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Perception of Distance Learning: Results of Surveys of Students and Faculty

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Abstract

The study aims to evaluate the impact of distance learning on the quality of higher education from the perspectives of students and faculty, focusing on satisfaction, academic performance, and perceptions of digital education. To achieve this, quantitative data were collected through two online surveys of students and faculty from 25 universities across Kazakhstan. Statistical methods, including the Mann–Whitney U Test, ANOVA, Correlation Analysis, Chi-Square Test, and Descriptive Statistics, were applied to test nine hypotheses. The results revealed that graduate students generally perceive distance learning more positively than undergraduates, while both groups identified technical difficulties and reduced personal interaction as the main barriers. A moderate positive correlation was found between student satisfaction and academic performance, indicating that interactive and well-structured online environments enhance learning outcomes. Faculty members reported increased stress and workload, highlighting the need for better institutional support and digital infrastructure. The novelty of this study lies in its comprehensive comparative assessment of both students' and teachers' experiences in the context of Kazakhstan's higher education system, offering valuable practical recommendations for improving hybrid and online learning models and ensuring their long-term effectiveness in post-pandemic conditions.

Keywords:

Distance Learning; Student Satisfaction; Academic Performance; Faculty Perception; Digital Technologies; Online Education; Higher Education.

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1- Introduction

Modern digital technologies have profoundly transformed higher education by reshaping teaching methods, assessment systems, and communication between students and instructors. The COVID-19 pandemic accelerated this transformation, forcing universities worldwide to adopt distance and hybrid learning formats on an unprecedented scale. According to UNESCO, more than 1.5 billion learners were affected by school and university closures in 2020, which intensified the need for reliable digital platforms and pedagogical innovations in higher education.

Existing research provides extensive insights into the advantages and limitations of online learning. Many studies highlight its flexibility, accessibility, and cost-effectiveness. However, scholars also point out serious challenges, including reduced student motivation, lack of social interaction, and difficulties in maintaining engagement and academic integrity. Although prior work examined the psychological and organizational aspects of e-learning, there remains limited empirical evidence on how students and faculty perceive the quality of distance education in developing countries with uneven digital infrastructure – particularly in Central Asia.

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Furthermore, previous studies tend to focus either on students' experiences or on teachers' readiness for digital education, rarely combining both perspectives in a single analytical framework. This creates a research gap concerning the integrated assessment of distance learning effectiveness from multiple stakeholders' viewpoints. The present study seeks to fill this gap by providing a comprehensive quantitative evaluation of the perceptions of both students and faculty in Kazakhstan's higher-education system – a region where digital transformation has accelerated but empirical studies remain scarce.

Accordingly, the main objectives of this research are: (1) to analyze students' and faculty's satisfaction with distance learning; (2) to examine the relationship between satisfaction, academic performance, and the use of digital tools; and (3) to identify barriers that hinder effective online education. The study also explores the extent to which hybrid formats can address current limitations of purely online teaching.

The rest of the article is organized as follows. Section 2 reviews the relevant literature and formulates the research hypotheses. Section 3 describes the data collection process and methodological framework. Section 4 presents and interprets the empirical results. Section 5 discusses these findings considering prior studies, and Section 6 concludes with policy implications and directions for future research.

2- Literature Review

The rapid development of digital education has led to significant changes in teaching and learning practices within higher education institutions. The shift to online and blended learning formats, accelerated by the COVID-19 pandemic, has brought new opportunities but also created significant challenges for students and faculty. This literature review covers key topics in the field, including student satisfaction, academic performance, barriers to effective distance learning, faculty perceptions, stressors, and the role of innovative technologies. Student satisfaction is a crucial factor in the success of distance learning. Lau et al. (2021) found that parental satisfaction during their children's online learning was highly dependent on their level of autonomy, highlighting the importance of self-regulation [1]. Similarly, Dabbagh & Kitsantas (2012) noted that self-regulation ability plays a key role in bridging formal and informal learning [2]. These findings are consistent with the findings of Wong et al. (2018), who identified self-regulation as one of the key success factors in online courses [3]. This suggests that students with high self-regulation skills are more likely to succeed in a digital learning environment.

Higher educational attainment also has an impact on student satisfaction. Garrison & Kanuka (2004) noted that master's and doctoral students were more likely to rate online learning more positively, which may be due to their advanced academic skills, greater experience with independent study, and higher intrinsic motivation [4]. Bernard et al. (2009) conducted a meta-analysis that confirmed the importance of interaction and engagement in achieving positive learning outcomes in online learning, emphasizing the need for meaningful communication and active student participation [5].

Despite its benefits, online learning faces significant challenges. Garrison & Cleveland-Innes (2005) noted that interaction alone is not sufficient for deep learning in online courses, emphasizing the importance of cognitive presence and meaningful student participation. They argue that simply accessing content does not ensure effective learning if students do not feel intellectually connected to the course [6]. Allen & Seaman (2016) identified technical difficulties, lack of motivation, and limited student support as key barriers to successful online learning [7]. These issues are particularly relevant in the context of rapid digital transition, where both students and faculty may struggle to adapt to new technologies and teaching methods [8-10]. Recent research further emphasizes that classroom interaction mediates the relationship between students' perceived learning and satisfaction with online courses [11], suggesting that fostering interaction remains essential even in virtual contexts.

Faculty attitudes towards online learning also play a key role in the success of digital education. Baran et al. (2011) noted that faculty readiness for online teaching is a critical factor in the effectiveness of distance learning. This includes not only technical skills but also the ability to engage meaningfully with students and provide timely feedback [12]. Al-Fraihat et al. (2020) also noted that successful digital learning depends on the integration of appropriate technologies and the ability to adapt teaching methods to online formats [13]. This finding aligns with the results of Shea et al. (2006), who emphasized the significance of faculty presence in fully online and blended courses, underscoring the need for ongoing professional development and support for faculty [14, 15]. The use of innovative technologies is closely related to the effectiveness of distance education. Vaughan (2014) and Graham (2013) noted that blended learning can significantly improve student engagement and academic performance by combining the best elements of traditional and online learning [16, 17]. This approach enables greater flexibility and personalization, resulting in increased student satisfaction and improved educational outcomes. Shea et al. (2006) also emphasized that integrating innovative tools, such as virtual labs, interactive simulations, and AI-based platforms, can significantly enhance the quality of online education [14]. In addition, the study by Slijepcevic & Huang (2025) demonstrated that faculty who engaged in structured online course design training achieved significantly higher learning outcomes and student evaluations [18].

More recent studies continue to explore faculty perspectives in the post-pandemic era. For instance, Ahmed et al. (2023) found that instructors' satisfaction and readiness for online teaching remain highly dependent on institutional digital support and the quality of professional development programs [19]. Similarly, a study by Yan et al. (2025)

confirmed that teacher satisfaction in online teaching is shaped by motivational and hygiene factors, aligning with Herzberg's two-factor model [20].

The transition to online teaching has also increased stress levels among faculty. Watermeyer et al. (2021) reported that the digital transformation caused by the COVID-19 pandemic has resulted in increased workload and stress for many faculty, highlighting the need for institutional support, professional development, and mental health resources [21]. This confirms the importance of creating a supportive work environment for faculty, as their well-being has a direct impact on the quality of teaching and student learning outcomes. This is consistent with evidence from Cabrera et al. (2024), which reported that educators' emotional resilience and digital competence are key predictors of satisfaction with online instruction [22].

Ultimately, assessment methods play a crucial role in determining student satisfaction and trust in online education. Gikandi et al. (2011) emphasized the importance of transparent and fair assessment methods in building student trust and supporting their academic achievement. They argue that clear assessment criteria, timely feedback, and opportunities for self-assessment are essential to maintaining student motivation and engagement in the digital learning environment [23].

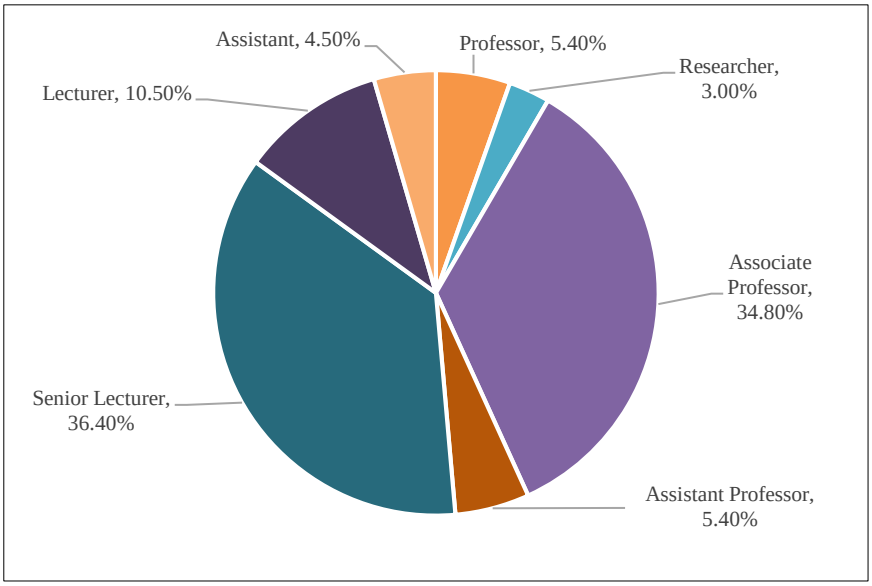
Despite the significant amount of research on distance learning, several questions remain that require further exploration. In particular, more data is needed on the impact of educational level and professional experience on the acceptance of digital technologies, as well as on the long-term effects of distance learning on students' academic achievement and motivation. Furthermore, additional research is required to investigate the impact of cultural and social factors on the effectiveness of online education, as well as the role of hybrid formats in the post-pandemic educational landscape. Together, these studies offer a comprehensive understanding of the challenges and opportunities in distance education, underscoring the need for continued research and innovation in this rapidly evolving field.

3- Material and Methods

The data for this study were collected through two separate online surveys conducted among faculty and students. The survey covered students and faculty from 25 leading universities from all regions of Kazakhstan. The selection of universities was based on a purposive sampling strategy to ensure representation of different types of higher education institutions across Kazakhstan, including public, private, and regional universities. The sample included institutions with active experience in implementing distance and blended learning formats during and after the COVID-19 pandemic. Participation in the survey was voluntary, and invitations were distributed through official university mailing lists and faculty networks. No randomization was applied at the institutional level, as the goal was to capture diverse experiences rather than achieve strict proportional representativeness.

For the faculty survey, approximately 500 invitations were sent, and 327 valid responses were received after data cleaning, resulting in a response rate of about 65%. For the student survey, around 800 invitations were distributed, yielding 546 valid responses, corresponding to a response rate of nearly 68%. Duplicate and incomplete submissions were excluded before analysis. This relatively high participation rate reflects strong engagement from both groups and contributes to the reliability and robustness of the dataset.

The faculty survey included questions regarding the use of distance learning technologies, perceptions of the advantages and disadvantages of such technologies, and overall satisfaction with the quality of online teaching. In total, the responses of 327 respondents representing various positions such as assistants, associate professors, senior lecturers, and professors with different lengths of service were analyzed in the faculty survey after data cleaning (Figure 1).



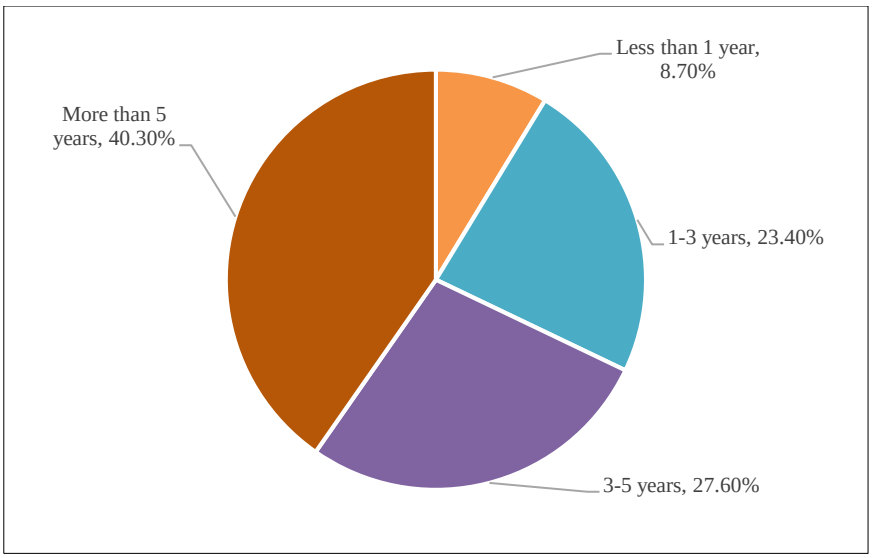


Figure 1. Distribution of positions and work experience of faculty

The student survey aimed to collect information about their experience with distance learning, assess the quality of online and offline lectures, and gather preferences for hybrid learning formats. In total, the student survey, after data cleaning, analyzed the responses of 546 respondents, including undergraduate, graduate, and doctoral students studying in various courses and programs at leading universities in Kazakhstan (Figure 2).

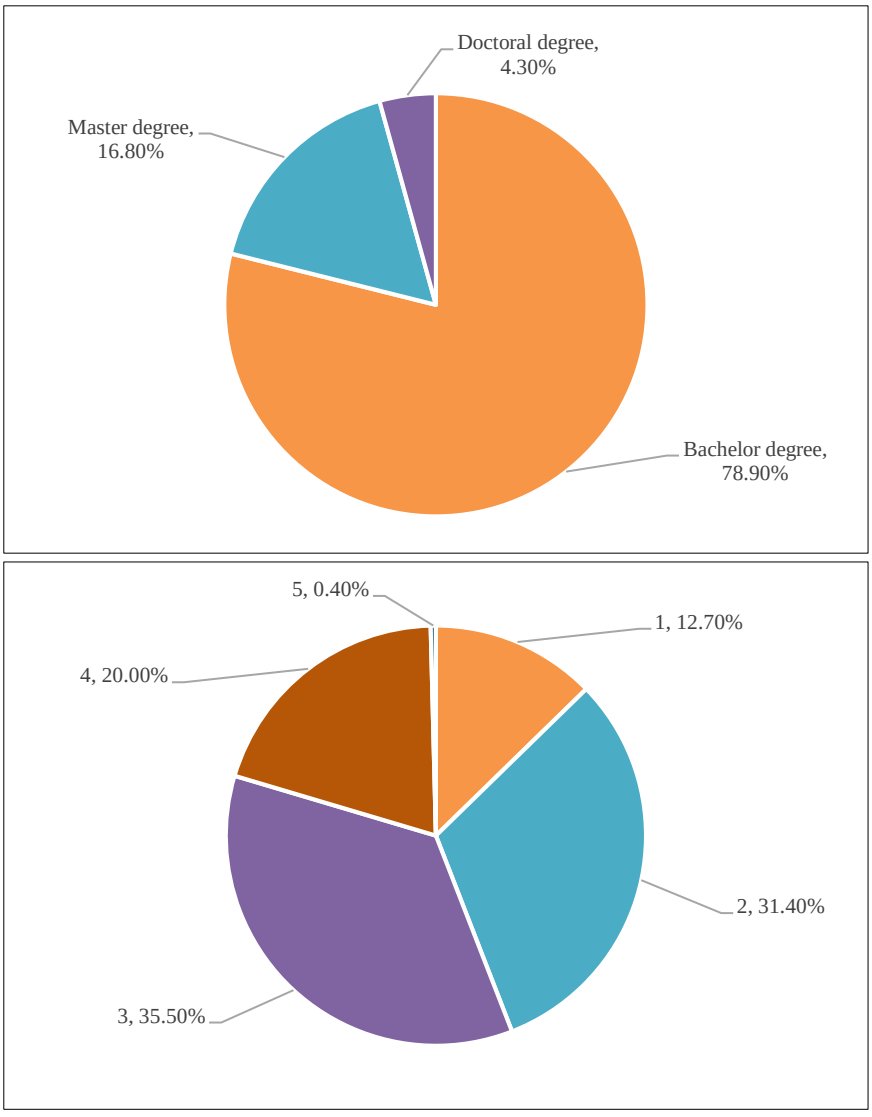


Figure 2. Distribution of students' level of education and course of study

To assess the impact of distance learning technologies on the quality of the educational process and students' academic performance, as well as to identify the primary barriers to distance learning for teachers and students, the following hypotheses were formulated.

H1: There is a significant difference in the perception of the quality of online and offline lectures between undergraduate and graduate students.

H2: Students with a higher level of education (Master's, Doctorate) are more likely to have a positive perception of distance learning compared to undergraduate students.

H3: Technical problems and lack of personal interaction are the main barriers to effective distance learning.

H4: There is a significant relationship between student satisfaction and academic performance in distance learning.

H5: Teachers positively assess the impact of distance learning despite technical and communication barriers.

H6: Teachers with more experience are less likely to use innovative technologies in distance learning.

H7: Students prefer hybrid learning formats.

H8: Distance learning causes higher levels of stress among teachers.

H9: Students' trust in online assessments is positively correlated with their evaluation of the quality of online lectures.

The following statistical methods were used to test the research hypotheses:

- Mann-Whitney U Test: used to test differences between two independent groups when the data do not meet the requirements of normal distribution (used for H1).
- ANOVA and t-test: used to assess differences between multiple groups or pairwise comparison of means (used for H2).
- Descriptive Analysis: helps identify key barriers to distance learning, such as technical problems and lack of face-to-face interaction (used for H3).
- Correlation Analysis: used to assess the strength and direction of the relationship between two quantitative variables, such as satisfaction with distance learning and academic performance (used for H4 and H9).
- Frequency Distribution Analysis: used to assess the opinions of teachers and students on various aspects of distance learning (used for H5 and H7).
- Chi-square test: used to test the relationship between categorical variables such as length of service and the use of innovative technologies (used for H6).
- Mean Comparison Test: used to assess differences in stress levels between teachers working online and offline (used for H8).

Each of these methods was chosen based on the nature of the hypothesis and the level of measurement of variables, which allows for the most accurate and correct assessment of the stated research assumptions. Statistical analysis was conducted using Python with packages SciPy, Pandas, and StatsModels to ensure precision and reproducibility of results. Thus, the flowchart illustrates the research process used in this study (Figure 3). The process consisted of five main stages. The study followed a quantitative, survey-based methodology combining data collection, statistical analysis, and interpretation.

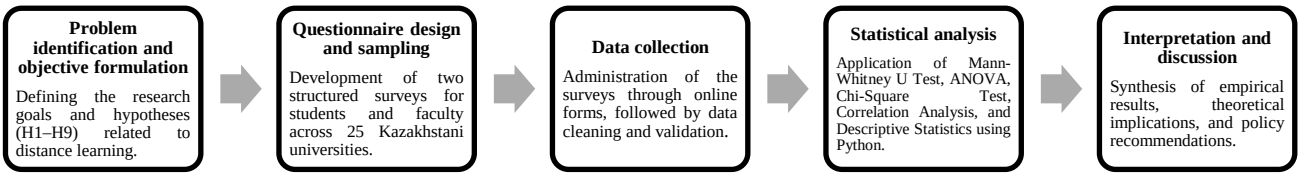


Figure 3. Research Methodology Framework

4- Results

To test the hypothesis H1 about the difference in the perception of the quality of online and offline lectures between undergraduate and graduate/doctoral students, the Mann-Whitney Test was used (Table 1, Figure 4).

Table 1. Result of the Mann-Whitney Test

Lecture type	U-statistic	p-value
Online	5298.0	6622.0
Offline	0.0193	0.5001

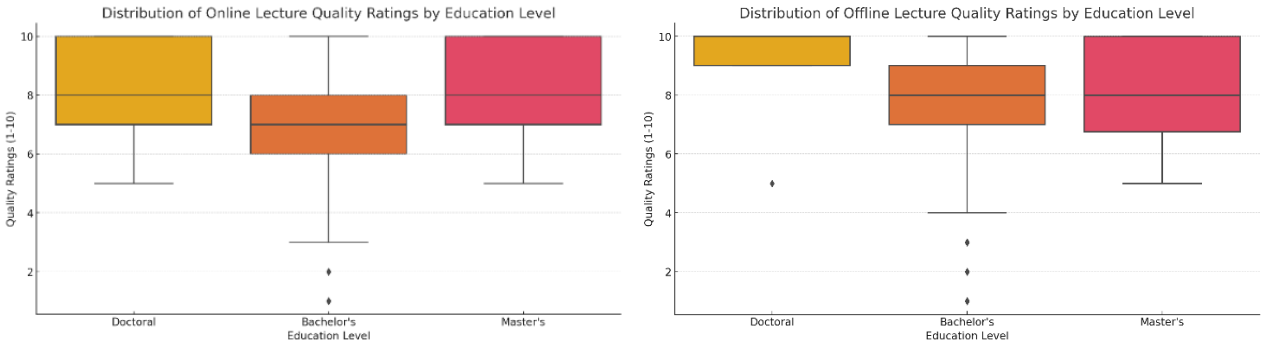


Figure 4. Distribution of quality assessments of online and offline lectures by level of education

The test results revealed a statistically significant difference in the perception of online lecture quality between undergraduate and graduate students ($p < 0.05$). This confirms the hypothesis that students with a higher level of education rate the quality of online lectures higher. This may be due to the higher level of independence and academic expectations of graduate students, who are better adapted to online learning formats. At the same time, the analysis of offline lecture assessments did not reveal significant differences between undergraduate and graduate students ($p > 0.05$), indicating a similar perception of the quality of traditional education. Thus, hypothesis H1 is partially accepted, and it can be concluded that the perception of lecture quality varies depending on the educational format and the level of academic preparation of students, which should be taken into account when developing educational programs and implementing new online teaching methods.

Analysis of variance (ANOVA) and t-tests were used to test hypothesis H2, concerning the influence of the level of education on the perception of distance learning. Students' responses to the question "How do you assess the overall impact of distance learning technologies on the quality of education?" were coded as follows:

- "Very positive" – 5;
- "Rather positive" – 4;
- "Neutral" – 3;
- "Rather negative" – 2;
- "Very negative" – 1.

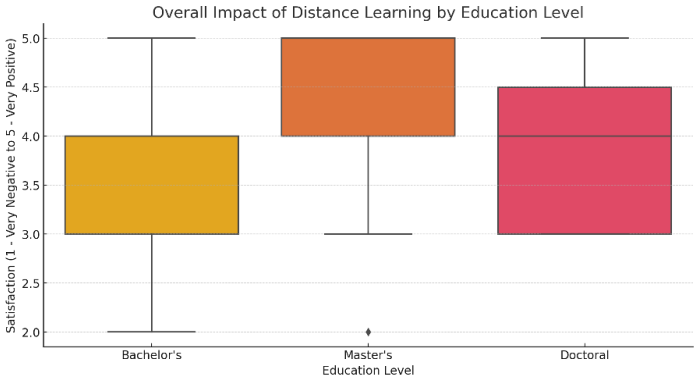


Figure 5. Distribution of quality assessments of online and offline lectures by level of education

The results of the one-way analysis of variance (ANOVA) revealed statistically significant differences in the assessments of the impact of distance learning on the quality of education among undergraduate, graduate, and doctoral students ($F = 11.40$; $p < 0.001$) (Figure 5). This confirms Hypothesis H2, which posits that students with a higher level of education, such as those holding master's and doctoral degrees, tend to assess the impact of distance learning more positively.

However, the results of paired t-tests showed that a significant difference was observed only between undergraduate and graduate students. In contrast, the differences between graduate and doctoral students, as well as between undergraduate and doctoral students, are not statistically significant (Table 2).

Table 2. Results of paired t-tests

Group	t-statistic	p-value
Bachelor-master	-5.75	0.001
Master-doctoral	1.75	0.118
Bachelor-doctoral	-0.59	0.578

These results suggest that the primary improvement in the perception of distance learning occurs during the transition from undergraduate to graduate studies. In contrast, a further increase in academic level, to doctoral studies, does not lead to significant changes in the perception of distance learning. Thus, hypothesis H2 that students with a higher level of education perceive distance learning more positively is confirmed for graduate students compared to undergraduate students. However, no significant differences were found between graduate and doctoral students, which may indicate similar expectations and academic requirements at these levels of preparation.

To determine the main barriers to distance learning (hypothesis H3), a descriptive analysis of the answers to the question "What disadvantages or problems have you encountered when using distance learning technologies?" was conducted. Respondents in both groups could select multiple answers (Table 3).

Table 3. Most frequently mentioned barriers to distance learning by students and teachers

Barriers to distance learning for students	Number of responses	Barriers to distance learning for teachers	Number of responses
Technical issues (problems with internet connection, software)	359	Technical problems (problems with internet connection, software, etc.)	266
Limited ability to interact with teachers and classmates due to the remote format.	257	Lack of personal contact and interaction with students	161
Lack of motivation due to lack of physical presence in classes	189	Difficulties in organizing group work and discussions	106
Lack of clarity and explanation of the material by teachers in the online format	170	Problems with motivating students	69
Feeling of isolation and lack of communication with classmates as a result of distance learning	117	Difficulties in assessing and monitoring knowledge	58

The results of the analysis of the main barriers to distance learning, identified based on survey data from students and teachers, show that technical problems and a lack of face-to-face interaction are the most frequently mentioned barriers. These factors were highlighted as key barriers by both groups of respondents, which confirms hypothesis H3. Technical problems include unstable internet connections, poor-quality equipment, and difficulties using various online learning platforms. This is especially important for students who require constant access to educational resources and interactive materials. A lack of face-to-face interaction was also noted as a significant barrier, especially among teachers, who face difficulties in maintaining active interaction with students, motivating them, and monitoring progress in the online format.

In addition, students identified barriers such as insufficient clarity of explanations and a lack of physical contact, which can reduce the quality of material assimilation and engagement in the learning process. Teachers, in turn, also noted difficulties in organizing group work and discussions, as well as problems with student motivation. Thus, hypothesis H3 is confirmed: technical problems and lack of personal interaction are indeed the main obstacles to effective distance learning, both among students and teachers. These results highlight the need to improve technical support, develop more interactive learning materials and enhance online communication opportunities to minimize the impact of these factors.

To test the hypothesis about the relationship between student satisfaction and academic performance in distance learning, correlation analysis was used. The Pearson correlation coefficient was calculated between the answers to the questions “How do you assess the overall impact of distance learning technologies on the quality of education?” and “Evaluate the impact of distance learning on your academic performance.” The answers to both questions were coded on a 5-point scale (Table 4).

Table 4. Coding of answers to questions about satisfaction with distance learning and academic performance

Answer to the question "How do you assess the overall impact of distance learning technologies on the quality of education?"	Answer to the question "Rate the impact of distance learning on your academic performance"	Scale
Very positive	My academic performance has improved significantly	5
Rather positive	My academic performance has improved	4
Neutral	I can't say exactly how my academic performance has changed	3
Rather negative	I have not had a significant change in my academic performance	2
Strongly negative	My academic performance has worsened	1

The Pearson correlation coefficient between students' satisfaction with distance learning and their academic performance is 0.33 (p-value = 0.00001). The positive value of the correlation coefficient (0.33) indicates a moderate positive relationship between satisfaction with distance learning and students' academic performance. Since the p-value is significantly less than the significance level ($p < 0.05$), this relationship is statistically significant, which confirms hypothesis H4 (Figure 6). This means that students who assess the impact of distance learning on the quality of education as more positive also report higher academic performance on average.

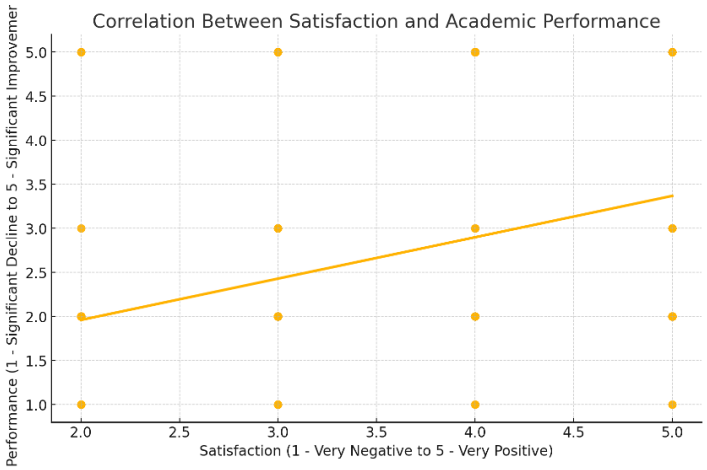


Figure 6. Correlation between students' satisfaction with distance learning and their academic performance

This result can be attributed to several factors. First, high satisfaction with distance learning is usually associated with better comprehension of educational materials, more comfortable learning conditions, and high levels of engagement. Second, students who feel confident in the online environment are better able to cope with academic assignments and utilize educational resources more effectively. However, the correlation coefficient of 0.33 indicates that this relationship is not strong, which suggests the influence of other factors, such as personal motivation, organizational skills, access to resources, and the quality of teaching. This may also reflect individual differences in adaptation to digital learning formats. Thus, hypothesis H4 is confirmed: there is a significant positive relationship between students' satisfaction with distance learning and their academic performance. Frequency analysis was used to test hypothesis H5 about faculty's opinions on the impact of distance learning. The distribution of ratings is presented in Table 5.

Table 5. Distribution of faculty's ratings on attitudes towards distance education

Rating and coding	Number of responses	Statistical indicators
Very positive – 5	101	Mean of ratings: 3.94 (between "Rather positive" and "Neutral")
Rather positive – 4	129	
Neutral – 3	75	Standard deviation: 0.89 (moderate variability of opinions)
Rather negative – 2	20	
Strongly negative – 1	2	Median: 4.0 (Rather positive)

The results of the analysis of faculty perceptions of the impact of distance learning on the quality of education confirm hypothesis H5, which posits that teachers generally evaluate distance learning positively, despite existing technical and communication barriers. The average assessment of the impact of distance learning was 3.94 (between "Rather Positive" and "Neutral"), which indicates the prevalence of positive opinions among teachers. The median value is also 4.0, which corresponds to the category "Rather Positive", confirming the overall positive attitude.

The most significant number of faculty (129) rated distance learning as "Rather Positive", and another 101 teachers rated it as "Very Positive". However, a significant proportion of respondents (75 people) expressed a neutral attitude, which may indicate mixed impressions, probably related to technical and organizational problems. However, it should be noted that 20 teachers rated distance learning as "Rather Negative", and another two teachers provided very negative assessments, indicating the presence of significant barriers and difficulties for some groups of teachers. Thus, hypothesis H5 is confirmed: the majority of teachers (70.3%) positively assess the impact of distance learning, despite the existing technical and communication barriers.

To test Hypothesis H6, which posits that the length of service of teachers affects their propensity to use innovative technologies in distance learning, a chi-square test was chosen. The chi-square test is used to test the statistical relationship between two categorical variables. In this case:

Variable 1: Length of service of teachers (categorical, includes categories "Less than 1 year", "1-3", "3-5 years", "More than 5 years").

Variable 2: Innovative technologies used (categorical, includes categories such as "Artificial intelligence", "Virtual reality", "Interactive platforms", etc.).

The primary objective of hypothesis H6 is to determine whether a relationship exists between the length of service and the use of innovative technologies, specifically whether these variables are dependent or independent. The chi-square test enables us to answer this question, as it is based on the analysis of a contingency table that displays the frequencies of technology use among teachers with varying lengths of service. This approach enables us to consider all possible combinations of length of service and types of technology.

The results of the chi-square test for hypothesis H6 showed that the relationship between the length of service of teachers and their propensity to use innovative technologies in distance learning is not statistically significant ($\chi^2 = 14.50$, $p = 0.992$). This means that the use of innovative technologies is not dependent on the length of service of the teacher, and more experienced teachers are not necessarily less likely to incorporate innovations into their teaching practice.

The lack of a significant relationship may be due to several factors. Firstly, many universities actively invest in improving the digital literacy of all teachers, regardless of their length of service, which helps reduce the differences between young and experienced teachers in their use of innovation. Secondly, modern educational platforms are often designed with ease of use in mind, which reduces barriers to implementing innovations, even among teachers with limited experience in digital technologies. Ultimately, the adoption of new technologies may depend not only on the length of service but also on personal motivation, academic interests, and the readiness to adapt to digital transformation. Thus, hypothesis H6 is not confirmed: the length of service of teachers does not have a significant impact on their propensity to use innovative technologies in distance learning. This emphasizes the importance of creating conditions for equal access to innovative tools and continuous professional development of teachers, regardless of their experience. To test hypothesis H7, about students' preference for learning Frequency analysis was used in the hybrid format. The results are presented in Figure 7.

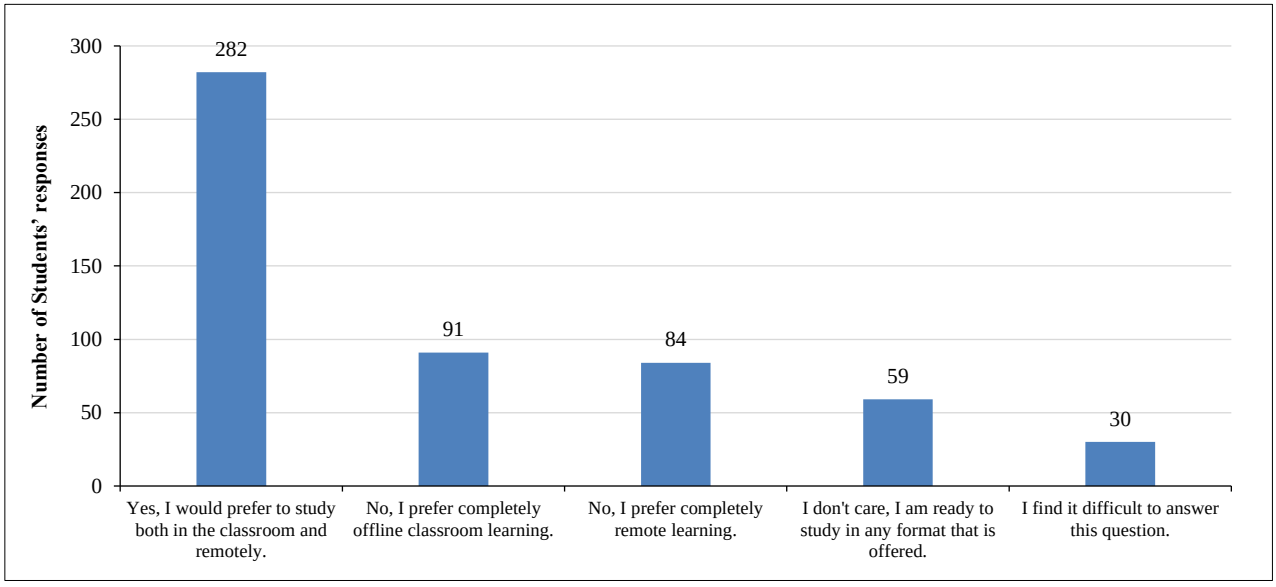


Figure 7. Students' responses on their preference to study in a hybrid format

The results of the analysis of students' preferences regarding the hybrid learning format confirm Hypothesis H7, which posits that the majority of students indeed prefer hybrid formats that combine both classroom and distance learning.

According to the data obtained, 282 students (the largest group) expressed a clear preference for the hybrid format, which indicates a high demand for a flexible learning model. Hybrid formats enable the combination of the benefits of personal interaction with teachers and classmates, characteristic of the offline format, with the convenience of remote access to educational materials and lectures. However, a significant portion of students (91 people) still prefer an exclusively traditional, offline learning format, which may be due to better comprehension of the material through personal interaction, improved concentration in the classroom, and the high quality of practical classes. It is interesting to note that 84 students prefer fully distance learning, which emphasizes the need to continue developing and supporting online formats even after returning to normal conditions. Additionally, 59 students indicated that the format of the training does not matter to them, which may suggest that these students are flexible and adaptable to various teaching methods. Thus, hypothesis H7 is confirmed: the majority of students (51.6%) prefer hybrid training formats, which emphasizes the importance of developing flexible educational models that combine the advantages of offline and online formats.

The method of comparing mean values was used to test hypothesis H8 regarding the level of stress among teachers in the distance learning format. Responses of teachers to the question "How do you rate the level of fatigue and stress of a teacher during distance learning compared to offline learning?" were coded as follows: "Noticeably more fatigue and stress during distance learning" – 5, "Slightly more fatigue and stress during distance learning" – 4, "Equal fatigue and stress in both distance and offline formats" – 3, "Less fatigue and stress during distance learning" – 2. The answer "I don't know" was excluded from the analysis due to uncertainty.

The results of the analysis of teachers' stress levels during distance learning support the hypothesis H8, which states that distance learning causes higher levels of stress compared to the traditional offline format. The average stress level, calculated based on teachers' assessments, was 3.26 (above the neutral value of 3), corresponding to the category "A little more tired and stressed". The standard deviation of 1.02 indicates moderate variability of opinions, which may reflect the diversity of teachers' working conditions, individual differences in adaptation to online formats, and the level of technical training.

The results of the t-test ($t = 4.49$, $p < 0.001$) confirm that this difference is statistically significant, which allows us to reject the null hypothesis that the average stress level is equal in online and offline formats (Table 6). This finding is consistent with previously identified barriers to distance learning, including technical issues, a lack of personal interaction, and an increased workload for teachers when transitioning to digital teaching methods. Thus, hypothesis H8 is confirmed: distance learning does indeed cause higher levels of stress among teachers compared to traditional education. These results underscore the need to develop measures that support teachers, including enhancing digital infrastructure, providing training in new distance teaching methods, and implementing more flexible working conditions to mitigate stress.

Table 6. Distribution of faculty's ratings on attitudes towards distance education

Indicator	Mean value	Standard deviation	Median	t-statistic	p-value
Value	3.26	1.02	3.0	4.49	0.00001

The correlation analysis method was used to test Hypothesis H9, which examined the relationship between students' trust in online assessments and their evaluation of the quality of online lectures. The variables chosen for the correlation analysis were the questions "What is your level of satisfaction with the accuracy (correctness) of the assessments given by teachers in the online format?" and "Evaluate the quality of online lectures and practical classes". Both of these questions were rated by students on a Likert scale, ranging from 1 (very low) to 10 (very high), which allowed for the quantitative measurement of their subjective perception of the quality of education.

The Pearson correlation coefficient, calculated based on these ratings, was 0.61, indicating a moderate positive relationship between trust in grades and the perceived quality of online lectures (Figure 8). This means that students who have more confidence in the accuracy and fairness of online grades also tend to rate the overall quality of online lectures higher. Furthermore, the p-value < 0.001 confirms that the detected relationship is statistically significant, allowing us to reject the null hypothesis that these two factors are independent. Thus, hypothesis H9 is supported: there is a significant positive relationship between students' trust in online grades and their perception of the quality of online lectures. This highlights the need for a transparent, fair, and objective grading system to improve the overall perception of online learning.

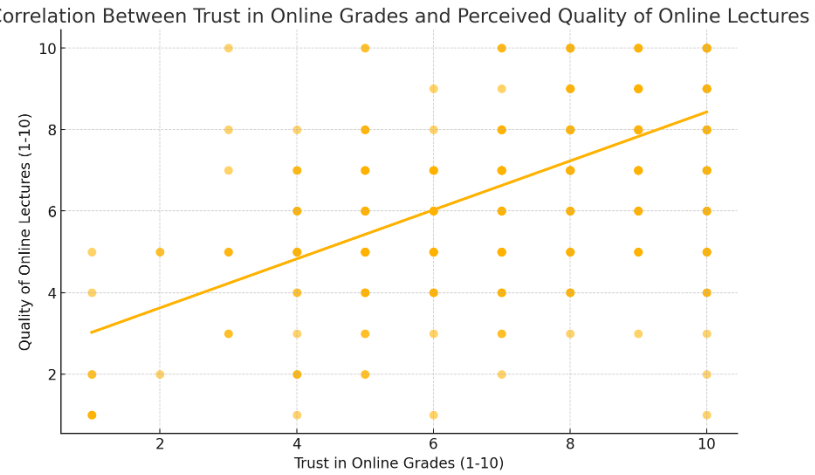


Figure 8. Correlation between students' trust in online grades and their perceived quality of online lectures

5- Discussion

The results of this study are generally consistent with existing research, while also highlighting some new aspects that warrant further investigation. The confirmation of hypothesis H1, that master's degree students evaluate the quality of online lectures more positively than undergraduate students, is consistent with studies showing that older students are generally better prepared for independent learning and more adept at adapting to digital formats [1, 3]. This result underscores the importance of considering students' academic preparation levels when designing distance courses.

The results of hypothesis H2 are also consistent with previous studies, which show that students with a higher level of education (i.e., master's and doctoral students) have a more positive perception of distance learning due to better self-organization skills and higher motivation [4, 5]. However, the lack of significant differences between master's and doctoral students may be due to the already formed academic skills and high degree of independence of these students.

The support for hypothesis H3 that technical problems and lack of face-to-face interaction are the main barriers to effective distance learning is consistent with the findings of studies such as Garrison & Cleveland-Innes (2005) and Allen & Seaman (2016), which highlight the importance of technological infrastructure and social interaction for successful online learning [6, 7]. This highlights the need to enhance digital infrastructure and develop more engaging learning formats.

The moderate positive correlation found in hypothesis H4 between satisfaction with distance learning and students' academic performance is consistent with the findings of authors such as Yukselturk & Bulut (2007), who note that satisfied students tend to demonstrate better academic results [24]. However, the moderate strength of this relationship highlights that other factors, including personal motivation, access to resources, and the quality of teaching, also influence academic performance.

The confirmation of hypothesis H5, that teachers have a positive perception of distance learning despite existing technical and communication barriers, is consistent with the results of studies that indicate a gradual adoption of digital technologies by teachers [12, 13]. However, the presence of a significant number of neutral and negative reviews suggests a need for additional support for teachers.

Cultural and institutional factors in Kazakhstan play a distinctive role in shaping perceptions of distance learning compared to Western higher education systems. The traditional emphasis on face-to-face instruction, hierarchical teacher–student relationships, and a preference for collective learning often lead students to value direct interaction and immediate feedback more strongly. Consequently, the absence of physical presence in online settings can be perceived as a reduction in academic quality and engagement. Institutional factors also contribute to these perceptions: universities in Kazakhstan are at different stages of digital transformation, and disparities in infrastructure, teaching support, and access to modern platforms may influence satisfaction levels. In contrast, many Western universities possess long-established online education ecosystems and pedagogical frameworks, resulting in higher digital readiness and acceptance of remote learning. At the same time, the strong sense of community and adaptability observed among Kazakhstani faculty and students fosters resilience and motivation during the transition to online education. These contextual differences highlight the need to design digital education strategies that are culturally responsive and tailored to local institutional realities.

The results of hypothesis H6 showed that teachers' experience does not have a significant impact on their propensity to use innovative technologies, which is consistent with the findings of studies such as Shea et al. (2006), who note that the use of technology depends more on readiness for change than on experience [14]. The confirmation of hypothesis H7, that most students prefer hybrid learning formats, also supports the findings of studies such as Vaughan (2014) and Graham (2013), which highlight the benefits of a hybrid approach in enhancing student engagement [16, 17].

The strong preference for hybrid learning formats – expressed by more than half of surveyed students – suggests the need to identify an optimal balance between online and face-to-face components. Evidence from both this study and prior literature indicates that a ratio of approximately 60–70% in-person learning combined with 30–40% online instruction yields the most favorable outcomes in terms of satisfaction, motivation, and academic performance. Such a structure maintains the benefits of direct interaction, peer collaboration, and instructor feedback while preserving the flexibility and accessibility of digital environments. Online components can be most effective when used for theoretical content delivery, self-paced learning, and formative assessment, whereas classroom sessions should focus on discussion, problem-solving, and applied practice. Universities could institutionalize hybrid timetables where digital and physical sessions are complementary rather than substitute. Implementing this balanced model requires coordinated scheduling, technological reliability, and pedagogical training for instructors to design integrated, student-centered hybrid courses.

The confirmation of hypothesis H8 regarding higher levels of teacher stress in distance learning contexts is consistent with research findings, such as those of Watermeyer et al. (2021), who found that teachers often face increased workload and stress in the context of the digital transformation of education [21].

The confirmation of higher stress levels among teachers in distance learning contexts highlights the need for stronger institutional support mechanisms. Universities should establish structured mental health and well-being programs, including access to counseling services, stress management workshops, and peer-support networks. Regular psychological assistance can help educators manage the challenges associated with remote teaching, workload imbalance, and digital fatigue. In addition, administrative workload optimization is crucial – automating routine academic reporting and streamlining communication channels can significantly reduce cognitive overload. Continuous professional development programs should also be implemented to strengthen teachers' confidence in using digital tools, interactive platforms, and assessment technologies. Institutional policies must encourage a supportive work culture that recognizes teaching efforts in digital formats through flexible scheduling, workload redistribution, and performance-based incentives. Collectively, these measures can mitigate stress, increase job satisfaction, and enhance the overall quality of teaching in the digital environment.

Finally, the confirmation of hypothesis H9, which suggests a significant positive relationship between students' trust in grades and their perception of the quality of online lectures, supports the findings on the importance of a transparent and fair assessment system [23]. This highlights the need to create clear assessment criteria and transparent feedback procedures to improve the overall perception of distance learning.

These results confirm the importance of a comprehensive approach to the development of distance education, including enhancing the digital infrastructure, increasing the digital literacy of teachers and students, and developing more flexible and engaging learning formats.

In the long term, the pandemic-driven shift to digital education is likely to produce complex effects on academic integrity, social skills, and the overall quality of education. While digital platforms have expanded access and flexibility, they have also created new challenges for maintaining academic honesty. The widespread use of online assessments increases the risk of plagiarism and unauthorized assistance, emphasizing the need for transparent evaluation systems, proctoring technologies, and ethical awareness among students. In terms of social and communication skills, prolonged reliance on remote formats may weaken students' interpersonal competencies, teamwork abilities, and emotional intelligence, which are typically developed through in-person interaction and campus engagement. To mitigate these effects, universities should integrate collaborative online learning environments and blended activities that foster peer dialogue and mentorship. Regarding educational quality, the long-term impact depends on how effectively institutions adapt pedagogy, teacher training, and digital infrastructure. If online learning remains interactive, well-structured, and inclusive, it can sustain or even enhance educational quality. Conversely, if digital tools are used without pedagogical redesign or support for teachers, disparities in engagement and learning outcomes may widen. Therefore, sustaining academic integrity, communication skills, and quality standards in digital education will require a continuous balance between technological innovation and human-centered pedagogy.

The findings of this study underline the urgent need for targeted policy interventions to reduce the digital divide within the higher education sector. First, infrastructure investment should be prioritized to ensure stable, high-speed internet access across all regions, including smaller towns where connectivity remains limited. The establishment of shared digital resource centers and cloud-based learning platforms could help equalize opportunities for students and faculty. Second, capacity-building and training programs are essential for improving digital literacy among both students and academic staff. Continuous professional development in online pedagogy, data management, and interactive content creation would enhance teaching quality and user confidence. Third, funding mechanisms should incentivize universities to modernize their technological base, support low-income students with subsidized access to devices, and promote public–private partnerships for developing educational technology solutions. Finally, policies must encourage the integration of hybrid and blended learning models as part of national education strategies, balancing technological innovation with human-centered pedagogy. These interventions would not only bridge the digital gap but also contribute to the long-term sustainability and inclusiveness of higher education in Kazakhstan.

6- Conclusion

This study investigated the impact of distance learning on the quality of higher education in Kazakhstan from the perspectives of both students and faculty. Based on quantitative survey data collected from 25 universities, nine hypotheses were tested to examine satisfaction, performance, and barriers related to online education. The results showed that graduate students tend to evaluate online learning more positively than undergraduate students, largely due to their higher level of self-regulation, motivation, and academic independence. A moderate but statistically significant correlation was found between student satisfaction and academic performance, confirming that interactive and well-structured digital environments enhance learning outcomes. Both students and teachers highlighted technical issues and reduced personal interaction as the main obstacles to effective distance learning. Faculty members generally demonstrated positive attitudes toward digital teaching formats, though they also reported higher workload and stress levels, emphasizing the need for institutional and psychological support mechanisms.

The findings enrich the existing literature on digital transformation in higher education and confirm the relevance of pedagogical and technological integration in ensuring learning effectiveness. From a theoretical standpoint, the study supports the applicability of the Community of Inquiry model and Technology Acceptance frameworks in understanding the relationship between satisfaction, engagement, and performance. Practically, the results highlight the importance of developing hybrid learning models that combine the flexibility of online education with the communicative benefits of face-to-face interaction. Universities should prioritize investments in digital infrastructure, provide continuous professional development for faculty, and implement student-centered digital strategies to ensure sustainability and inclusiveness in higher education. Future research may extend this analysis through longitudinal data and cross-country comparisons to better understand the long-term influence of digital learning environments on academic success and institutional performance.

7- Declarations

7-1- Author Contributions

Conceptualization, Z.T. and S.K.; methodology, Z.T.; software, S.B.; validation, S.K., A.K., and P.S.; formal analysis, Z.T.; investigation, Z.T.; resources, A.K.; data curation, P.S.; writing—original draft preparation, Z.T.; writing—review and editing, S.K.; visualization, S.B.; supervision, Z.T.; project administration, S.K. All authors have read and agreed to the published version of the manuscript.

7-2- Data Availability Statement

The data presented in this study are available on request from the corresponding author.

7-3- Funding

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7-4- Institutional Review Board Statement

Not applicable.

7-5- Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

7-6- Conflicts of Interest

The authors declare that there is no conflict of interests regarding the publication of this manuscript. In addition, the ethical issues, including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancies have been completely observed by the authors.

8- References

[1] Lau, E. Y. H., Li, J. Bin, & Lee, K. (2021). Online Learning and Parent Satisfaction during COVID-19: Child Competence in Independent Learning as a Moderator. Early Education and Development, 32(6), 830–842. doi:10.1080/10409289.2021.1950451.

[2] Dabbagh, N., & Kitsantas, A. (2012). Personal Learning Environments, social media, and self-regulated learning: A natural formula for connecting formal and informal learning. Internet and Higher Education, 15(1), 3–8. doi:10.1016/j.iheduc.2011.06.002.

[3] Wong, J., Baars, M., Davis, D., Van Der Zee, T., Houben, G. J., & Paas, F. (2019). Supporting Self-Regulated Learning in Online Learning Environments and MOOCs: A Systematic Review. International Journal of Human-Computer Interaction, 35(4–5), 356–373. doi:10.1080/10447318.2018.1543084.

[4] Garrison, D. R., & Kanuka, H. (2004). Blended learning: Uncovering its transformative potential in higher education. Internet and Higher Education, 7(2), 95–105. doi:10.1016/j.iheduc.2004.02.001.

[5] Bernard, R. M., Abrami, P. C., Borokhovski, E., Wade, C. A., Tamim, R. M., Surkes, M. A., & Bethel, E. C. (2009). A meta-analysis of three types of interaction treatments in distance education. Review of Educational Research, 79(3), 1243–1289. doi:10.3102/0034654309333844.

[6] Garrison, D. R., & Cleveland-Innes, M. (2005). Facilitating Cognitive Presence in Online Learning: Interaction Is Not Enough. International Journal of Phytoremediation, 21(1), 133–148. doi:10.1207/s15389286ajde1903_2.

[7] Allen, I. E., & Seaman, J. (2016). Online report card: Tracking online education in the United States. Babson Survey Research Group. Babson College, Massachusetts, United States.

[8] Olzhebayeva, G., Buldybayev, T., Omeljanciuk, A., Pavalkis, D., & Zhidebekkyzy, A. (2024). Managing Green Transition in Higher Education: the Case of Central Asian Universities. Polish Journal of Management Studies, 30(1), 224–239. doi:10.17512/pjms.2024.30.1.13.

[9] Najjar, N., Rouphael, M., Bitar, T., & Hleihel, W. (2025). The rise and drop of online learning: adaptability and future prospects. Frontiers in Education, 10, 1522905. doi:10.3389/feduc.2025.1522905.

[10] Jarrah, M., Alghazo, S., Al-Deaibes, M., & Alhawamdeh, H. A. (2025). Real-world experiences of online learning: the effect of synchronous online learning on university students' classroom engagement. Humanities and Social Sciences Communications, 12(1), 1–11. doi:10.1057/s41599-025-04701-6.

[11] Lin, J., & Wang, Y. (2024). Unpacking the mediating role of classroom interaction between student satisfaction and perceived online learning among Chinese EFL tertiary learners in the new normal of post-COVID-19. Acta Psychologica, 245, 104233. doi:10.1016/j.actpsy.2024.104233.

[12] Baran, E., Correia, A. P., & Thompson, A. (2011). Transforming online teaching practice: Critical analysis of the literature on the roles and competencies of online teachers. Distance Education, 32(3), 421–439. doi:10.1080/01587919.2011.610293.

[13] Al-Fraihat, D., Joy, M., Masa'deh, R., & Sinclair, J. (2020). Evaluating E-learning systems success: An empirical study. Computers in Human Behavior, 102, 67–86. doi:10.1016/j.chb.2019.08.004.

[14] Shea, P., Sau Li, C., & Pickett, A. (2006). A study of teaching presence and student sense of learning community in fully online and web-enhanced college courses. Internet and Higher Education, 9(3), 175–190. doi:10.1016/j.iheduc.2006.06.005.

[15] Alcaide-Pulido, P., Gutiérrez-Villar, B., Ordóñez-Olmedo, E., & Pérez-Escolar, M. (2025). Analysis of faculty readiness for online teaching: assessing impact and adaptability in diverse educational contexts. Smart Learning Environments, 12(1), 5. doi:10.1186/s40561-024-00353-2.

[16] Vaughan, N. (2014). Student engagement and blended learning: Making the assessment connection. Education Sciences, 4(4), 247–264. doi:10.3390/educsci4040247.

[17] Graham, C. R. (2015). Emerging Practice and Research in Blended Learning. Handbook of Distance Education, 333–350. doi:10.4324/9780203803738.ch21.

[18] Slijepcevic, N., & Huang, W. (2025). Evaluating the impact of online course development and teaching certificate academy on university faculty teaching practices through student learning experiences and faculty perceptions. Internet and Higher Education, 67, 101020. doi:10.1016/j.iheduc.2025.101020.

[19] Ahmed, V., Anane, C., Alzaatreh, A., & Saboor, S. (2023). Faculty perception of online education: considerations for the post-pandemic world. Frontiers in Education, 8, 1258980. doi:10.3389/feduc.2023.1258980.

[20] Yan, N., Batako, A., Czanner, G., & Zhang, A. (2025). Teacher Satisfaction in Online Education: A Two-Factor Model of Extrinsic and Intrinsic Factors Across Diverse Contexts. Technology, Knowledge and Learning, 30(2), 711–739. doi:10.1007/s10758-024-09799-2.

[21] Watermeyer, R., Crick, T., Knight, C., & Goodall, J. (2021). COVID-19 and digital disruption in UK universities: afflictions and affordances of emergency online migration. Higher Education, 81(3), 623–641. doi:10.1007/s10734-020-00561-y.

[22] Cabrera, R. N., Menchaca, V. D., Simonsson, M., & Silva, H. (2024). Faculty Perceptions of Online Instruction and Educational Technology in Higher Education. International Journal of Technology in Education and Science, 8(1), 1–19. doi:10.46328/ijtes.528.

[23] Gikandi, J. W., Morrow, D., & Davis, N. E. (2011). Online formative assessment in higher education: A review of the literature. Computers and Education, 57(4), 2333–2351. doi:10.1016/j.compedu.2011.06.004.

[24] Yukselturk, E., & Bulut, S. (2007). Predictors for student success in an online course. Journal of Educational Technology & Society, 10(2), 71-83.