participants and/or Animals

This study involved human participants and did not involve animals. The research was non-invasive and did not include medical, psychological, or other experimental interventions.

Consent to Participate

Participation in the study was entirely voluntary. All participants provided informed consent to participate before taking part in the research.

Consent to Publish

All participants consented to the anonymous use and publication of aggregated research results.

Funding

The publication was financed from the subsidy granted to the Krakow University of Economics - Project nr 041/ZII/2025/POT.

Author's Contribution

Conceptualization, Svitlana O. Didkivska, Grażyna Paliwoda-Pękosz and Tetiana A. Vakaliuk; literature review – Tetiana A. Vakaliuk; data collection - Svitlana O. Didkivska and Grażyna Paliwoda-Pękosz; methodology, Svitlana O. Didkivska, Grażyna Paliwoda-Pękosz and Tetiana A. Vakaliuk; visualisation, Svitlana O. Didkivska and Tetiana A. Vakaliuk; writing – original draft, Svitlana O. Didkivska and Tetiana A. Vakaliuk; writing – review and editing Grażyna Paliwoda-Pękosz and Tetiana A. Vakaliuk. All authors have read and agreed to the published version of the manuscript.

Competing Interests

The authors declare no conflict of interest.

Availability of Data and Materials

Data supporting the findings of this study are available at Zenodo:
<https://doi.org/10.5281/zenodo.18338485>

References

- Ababneh, I., Al-qdah, M., & Almutairi, A. (2023). Comparison of Academic Results during Conventional and Online Modes of Learning: A Case Study of Two Groups of Saudi University Students. *Sustainability*, 15(7), 5799. doi:<https://doi.org/10.3390/su15075799>
- Adarkwah, M. A. (2021). "I'm not against online teaching, but what about us?". *Education and Information Technologies*, 26(2), 1665-1685.
- Akhigbe, B. (2020). Users' Satisfaction with Internet Service Performance-Based on User Log. *IPTEK The Journal for Technology and Science*, 31(3), 279-294. doi:<http://dx.doi.org/10.12962/j20882033.v31i3.5236>
- Alderman, L., Towers, S., & Bannah, S. (2012). Student feedback systems in higher education: a focused literature review and environmental scan. *Quality in Higher Education*, 18(3), 261–280. doi:<https://doi.org/10.1080/13538322.2012.730714>

- Bakhrushin, V. (2011). *Data analysis methods: a textbook for students*. Zaporizhia. Retrieved from <http://kist.ntu.edu.ua/textPhD/metDataManing.pdf>
- Baruth, O., Gabbay, H., Cohen, A., Bronshtein, A., & Ezra, O. (2021). Distance learning perceptions during the coronavirus outbreak: Freshmen versus more advanced students. *Journal of Computer Assisted Learning*, 37(6), pp. 1666-1681. doi:10.1111/jcal.12612
- BBC News Україна. (2023, 12 12). *BBC*. Retrieved from Монобанк як і "Київстар" зазнав атаки хакерів. Що відбувається: <https://www.bbc.com/ukrainian/articles/c03215wj6njo>
- Birch-Jensen, A., Gremyr, I., & Halldorsson, A. (2020). Digitally connected services: Improvements through customer-initiated feedback. *European Management Journal*, 35(5), 814-825.
- Braun, V., & Clarke, V. (2023). Toward good practice in thematic analysis: Avoiding common problems and being a knowing researcher. *International journal of transgender health*, 24(1), pp. 1-6. doi:<https://doi.org/10.1080/26895269.2022.2129597>
- Chochół, A., & Hnatyszak, O. (2021). *Model Wewnętrznej Oceny Jakości Kształcenia Na Uczelni*. Warsaw: Polskie Wydawnictwo Ekonomiczne S. A.
- Commission of the European Communities. (2004). *Communication from the Commission the New Generation of Community Education and Training Programmes after 2006*. Retrieved from Communication from the Commission the New Generation of Community Education and Training Programmes after 2006: <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2004:0156:FIN:EN:PDF>
- Didkivska, S. (2024). To-date approaches to the quality of educational services with the use of distance learning. In S. Didkivska, *An Enhancement of University Educational Services with the Use of Distance Learning: Polish and Ukrainian Perspectives*. PHD (pp. 1-164). Krakow: Krakow University of Economics. Retrieved from <https://bip.uek.krakow.pl/attachments/7302/download>
- Didkivska, S., Paliwoda-Pękosz, G., & Valaliuk, T. (n.d.). Dataset of quality analysis for a proposition of a framework for shaping the quality of university distance learning in Ukraine and Poland. 2026. Zenodo. doi:10.5281/zenodo.18338485
- Dziewulak, D. (2012). Kształcenie na odległość w wybranych państwach europejskich. *Analizy BAS*, 18, 1-11.
- Favale, T., Soro, F., Trevisan, M., Drago, I., & Mellia, M. (2020). Campus Traffic and e-Learning During COVID-19 Pandemic. *Computer Network*, 176, 1-9.

- Ferreira, F., do Couto, L., de Melo Baptista Domingues, G., & Saporetti, C. (2025). Development of a framework using deep learning for the identification and classification of engagement levels in distance learning students. *Social Network Analysis and Mining*, 37. doi:10.1007/s13278-025-01408-z
- Finley, A. (2021). *How College Contributes" to" Workforce Success: Employer Views on What Matters Most*. Washington: Association of American Colleges and Universities. Retrieved from <https://files.eric.ed.gov/fulltext/ED616977.pdf>
- Genta, C., Favaro, S., Sonetti, G., Fracastoro, G., & Lombardi, P. (2022). Quantitative assessment of environmental impacts at the urban scale: the ecological footprint of a university campus. *Environment, Development and Sustainability*, 5826–5845. doi:<https://doi.org/10.1007/s10668-021-01686-5>
- Hawthorne, S. (2020). *Impact of Internet Connection on Gifted Students' Perceptions of Course Quality at an Online High School*. Boise: Boise State University.
- ISO. (2017). ISO/IEC 40180:2017. *Information technology — Quality for learning, education, and training — Fundamentals and reference framework*. Geneva: International Organisation for Standardization (ISO).
- ISO. (2018). ISO 21001:2018 2018. *Educational organisations — Management systems for educational organisations -Requirements with guidance for use*. International Organisation for Standardization (ISO).
- ISO. (2021). ISO 29994. *Education and learning services — Requirements for distance learning*. Geneva: ISO copyright office.
- ISO. (2024). ISO/TR 29996:2024(en). *Education and learning services — Distance and digital learning services (DDLs) — Case studies*. ISO copyright office.
- Kucharska, A., & Rostek, K. (2021). COVID-19 and Technological Maturity of HEIs in Poland. *Social Science Computer Review*, 41(1), 27-43. doi:<https://doi.org/10.1177/08944393211032199>
- Kumi-Yeboah, A., Kim, Y., Mohammed, Z., & Amponsah, S. (2025). Addressing the role of technology in internationalisation at a distance: Voices of students' in international distance learning from Ghana—sub-Saharan Africa. *British Journal of Educational Technology*. doi:10.1111/bjet.13552
- Lorenzo, G., & Moore, J. (2002). *The Sloan Consortium Report to the Nation: Five Pillars of Quality Online Education*. Retrieved 08 14, 2020, from <http://www.edtechpolicy.org/ArchivedWebsites/Articles/FivePillarsOnlineEducation.pdf>

- Łaszczyk, J. (2020). Edukacja zdalna- szansa czy konieczność? *Nauczanie po pandemii. Nowe pytania czy nowe odpowiedzi na stare pytania?*, 65-73.
- Ma, P., & Wang, C. (2023). Research on the Construction of Information System Stability Guarantee Capability. *2023 IEEE 22nd International Conference on Trust, Security and Privacy in Computing and Communications (TrustCom)*, 2087-2091. doi:10.1109/TrustCom60117.2023.00289.
- Manzoor, B., Othman, I., Gardezi, S., Altan, H., & Abdalla, S. (2021). BIM-based research framework for sustainable building projects: a strategy for mitigating BIM implementation barriers. *Applied Sciences*, 11(12), p. 5397. doi:10.3390/app11125397
- Markova, T., Glazkova, I., & Zaborova, E. (2017). Quality issues of online distance learning. *Procedia-Social and Behavioral Sciences*, 237, 685-691.
- Masoumi, D., & Lindström, B. (2012). Quality in E-learning: A Framework for Promoting and Assuring Quality in Virtual Institutions. *Journal of Computer Assisted Learning*, 28(1), 27-41.
- Maynard do Lago, M., Fernandes, E., & Rampersad, R. (2025). Education 4.0. Leadership and creation of collaborative environments in private higher education institutions in times of crisis. *Revista de Educación*, 409(9), pp. 96-108. doi:doi.org/10.61586/C4338
- Meikleham, A., & Hugo, R. (2020). Understanding informal feedback to improve online course design. *European Journal of Engineering Education*, 45(1), 4-21.
- Ministerstwo Łączności. (2001, 6 14). *ePolska Plan działań na rzecz rozwoju społeczeństwa informacyjnego w Polsce na lata 2001 - 2006*. Retrieved from Strategie rozwoju społeczeństwa informacyjnego w Polsce: <https://historiainformatyki.pl/dokument.php?nrar=15&nrzesp=1&sygn=XV/1/3&handle=1593>
- Ministerstwo Nauki i Szkolnictwa Wyższego. (2005, 9 1). *Ustawa z dnia 27 lipca 2005 r. Prawo o szkolnictwie wyższym*. Retrieved from Internetowy System Aktów Prawnych: <https://isap.sejm.gov.pl/isap.nsf/DocDetails.xsp?id=wdu20051641365>
- Ministerstwo Nauki i Szkolnictwa Wyższego. (2007, 9 25). *Warunki, jakie muszą być spełnione, aby zajęcia dydaktyczne na studiach mogły być prowadzone z wykorzystaniem metod i technik kształcenia na odległość*. Retrieved from Akty Prawne: <https://www.prawo.pl/akty/dz-u-2007-188-1347,17383529.html>
- Moloi, K., Lebelo, R., Isabirye, A., & Molo, M. (2024). Students' Challenges in an E-learning Setting at a University of Technology in South Africa. *Revista de Educación*, 405(8), pp. 54-81. doi:10.59671/Mc4rf

- Nenko, Y., Kybalna, N., & Snisarenko, Y. (2020). The COVID-19 Distance Learning: Insight from Ukrainian students. *Revista Brasileira de Educação do Campo*, 5, 15-17.
- Osova, O., Vakaluik, T., Panchenko, V., Didkivska, S., & Kontsedailo, V. (2021). International Conference on New Trends in Languages, Literature and Social Communications (ICNTLLSC 2021). *Formation of Future Foreign Language Teachers' Linguistic and Methodological Competency Using Digital Technologies*, (pp. 282-290).
- Paliwoda-Pękosz, G., Stal, J., & Wojtowicz, L. (2015). Proceedings of 9th European Conference on IS Management and Evaluation (ECIME). *Application of ICT Tools in Enhancing Education in Information Society*, (pp. 160-169).
- Pogorilyj, V., Dudikova, L., Yakymenko, O., Poyda, S., & Koval, B. (2020). Improvement of Learning Outcomes in Educational Process of Interns-Pharmacists using Distance Learning Elements. *Information Technologies and Learning Tools*, 72(2), 236-249.
- President of Ukraine. (2007, 1 9). *The Law of Ukraine on the Basic Principles of Information Society Development in Ukraine for 2007-2015*. Retrieved from Verkhovna Rada of Ukraine. Legislation of Ukraine.: <https://zakon.rada.gov.ua/laws/show/537-16#Text>
- President of Ukraine. (2013, 6 25). *Decree of the President of Ukraine on the National Strategy for the Development of Education in Ukraine for the period until 2021*. Retrieved from Верховна Рада України. Законодавство України.: <https://zakon.rada.gov.ua/laws/show/344/2013#Text>
- Publications Office of the European Union. (1992, 7 29). *Treaty of Maastricht on European Union*. Retrieved from Summary of EU legislation: <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=LEGISSUM:xy0026>
- Sammarro, M. (2022). Digital Competence for Citizenship: Distance Learning Before and During the Covid-19 Emergency. *INTERNATIONAL SYMPOSIUM: New Metropolitan Perspectives*, 887-895.
- Savchuk, S. (2024). Challenges and prospects for the formation of state policy in the field of cybersecurity and combating cybercrime. *Public Policy and Accounting*, pp. 30-38. doi:10.26642/ppa-2024-1(9)-30-38
- Senat UEK. (2009, 5 25). *Uchwała nr 14/2009*. Retrieved from Biuletyn Informacji Publicznej. Uniwersytet Ekonomiczny w Krakowie: <https://bip.uek.krakow.pl/uchwala/1937/uchwala-nr-14-2009>
- Stal, J., & Paliwoda-Pękosz, G. (2019). Fostering Development of Soft Skills in ICT Curricula: A Case of a Transition Economy. *Information Technology for Development*, 25(2), 250-274.

- Stefanovic, M., Tadic, D., Arsovski, S., Arsovski, Z., & Aleksic, A. (2010). A Fuzzy Multicriteria Method for E-learning Quality Evaluation. *International Journal of Engineering Education*, pp. 1200–1209.
- Stracke, M. (2019). Quality Frameworks and Learning Design for Open Education. *The International Review of Research in Open and Distributed Learning*, 20(2). doi:10.19173/irrodl.v20i2.4213
- The Security Service of Ukraine. (2024, 20 12). *SSU Cyber Security Department: russian intelligence services are involved in cyberattack on state registers of Ukraine's Ministry of Justice*. Retrieved from Security Service of Ukraine: <https://ssu.gov.ua/en/novyny/do-kiberataky-na-derzhavni-reiestry-miniustu-prychetni-rosiiski-spetssluzhby-departament-kiberbezpeky-sbu>
- Vakaliuk, T., Spirin, O., & Kontsedailo, V. (2021). Criteria for selecting open web-oriented technologies for teaching the basics of programming to future software engineers. *Educational Technology Quarterly*, pp. 73–86. doi:10.55056/etq.16
- Vynoslavskaya, O., Kononets, M., & Mazurek, E. (2024). New Media Pedagogy: Research Trends, Methodological Challenges, and Successful Implementations. *Emergency Remote Teaching During the Crisis Situations. Comparative Perspective of Ukraine and Poland*. 2130, pp. 235–253. Springer. doi:10.1007/978-3-031-63235-8_16
- Yu, X., Sheng, Y., & Zhang, L. (2023). 2023 Asia-Europe Conference on Electronics, Data Processing and Informatics (ACEDPI). *Teaching Management System Based on. NET and Mobile Communication Technology* (pp. 380–384). IEEE.
- Житомирська політехніка. (2022, 05 23). *Новини Житомирської політехніки*. Retrieved from День Європи: онлайн-зустріч «Дружня підтримка країн Європи та нові можливості для студентів України під час війни»: <https://news.ztu.edu.ua/2022/05/den-yevropy-onlajn-zustrich-druzhnya-pidtrymka-krayin-yevropy-ta-novi-mozhlyvosti-dlya-studentiv-ukrayiny-pid-chas-vijny/>
- Житомирська політехніка. (2023, 9 21). *Психологічна підтримка для здобувачів освіти та викладачів Житомирської політехніки*. Retrieved from Психологічна підтримка для здобувачів освіти та викладачів Житомирської політехніки: <https://news.ztu.edu.ua/2023/09/psychologichna-pidtrymka-dlya-zdobuvachiv-osvity-ta-vykladachiv-zhytomyrskoyi-politehniky/>
- Комітет Верховної Ради України. (2023, 12 29). *Верховна Рада України online Офіційний вебпортал парламенту України*. Retrieved from Інформація про роботу Комітету Верховної Ради України з питань освіти, науки та інновацій за 2023 рік: https://kno.rada.gov.ua/documents/doc_arch/76298.html

Прес-служба Апарату Верховної Ради України. (2023, 12 28). *Верхована Рада Україна online* Офіційний вебпортал парламенту України. Retrieved from Новини комітетів: https://www.rada.gov.ua/news/news_kom/245282.html

Appendix

1. Guided questions for the semi-structured interviews

Academic Staff

What do you think about DL that was conducted at the university?

How do you imagine high-quality DL?

In your opinion, what are the hindrances of DL?

Have you encountered any unethical behaviours among students during DL?

What will be the future of DL?

What kind of stakeholders do you see in DL?

Students

What do you think about DL at the university?

How do you imagine good quality DL?

What kind of stakeholders do you see in DL?

Have you encountered unethical behaviour of students during DL?

E-Learning Department staff

What do you think about DL that was conducted at the university?

What should high-quality DL look like? What does this quality depend on?

How did the academic staff cope with DL?

What kind of stakeholders do you see in DL?

What will be the future of DL in education?

IT Department staff

What do you think about DL that was conducted at the university?

What technical and organisational challenges have the institution faced in implementing DL?

What new solutions have been developed in relation to DL?

What are the most common problems that lecturers have approached you with seeking assistance?

What could be done today to improve the quality of DL?

Employers

Have you had any experience with graduates from KUE / ZP who studied remotely?

Do you see any differences between them and the graduates from previous years (in terms of knowledge and skills level)?

Can DL be an optimal form of employee training? Yes/No - why?

In your opinion, what should be the future scope of utilising DL?

2. DL Quality parameters

Parameter numbers:

1. *Autonomy Possibility with Academic Support for Student's*
2. *Equivalence of Educational Outcomes*
3. *Ecological Impact*

4. *Effective Knowledge Gain and Control*
5. *Schedule Effectiveness and Flexibility*
6. *Engagement and Focus from Academic Staff and Students*
7. *Personal Data Protection*
8. *QC Methods for Educational Software*
9. *Materials and Methods Relevant to Modern Times*
10. *Official University Regulations for DL*
11. *Optimal Cognitive Load (based on Organizational Effectiveness and Flexibility)*
12. *Pre-sorting of Students into Groups According to their Level of Knowledge*
13. *Feedback Need for Quality Control*
14. *Psychological and Academic Preparedness*
15. *Student-Lecturer Common Vision for Effective Learning Environment*
16. *Technological and Organisational Infrastructure*
17. *High Quality of Computer Telecommunications Supply*

3. Expert questionnaire

General Information: City / Name of your university / Position / Years of experience in the stated position.

Parameters ranking: Rank the following parameters affecting the quality of DL important (1 – the most important, 17 – the least important) (see Appendix 2).

Parameters evaluation: Rate the importance of each of the parameters in assuring the quality of DL (Likert scale: 1-not important, 5- extremely important).

What other indicators, apart from those mentioned, should be included in a general model for assessing the quality of DL? (optional)

4. Ranking of DL quality indicators by Ukrainian and Polish experts.

Res.\par.*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	7	3	1	14	6	10	16	11	15	4	9	2	12	5	8	13	17
2	6	1	2	11	7	9	17	12	16	5	10	3	13	4	8	14	15
3	8	2	3	12	4	9	17	10	13	6	11	1	14	5	7	15	16
4	7	3	1	11	5	10	17	12	16	4	8	2	13	6	9	14	15
5	7	4	3	13	6	16	15	9	17	2	11	1	14	5	10	12	8
6	9	3	1	12	5	8	15	10	17	4	2	11	13	6	7	14	16
7	10	4	1	11	6	17	2	12	16	9	3	7	8	5	14	13	15
8	9	3	2	11	7	6	14	10	15	5	13	1	16	4	8	17	12
9	8	3	2	10	15	6	16	11	7	4	12	1	13	5	9	14	17
10	11	4	1	9	5	6	14	12	16	3	10	2	15	7	8	17	13
11	10	1	2	11	4	5	12	13	17	6	9	3	14	8	7	15	16
12	12	3	1	9	5	4	17	11	16	7	10	2	13	6	8	14	15
13	11	4	3	1	8	10	15	12	16	5	9	2	14	7	6	13	17
14	13	3	10	16	4	8	2	9	17	6	11	1	12	5	7	14	15

15	12	4	1	17	3	5	13	14	15	10	11	2	6	7	8	9	16
S**	140	45	34	168	90	129	202	168	229	80	139	41	190	85	124	208	223
d***	5	-90	-101	33	-45	-6	67	33	94	-55	4	-94	55	-50	-11	73	88

Table 1A Ukrainian experts.

Res. \ par.*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	16	6	17	5	7	4	15	8	3	13	9	14	11	10	12	2	1
2	15	8	17	3	6	7	9	14	2	10	5	13	4	11	12	1	16
3	3	6	16	5	12	1	17	14	2	13	7	10	4	9	15	8	11
4	16	8	15	4	1	17	3	6	2	12	10	14	7	11	13	5	9
5	7	14	17	5	6	1	9	12	2	11	4	15	13	3	8	10	16
6	15	10	14	4	5	9	8	6	3	1	11	13	7	17	12	2	16
7	15	9	17	2	3	6	8	5	1	12	10	14	7	11	13	4	16
8	10	6	12	3	4	2	16	17	1	9	7	14	5	15	13	8	11
9	15	8	14	3	1	17	7	5	2	11	9	13	6	10	12	4	16
10	8	6	17	3	7	4	15	13	5	2	11	16	10	9	1	12	14
11	6	13	17	11	9	1	16	15	2	10	3	12	4	8	7	5	14
12	15	8	14	2	3	17	7	5	1	11	9	13	6	10	12	4	16
13	2	10	17	5	7	15	16	12	6	11	3	13	9	4	14	1	8
14	11	1	17	6	5	3	16	14	4	12	8	15	9	10	13	2	7
15	13	6	17	2	4	8	14	10	1	9	7	16	5	11	12	3	15
S**	167	119	238	63	80	112	176	156	37	147	113	205	107	149	169	71	186
d***	32	-16	103	-72	-55	-23	41	21	-98	12	-22	70	-28	14	34	-64	51

Table 2A Polish experts.

Note: due to alphabetical order in ranking system, that originally differed in Polish and Ukrainian version numbers of parameters were unified during translation to English

**S - total sum of ranks for each item across all 15 experts

***d - deviation from the mean total rank for each item