Contemporary Educational Technology, 2024, **16**(1), ep488
ISSN: 1309-517X (Online)

OPEN ACCESS

Research Article

Exploring higher education students' attitudes toward e-learning after COVID-19

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Citation: Masalimova, A. R., Zheltukhina, M. R., Sergeeva, O. V., Sizova, Z. M., Novikov, P. N., & Sadykova, A. R. (2024). Exploring higher education students' attitudes toward e-learning after COVID-19. *Contemporary Educational Technology, 16*(1), ep488. https://doi.org/10.30935/cedtech/14045

ARTICLE INFO

Received: 21 Sep 2023
Accepted: 7 Dec 2023

ABSTRACT

The proliferation of technology and the heightened significance of e-learning in the midst of the COVID-19 pandemic transformed the perspectives and attitudes of educational stakeholders toward educational technology. The objective of this research was to explore the attitudes of higher education students toward e-learning. Data collection was conducted via a questionnaire. The findings demonstrated that the key benefit of e-learning, as reported by a substantial majority (77.0%) of participants, is the convenience of studying from home. This is closely followed by the advantage of learning at one's own pace, as 69.4% of respondents expressed. A considerable proportion (58.8%) highlighted the comfort factor associated with e-learning, along with the cost-saving aspect of reduced expenses on accommodation and transportation. Other advantages included the ability to access course materials remotely (57.6%) option to record meetings online (51.1%), regarding disadvantages of e-learning, the majority (59.4%) of respondents indicated that e-learning limits interaction with others, followed by social isolation (44.1%), lack of self-discipline (43.5%), internet problems (43.5%). The results showed that e-learning was perceived to be less effective compared to conventional face-to-face learning. Also, we showed that, in general, there is no significant relationship between socio-demographic variables and attitudes toward e-learning. Only a few significant relationships were found regarding demographic variables on attitudes. We made educational implications for the next studies on our results.

Keywords: higher education students, university students, undergraduate students, e-learning, attitudes

INTRODUCTION

In recent years, e-learning has become important for instruction. This growth can be attributed to changing pedagogical paradigms and the demand for flexible learning options. Using digital technologies to facilitate learning outside the traditional classroom, e-learning has become integral to today's educational systems. It allows for flexible scheduling and access to materials from anywhere. The adoption of e-learning has accelerated, especially in response to global events such as the COVID-19 pandemic. After COVID-19, traditional education, once limited to physical classrooms and face-to-face interactions, is now being supplemented and sometimes replaced by online learning environments. E-learning can improve the quality of education by providing various learning resources and allowing for personalized learning experiences (Ratnawati & Idris, 2020). For example, e-learning expands the range of courses and programs available to students (Ozornina et al., 2022). Universities offer a wider variety of courses through online platforms, including those in niche or specialized areas, allowing students to pursue their academic interests, especially during the COVID-19 pandemic (Basu, 2022). In addition, e-learning platforms often include tools for collaboration and communication between students and instructors (Ozornina et al., 2022). This communication can foster community, enable peer-to-peer learning, and facilitate discussions in distance or online courses. E-learning helps students get comfortable with technology and prepares them for a workplace, where digital skills are in high demand (Akcil & Bastas, 2020). Furthermore, it can be more cost-effective than traditional classroom training (Thapa et al., 2021) and reduces the expenses associated with commuting, housing, and physical textbooks. This affordability makes higher education more accessible to students (Abramova & Shishmolina, 2022).

Colleges and universities worldwide have invested heavily in online courses and digital resources to accommodate students with different needs and preferences during the pandemic (Vlasova et al., 2022). In this era of change in education, it is essential to understand students' attitudes toward e-learning. For example, students' attitudes toward e-learning can significantly impact their engagement, motivation, and, ultimately, their learning outcomes (Akcil & Bastas, 2020; Monib, 2023; Prakasha et al., 2022; Thapa et al., 2021; Uyar, 2023). E-learning is important by providing college students with flexible, accessible, and technology-enhanced learning experiences (Prevalla et al., 2022). As e-learning continues gaining momentum, educators, policymakers, and researchers must understand students' attitudes toward this evolving pedagogical approach and design their instruction programs according to e-learning strategies and curricula. Research has suggested that students' attitudes toward e-learning can vary widely and be influenced by several technological, pedagogical, and socio-cultural dimensions (Monib, 2023; Uyar, 2023). While these factors provide a foundation for understanding student attitudes toward e-learning, it is important to recognize that attitudes can be highly individualized and context-dependent (Prakasha et al., 2022). In addition, the rapid evolution of technology and educational practices requires ongoing research to keep pace with changing student attitudes (Akcil & Bastas, 2020).

Numerous studies have examined student attitudes toward e-learning. For instance, Kar et al. (2014) studied undergraduate students' attitudes toward e-learning in West Bengal. Their results revealed high attitudes towards e-learning and no significant differences regarding gender, field of study, and place of residence. Rhema and Miliszewska (2014) investigated the experiences and perceptions regarding e-learning of engineering students among Libyan university students. The findings revealed no significant difference in the degree of positive attitudes towards information and communication technology and e-learning between female and male students. Additionally, it was determined that geographical location, age, and academic year did not yield statistically significant results concerning attitudes toward e-learning. Alshaiekh and Singh (2018) investigated the factors influencing the e-learning of Saudi Arabian female undergraduate students. The attitudes of female college students towards e-learning were found to have a positive correlation with aspects such as utility, flexibility, interactivity, and college support. These factors were identified as major influencers of female students' attitudes towards e-learning. Ozaydin Ozkara and Ibili (2021) found that the preservice teachers' attitudes toward e-learning differed by learning style but not by age, gender, and subject area. Prakasha et al. (2022) studied university students' attitudes toward e-learning and found that females had more positive attitudes toward e-learning than males. Men showed an avoidant e-learning attitude. Also, the

results showed that socioeconomic status did not influence students' e-learning attitudes. Irwanto (2023) found that Indonesian higher education students' attitudes toward e-learning tended to be positive.

In a study conducted by Monib (2023), an examination was carried out to explore the perspectives held by English as a foreign language students regarding using e-learning. The study's findings indicated that e-learning is widely regarded as a valuable tool in higher education. The participants preferred hybrid learning, which combined online and face-to-face training. The study's findings revealed a statistically significant correlation between gender and the perceived ease of use. Many male participants positively perceived e-learning in the educational context, considering it user-friendly. Conversely, female participants held a contrasting viewpoint, expressing disagreement with this perception. Uyar (2023) investigated university students' attitudes toward e-learning. The results showed that students had high attitudes toward e-learning. Male students, students with prior e-learning experience, those with internet connection at home, individuals with personal computers, and students enrolled in technical courses exhibited more favorable attitudes towards e-learning in this study. As weaknesses of e-learning, students cited insufficient interaction between teachers and students, inequality of opportunity, and lack of knowledge among students and instructors. Students cited network connection failure, lack of equipment, and lack of internet access as problems with the e-learning process in terms of e-learning development. Malkawi et al. (2021) studied college students' satisfaction levels and attitudes toward e-learning during the pandemic. The findings indicated that students generally exhibit high satisfaction levels and positive attitudes towards eLearning and virtual education, but variations exist across different aspects. The findings indicate no statistically significant disparity in student gender, place of residence, college affiliation, and overall grade point average. Nevertheless, the findings indicate a statistically significant gap in student satisfaction and attitudes regarding e-learning.

The research above examined and identified higher education students' attitudes toward e-learning, but most of these studies were not conducted in a Russian context. In addition, much of this research was conducted during the pandemic. However, the number of research studies that studied higher education students' attitudes toward e-learning after the pandemic is very low. Therefore, this research aimed to explore students' attitudes toward e-learning and the effects of socio-demographic factors on these attitudes. By examining this specific and evolving topic area, our objective is to make a scholarly contribution toward a more comprehensive comprehension of university students' attitudes regarding e-learning. Additionally, we aimed to explore ways in which educational institutions can enhance their e-learning provisions to effectively cater to learners' diverse requirements and preferences in the era of digitalization. By modifying e-learning offerings to align with student preferences, educational institutions have the potential to enhance the overall learning experience and effectively perform digital learning initiatives. Based on the findings derived from this research, institutions may have the potential to enhance resource allocation efficiency by directing their attention toward technologies that align with the preferences and needs of higher education students.

METHOD

Research Design

The current study utilized a quantitative research methodology. The current study utilized a descriptive research design to accomplish its purpose.

Participants

The participants were involved from two public research universities located in Russia. The participants were from Kazan Federal State University (KFU) and Kazan National Research Technological University (KNRTU). The overall number of participants in the study was 170 higher education students.

Data Collection Instrument

The research in question employed the data collection instrument developed by Thapa et al. (2021). They developed after conducting a comprehensive literature review. The survey instrument comprised four distinct sections. Section 1 encompassed socio-demographic data, encompassing age, college or university, academic year, electronic devices for e-learning, internet sources, and prior experience. The subsequent section encompassed the components of the advantages and disadvantages of e-learning. The authors used multiple

choice questions, wherein participants were prompted to express their perceived advantages or disadvantages associated with this assessment format. The third component encompassed items about the efficacy of e-learning compared to conventional face-to-face instructional approaches. The participants were required to assess the effectiveness of e-learning compared to traditional learning by utilizing a Likert scale ranging from one (indicating strong effectiveness) to five (indicating strong ineffectiveness). The fourth section encompassed measures assessing students' attitudes towards e-learning.

The scale includes six domains: perceived usefulness (one to 18), intention to adopt e-learning (19 to 27), ease of e-learning (28 to 35), technical support (36 to 39), stressors of e-learning (40 to 42), and distant use of e-learning (43 to 46). Scores range from strongly disagree=1 to strongly agree=5. There are 46 items of which 26 are positive and 20 are negative. The total score ranges from 46 to 230, and the mean of the five-point Likert scale was used to evaluate the overall attitude. Cronbach's alpha coefficients for the Likert scale measuring perceived usefulness, intention to adapt, ease, technical support, e-learning stresses, and distant use of e-learning were reported as 0.90, 0.87, 0.90, 0.80, 0.80, and 0.82, respectively. The instrument underwent translation from Russian to English before being tested for readability by ten students. The obtained results showed that the instrument was readable for data collection. A few minor corrections were made to finalize the instrument based on the participants' feedback.

Data Collection

Data gathering was carried out using online platforms. The questionnaire was generated using the Google Forms platform and then shared with the participants by the instructors using a hyperlink. Data gathering occurred in May and June of 2023. The purpose and objectives of the research were clearly explained in the document. Participants agreeing to participate in the study were asked to complete the questionnaire. The consent form was structured such that individuals desiring to participate in the study were obligated to click on a "proceed" button, signifying their recognition of having examined and consented to the conditions delineated in the consent form. The study carefully maintained the principles of privacy and confidentiality regarding maintaining records. Data collection for this study was conducted by ethical guidelines, with written permission obtained from the universities.

Data Analysis

Collected data underwent a thorough review, coding, and organization to ensure accuracy, completeness, and consistency. Data was analyzed using statistical package for social science version 29. The received data was analyzed and interpreted using descriptive statistics, including frequency, median, mean, percentage, and standard deviation. Furthermore, inferential statistics were utilized in the analysis procedure. Chi-square test assessed the relationship between people's attitudes toward e-learning and particular socio-demographic characteristics. The overall attitude was evaluated by computing the mean score on a five-point Likert scale to determine whether it was positive or negative. Negative items were reversed before analyzing the data.

RESULTS

Socio-Demographic Results

Table 1 presents the socio-demographic information about the participants. Among the participants, a majority were identified as female, comprising 67.6% of the total sample, while the remaining 32.4% were identified as male. Most participants (36.5%) were individuals in their first year of study at the university. 27.6% of the participants were enrolled in their second year of study. The proportion of students in their third year of study was 20.0%. The proportion of students in their fourth year of study was 11.8%. The proportion of students in their fifth year of study was 4.1%. Most participants (75.3%) were between 19 to 22 years old. The proportion of individuals aged 19 years in the sample was 26.5%. The vast majority of participants (91.8%) were found to be residing in urban regions. The study revealed that most participants (54.7%) utilized laptops as their primary device for e-learning. Additionally, many respondents relied on cell phones (30.6%) and computers (14.1%). A small fraction of individuals (0.6%) reported using tablets for their e-learning activities. Most participants (82.3%) were affiliated with KNRTU. Of them, 17.7% were from KFU. Most (75.3%) of the participants had already participated in e-learning before this pandemic.

Table 1. Participants' socio-demographic information

Characteristic	Frequency (n)	Percentage (%)
Gender		
Female	115	67.6
Male	55	32.4
Study year		
First year	62	36.5
Second year	47	27.6
Third year	34	20.0
Fourth year	20	11.8
Fifth year	7	4.1
Age		
17	2	1.2
18	13	7.6
19	45	26.5
20	33	19.4
21	28	16.5
22	22	12.9
23	5	2.9
24	3	1.8
25	6	3.5
>25	13	7.6
University		
KFU	30	17.7
KNRTU	140	82.3
Gadgets/device used in learning		
Mobile	52	30.6
Computer	24	14.1
Laptop	93	54.7
Tablet	1	0.6
Previously participated in any online courses		
No	42	24.7
Yes	128	75.3

Table 2. Results regarding advantages & disadvantages of using e-learning

Advantages & disadvantages of using e-learning	Frequency (n)	Percentage (%)
Advantages		
Learning in your own pace	118	69.4
Ability to stay at home	131	77.0
Classes' interactivity	63	37.0
Ability to record a meeting	87	51.1
Comfortable	100	58.8
Remote access	98	57.6
Reduce cost of accommodation & transportation	100	58.8
Others	8	4.7
Disadvantages		
Reduced interaction with others	101	59.4
Poor learning condition at home	12	7.0
Lack of self-discipline	74	43.5
Social isolation	75	44.1
Internet problems	74	43.5
Technical issues	71	41.7
Poor interaction with facilitators	14	8.2
Others	13	7.6

Note. Participants had multiple responses

Advantages & Disadvantages of E-Learning

Table 2 presents a comprehensive overview of the advantages and disadvantages of using e-learning. The primary advantage of e-learning, as indicated by a significant majority (77.0%) of participants, is the convenience of studying from home. This is closely followed by the advantage of learning at one's own pace, as 69.4% of respondents expressed.

Table 3. An analysis of efficacy of e-learning in comparison to traditional face-to-face learning

Items	SI		I		N		E		SE		M	SD
	n	%	n	%	n	%	n	%	n	%		
E-learning is better than traditional learning.	14	8.2	35	20.6	92	54.1	25	14.7	4	2.4	2.82	.86
E learning is not secured.	12	7.1	30	17.6	94	55.3	28	16.5	6	3.5	2.92	.87
E-learning is better than traditional learning in terms of increasing knowledge.	21	12.4	42	24.7	73	42.9	28	16.5	6	3.5	2.74	.99
E-learning is better than traditional learning in terms of increasing skills.	20	11.8	31	18.2	82	48.2	29	17.1	8	4.7	2.85	.99
E-learning is better than other learning in terms of achieving social competencies.	16	9.4	21	12.4	86	50.6	29	17.1	18	10.6	3.07	1.04
E-learning is more enjoyable than face-to-face learning.	18	10.6	31	18.2	70	41.2	35	20.6	16	9.4	3.00	1.09
E learning makes the participants less active than in the face to face learning.	16	9.4	25	14.7	60	35.3	52	30.6	17	10.0	3.17	1.09
E-learning is an innovative idea and must be encouraged.	24	14.1	36	21.2	78	45.9	21	12.4	11	6.5	2.76	1.05

Note. SI: Strongly ineffective; I: Ineffective; N: Neutral; E: Effective; SE: Strongly effective; M: Mean; & SD: Standard deviation

Table 4. Participants' answers regarding perceived usefulness

Items	SDA		D		N		A		SA		M	SD
	n	%	n	%	n	%	n	%	n	%		
E-learning can solve many of the educational problems.	9	5.3	19	11.2	62	36.5	52	30.6	28	16.5	3.42	1.05
E-learning saves time.	7	4.1	12	7.1	45	26.5	53	31.2	53	31.2	3.78	1.09
E-learning improves access to learning material.	5	2.9	16	9.4	46	27.1	48	28.2	55	32.4	3.78	1.09
E-learning helps me to achieve better results.	4	2.4	16	9.4	88	51.8	40	23.5	22	12.9	3.35	.90
E-learning increase learner's engagement in learning.	11	6.5	19	11.2	94	55.3	25	14.7	21	12.4	3.15	.99
E- learning improve teacher and students interaction	20	11.8	46	27.1	70	41.2	23	13.5	11	6.5	2.76	1.04
E-learning increase my understanding of concept	9	5.3	27	15.9	84	49.4	34	20.0	16	9.4	3.12	.96
E-learning has created more problems than it solved	6	3.5	21	12.4	84	49.4	37	21.8	22	12.9	3.28	.96
E-learning is too time consuming to use.	4	2.4	22	12.9	67	39.4	47	27.6	30	17.6	3.45	1.00
E-learning has had little impact on me	5	2.9	35	20.6	83	48.8	28	16.5	19	11.2	3.12	.96
E-learning is as informative as the teacher	13	7.6	36	21.2	70	41.2	32	18.8	19	11.2	3.05	1.07
E-learning will never replace other forms of teaching & learning.	30	17.6	32	18.8	78	45.9	19	11.2	11	6.5	2.70	1.08
E-learning help to reinforce my knowledge.	2	1.2	13	7.6	79	46.5	54	31.8	22	12.9	3.48	.85
E-learning help me to organize my work	5	2.9	16	9.4	80	47.1	48	28.2	21	12.4	3.38	.92
E-learning help me to catch up missed lectures	1	0.6	8	4.7	50	29.4	61	35.9	50	29.4	3.89	.90
E-learning increase my effectiveness to create presentations.	5	2.9	7	4.1	63	37.1	53	31.2	42	24.7	3.71	.98
E-learning increase my research capability.	5	2.9	14	8.2	66	38.8	47	27.6	38	22.4	3.58	1.01
Universities should adopt e-learning for their students.	4	2.4	12	7.1	76	44.7	41	24.1	37	21.8	3.56	.98

Note. SDA: Strongly disagree; D: Disagree; N: Neutral; A: Agree; SA: Strongly agree; M: Mean; & SD: Standard deviation

Additionally, a considerable proportion (58.8%) highlighted the comfort factor associated with e-learning, along with the cost-saving aspect of reduced expenses on accommodation and transportation. Other notable advantages mentioned include the ability to access course materials remotely (57.6%), the option to record meetings online (51.1%), and the interactive style of online classes (37.0%). Regarding the disadvantages of e-learning, the majority (59.4%) of respondents indicated that e-learning limits interaction with others, followed by social isolation (44.1%), lack of self-discipline (43.5%), Internet problems (43.5%), poor interaction with facilitators (8.2%), and poor learning conditions at home (7.0%).

Table 3 presents a comparative analysis of traditional learning and e-learning. The findings indicate a significant prevalence of a neutral attitude among the participants. Moreover, e-learning was found to be less efficacious than traditional face-to-face instruction. Apart from these results, 27.7% of the participants stated that e-learning is better than others for learning social competencies. 40.6% felt that e-learning made participants less active than face-to-face learning.

Perceived Usefulness

Table 4 presents the participants' subjective evaluation of the usefulness of e-learning. A significant proportion of participants (47.1%) believed that e-learning could address numerous educational problems. Most respondents (62.4%) indicated that e-learning contributes to time savings, while 60.6% expressed that

Table 5. Participants' answers regarding intention to adapt

Items	SDA		D		N		A		SA		M	SD
	n	%	n	%	n	%	n	%	n	%		
E-learning makes me uncomfortable because I do not understand it.	4	2.4	14	8.2	58	34.1	44	25.9	50	29.4	3.72	1.05
E-learning is a de-humanizing process of learning.	6	3.5	20	11.8	92	54.1	21	12.4	31	18.2	3.30	1.01
I dislike the idea of using e-learning.	5	2.9	19	11.2	64	37.6	34	20.0	48	28.2	3.59	1.10
I am not in favor of e-learning as it leads to social isolation.	14	8.2	27	15.9	62	36.5	29	17.1	38	22.4	3.29	1.21
E-learning does not interest me.	9	5.3	26	15.3	59	34.7	31	18.2	45	26.5	3.45	1.18
I plan to participate in future e-learning courses	2	1.2	17	10.0	70	41.2	54	31.8	27	15.9	3.51	.91
I plan to buy a computer to be able to follow lectures notes online.	21	12.4	24	14.1	68	40.0	28	16.5	29	17.1	3.12	1.21
Using e-learning makes learning fun.	5	2.9	17	10.0	73	42.9	43	25.3	32	18.8	3.47	1.00
I do not know what I would do without e-learning.	26	15.3	20	11.8	82	48.2	26	15.3	16	9.4	2.92	1.12

Note. SDA: Strongly disagree; D: Disagree; N: Neutral; A: Agree; SA: Strongly agree; M: Mean; & SD: Standard deviation

Table 6. Participants' answers regarding ease of learning

Items	SDA		D		N		A		SA		M	SD
	n	%	n	%	n	%	n	%	n	%		
Using e-learning is more difficult than using the library.	7	4.1	6	3.5	60	35.3	27	15.9	70	41.2	3.86	1.12
I cannot read the lectures notes through the web.	11	6.5	9	5.3	49	28.8	37	21.8	64	37.6	3.79	1.19
I cannot learn courses through the web.	3	1.8	6	3.5	49	28.8	38	22.4	74	43.5	4.02	1.01
It is difficult to acquire any significant information by using the Internet.	5	2.9	10	5.9	53	31.2	30	17.6	72	42.4	3.91	1.11
It is difficult to express my thoughts by writing through e-learning.	9	5.3	13	7.6	53	31.2	38	22.4	57	33.5	3.71	1.16
I find that using the Internet make me slow.	3	1.8	17	10.0	50	29.4	33	19.4	67	39.4	3.85	1.10
I feel we are becoming slaves to technology.	9	5.3	25	14.7	59	34.7	24	14.1	53	31.2	3.51	1.22
My interaction with e-learning is not understandable.	5	2.9	12	7.1	62	36.5	29	17.1	62	36.5	3.77	1.1

Note. SDA: Strongly disagree; D: Disagree; N: Neutral; A: Agree; SA: Strongly agree; M: Mean; & SD: Standard deviation

it enhances accessibility to supplementary learning resources. However, most respondents (36.4) felt that e-learning helps achieve better results. However, 51.8 of the same participants have neutral attitudes regarding this item. The study found that e-learning can enhance learner engagement, improve teacher-student interaction, and promote a better understanding of concepts (27.1%, 20.0%, 29.4%, and 34.7%, respectively). Almost 34.7% of the respondents experienced problems with e-learning rather than finding it helpful, and 45.2% believed it was too time-consuming. 27.1% felt it had little impact on them, and 30.0% reported that it was as informative as learning from a teacher. According to a recent survey, 36.4% of respondents believe that e-learning has the potential to replace other traditional forms of teaching and learning. Additionally, 44.7% of participants found that e-learning helped reinforce their knowledge, while 40.6% felt it assisted them in organizing their work. Moreover, an overwhelming 65.3% of respondents agreed that e-learning made catching up on missed lectures easy. 55.9% of respondents believe e-learning increases their effectiveness in creating presentations, and 50.0% think it enhances their research capability. Additionally, 45.9% of respondents feel universities should adopt e-learning for their students.

Intention to Adopt E-Learning

Table 5 shows the respondents' intention to adapt to e-learning. Most respondents (55.3%) did not feel uncomfortable with e-learning, while 30.6% found it to be a dehumanizing learning process. Nearly 48.2% of the respondents disagreed with e-learning, and 39.5% did not prefer e-learning because it leads to social isolation. About 44.7% of the respondents were not interested in e-learning, 47.7% planned to take e-learning courses, and 33.6% planned to buy a computer to follow lecture notes online. 44.1% of the respondents found e-learning to be fun. 27.1% of the respondents could not imagine their life without e-learning.

Ease of Learning

Table 6 illustrates that 57.1% of respondents found e-learning easier than the library. 59.4% of the respondents indicated they could not read the lecture notes online. 65.9% of them indicated that they cannot

Table 7. Participants' answers regarding technical support

Items	SDA		D		N		A		SA		M	SD
	n	%	n	%	n	%	n	%	n	%		
My institute has an updated website.	14	8.2	19	11.2	67	39.4	32	18.8	38	22.4	3.36	1.18
My institute facilitates e-learning training program.	8	4.7	17	10.0	75	44.1	42	24.7	28	16.5	3.38	1.02
My institute has adequate technology for e-learning.	9	5.3	10	5.9	61	35.9	52	30.6	38	22.4	3.59	1.06
I seek technical assistance from college support services.	40	23.5	24	14.1	70	41.2	13	7.6	23	13.5	2.74	1.28

Note. SDA: Strongly disagree; D: Disagree; N: Neutral; A: Agree; SA: Strongly agree; M: Mean; & SD: Standard deviation

Table 8. Participants' answers regarding learning stressors

Items	SDA		D		N		A		SA		M	SD
	n	%	n	%	n	%	n	%	n	%		
Feel anxious about my ability to use e-learning effectively.	9	5.3	15	8.8	71	41.8	33	19.4	42	24.7	3.49	1.1
Slow the Internet connections stress me.	38	22.4	43	25.3	53	31.2	18	10.6	18	10.6	2.62	1.2
I feel pressured by my teachers to use e-learning for my research/ learning activities.	4	2.4	7	4.1	63	37.1	38	22.4	58	34.1	3.82	1.0

Note. SDA: Strongly disagree; D: Disagree; N: Neutral; A: Agree; SA: Strongly agree; M: Mean; & SD: Standard deviation

Table 9. Participants' answers regarding e-distant use of e-learning

Items	SDA		D		N		A		SA		M	SD
	n	%	n	%	n	%	n	%	n	%		
E-learning should be offered fully online to reach students living in remote areas.	14	8.2	21	12.4	79	46.5	28	16.5	28	16.5	3.21	1.11
E-learning should be used to reduce travel related stress.	7	4.1	11	6.5	72	42.4	43	25.3	37	21.8	3.54	1.03
E-learning should be adopted to allow married students to balance family and study demands.	5	2.9	9	5.3	70	41.2	43	25.3	43	25.3	3.65	1.01
E-learning should be adopted to allow working students to study from home.	3	1.8	8	4.7	50	29.4	59	34.7	50	29.4	3.85	.95

Note. SDA: Strongly disagree; D: Disagree; N: Neutral; A: Agree; SA: Strongly agree; M: Mean; & SD: Standard deviation

learn courses through the Internet. The results showed that 60.0% of the participants indicated that acquiring significant online information is difficult. 55.9% of the participants indicated that it is difficult to express their thoughts in writing through e-learning. On the other hand, 58.8% thought using the internet makes them slow, and 45.3% said that they have become a slave to technology. 53.6% of them said that their interaction with e-learning is not understandable.

Technical Support

Table 7 shows the technical support that respondents' institutions provided while e-learning was introduced and practiced. Most students had a neutral attitude toward technical support issues. 39.4% were unaware of their institution's updated website, and 41.2% indicated that their institute offers an e-learning training program. 53.0% of the students who participated agreed that their institution has sufficient technology to support e-learning. Of all the respondents, 37.6% stated that they did not ask for technical assistance from their college.

Learning Stressors

Table 8 presents the stressors the participants were subjected to in the e-learning context. Approximately 44.1% of the participants experienced anxiety regarding their proficiency in e-learning. Approximately 47.7% of the participants reported an absence of stress associated with a slow internet connection, while 56.5% acknowledged experiencing pressure from their educators to engage in e-learning for learning purposes.

E-Distant Use of E-Learning

Table 9 illustrates the importance of utilizing remote e-learning. A significant proportion (33.0%) of the Participants stated their support for using e-learning to engage students living in physically distant places effectively. However, 46.5% of the participants were neutral toward this idea. 47.1% of participants agreed that e-learning reduces travel-related stress and should be used for this goal in higher education. Most participants, specifically 50.6%, agreed that e-learning should be adapted to assist married students in

efficiently balancing their familial obligations with their educational pursuits. In addition, 64.2% of the respondents favored allowing working students to study from home.

Relationships Between Attitudes & Socio-Demographic Variables

Table 10 shows the statistical relationships between attitudes toward e-learning and socio-demographic variables such as gender, year of study, college, and previous participation in e-learning. The findings indicated that there were not any statistically significant relationships between socio-demographic factors and attitudes toward e-learning. The statistical analyses revealed only a few significant relationships. First, there is a statistical difference between genders in the intention to use e-learning. Second, a statistical difference exists between participation in e-learning and intention to adopt e-learning. This finding indicates that engagement in e-learning enhances the inclination to embrace e-learning. Furthermore, there is a

Table 10. Investigation of relationship between attitudes towards e-learning & socio-demographic factors

Items			Attitudes				Chi-square	p-value
			Negative		Positive			
			n	%	n	%		
Perceived usefulness	Gender	Female	24	20.9	17	14.8	.408	.810
		Male	10	18.2	10	18.2		
	Study year	First year	12	19.4	8	12.9	5.276	.720*
		Second year	11	23.4	6	12.8		
		Third year	8	23.5	8	23.5		
		Fourth year	3	15.0	4	20.0		
		Fifth year	0	0.0	1	3.7		
	College	KFU	5	18.5	6	22.2	1.647	.810*
		KNRTU	29	20.7	21	15.0		
	Participated in e-learning	No	12	35.3	3	11.1	4.732	.090
		Yes	22	64.7	24	88.9		
Intention to adopt e-learning	Gender	Female	32	27.8	27	23.5	7.764	.021
		Male	6	10.9	11	20.0		
	Study year	First year	16	25.8	16	25.8	4.450	.820*
		Second year	9	19.1	10	21.3		
		Third year	9	26.5	7	20.6		
		Fourth year	4	20.0	4	20.0		
		Fifth year	0	0.0	1	14.3		
	College	KFU	4	11.1	9	33.3	4.808	.250
		KNRTU	34	24.3	28	20.0		
	Participated in e-learning	No	9	23.7	3	7.9	8.421	.015
		Yes	29	76.3	35	92.1		
Ease of learning	Gender	Female	13	11.3	51	44.3	.193	.900
		Male	5	9.1	25	45.5		
	Study year	First year	9	14.5	30	48.4	12.737	.090*
		Second year	5	10.6	18	38.3		
		Third year	0	0.0	16	47.1		
		Fourth year	2	10.0	11	55.0		
		Fifth year	2	28.6	1	14.3		
	College	KFU	0	0.0	11	40.7	7.053	.090*
		KNRTU	17	12.1	64	45.7		
	Participated in e-learning	No	7	38.9	11	14.5	8.154	.017
		Yes	11	61.1	65	85.5		
Technical support	Gender	Female	26	22.6	36	31.3	3.911	.140
		Male	18	32.7	10	18.2		
	Study year	First year	20	32.2	20	32.3	13.305	.100
		Second year	6	12.8	14	29.8		
		Third year	12	35.3	8	23.5		
		Fourth year	5	25.0	2	10.0		
		Fifth year	1	14.3	2	28.6		
	College	KFU	11	23.6	1	3.7	12.895	.004*
		KNRTU	33	40.7	43	30.7		
	Participated in e-learning	No	10	22.7	8	17.4	2.621	.270
		Yes	34	77.3	38	82.6		

Table 10 (Continued). Investigation of relationship between attitudes towards e-learning & socio-demographic factors

Items			Attitudes				Chi-square	p-value
			Negative		Positive			
			n	%	n	%		
Learning stressor	Gender	Female	28	24.3	25	21.7	2.159	.340
		Male	8	14.5	14	25.5		
	Study year	First year	14	22.6	13	21.0	5.082	.750*
		Second year	10	21.3	11	23.4		
		Third year	6	17.6	11	32.4		
		Fourth year	3	15.0	3	15.0		
		Fifth year	3	42.9	1	14.3		
	College	KFU	6	22.2	7	25.0	1.324	.930*
		KNRTU	29	20.7	32	22.9		
	Participated in e-learning	No	7	19.4	8	20.5	1.609	.440
		Yes	29	80.6	31	79.5		
E-distant use of e- learning	Gender	Female	11	9.6	42	36.5	2.067[a]	.350*
		Male	9	16.4	16	29.1		
	Study year	First year	7	11.3	25	40.3	5.384	.710*
		Second year	5	10.6	14	29.8		
		Third year	3	8.8	9	26.5		
		Fourth year	4	20.0	7	35.0		
		Fifth year	1	14.3	3	42.9		
	College	KFU	2	7.4	13	48.1	4.250	.330
		KNRTU	18	12.9	43	30.7		
	Participated in e-learning	No	5	25.0	15	75.0	6.012	.049
		Yes	8	13.8	50	86.2		

significant disparity in statistical data between the level of engagement in e-learning and the level of ease experienced in the learning process within e-learning platforms. Fourth, there is a statistical difference between the two universities in the dimension of technical support.

DISCUSSION

We aimed to investigate students' attitudes towards e-learning post-pandemic based on their experiences with e-learning activities. The findings indicated that most of the participants used laptops for e-learning. After getting the laptops, they used mobile phones during the e-learning activities. The finding regarding mobile phones is similar to the findings of Thapa et al. (2021). This result may be due to cultural habits that lead to an increased use of laptops in e-learning. Regarding the advantages and disadvantages of using e-learning, the results revealed that most participants indicated the convenience of studying from home as an advantage. This finding is closely followed by the advantage of learning at one's own pace, the comfort factor associated with e-learning, and the cost-saving aspect of reduced expenses on accommodation and transportation. Other notable advantages included the ability to access course materials remotely, the option to record meetings online, and the interactive style of online classes. These findings parallel Thapa et al. (2021), who reported that the main benefit of e-learning for nursing students was the opportunity to stay at home. This finding is also similar to the results of Monib (2023), who found that undergraduate students perceive e-learning as useful in higher education.

Regarding the negative aspects of e-learning, the majority of participants highlighted that e-learning restricts interpersonal interaction, mostly resulting in social isolation, insufficient self-control, and internet-related issues. Students experienced major disadvantages in e-learning due to internet and technical issues, consistent with other studies (Thapa et al., 2021; Uyar, 2023), indicating that a significant barrier to implementing e-learning has been recognized as an absence of technological resources. Additionally, almost half of the participants cited a lack of interaction as a disadvantage. In technology-based education, effective teaching and learning are crucial yet challenging in e-learning courses.

A comparison between traditional learning and e-learning demonstrated that face-to-face instruction was more efficacious than e-learning. According to this result, students in this research perceived e-learning as

less effective. Around 40.0% of the participants believed that e-learning made them less active than traditional learning. This finding aligns with the study by Thapa et al. (2021), which suggested that students may be more accustomed to traditional learning methods and not feel that online courses meet their goals. Similarly, the study by Bali and Liu (2018) demonstrated that traditional classroom instruction received higher ratings regarding social presence, interaction, and overall satisfaction than online learning. On the other hand, According to Monib (2023), over 50.0% of participants favored hybrid learning that combines online and face-to-face instruction.

The results regarding the participants' attitudes toward the usefulness of e-learning. Nearly half of the participants believed that e-learning could address numerous educational problems. Over half of the participants responded that e-learning contributes to time savings and enhances accessibility to supplementary learning resources. This result is consistent with earlier research on attitudes toward e-learning (Irwanto, 2023; Thapa et al., 2021). This result means that e-learning presents advantages to higher education students regarding time management and access to online learning resources.

36.0% of respondents believe that e-learning can enhance results by boosting learner engagement, improving the interaction between teachers and students, and facilitating a better understanding of concepts. Nonetheless, some respondents found e-learning to be problematic and excessively time-consuming. Despite these concerns, many participants found e-learning informative and agreed it could replace traditional teaching methods. The respondents believed that e-learning is a helpful tool in strengthening their knowledge, organizing their work, and catching up on missed lectures. Over 50.0% also agreed that e-learning enhances presentation skills and research capabilities. Additionally, 45.0% of the respondents advocated integrating e-learning into universities' curricula.

Regarding the intentions, most respondents disagreed with e-learning and were not interested in e-learning. This result is inconsistent with earlier research on attitudes toward e-learning (Thapa et al., 2021). Also, approximately one-third of the students have intended to purchase a computer to keep up with their lecture notes online. This result is consistent with earlier research on attitudes toward e-learning (Thapa et al., 2021). In addition, 44.0% of them indicated that learning with e-learning was fun and planned to take e-learning courses. This result is consistent with the findings of Thapa et al. (2021).

Regarding the level of ease associated with e-learning, a majority of the participants expressed dissatisfaction. It conveyed that utilizing e-learning was comparatively simpler than utilizing the library. The participants indicated they could not read the lecture notes online or learn courses online. Also, the participants indicated that acquiring significant online information and expressing their thoughts in writing through e-learning is difficult. Also, they thought using the internet made them slow and became a slave to technology, and they had difficulty comprehending how they interact with e-learning. Regarding technical support, most students had a neutral attitude towards technical support issues. Less than half of the students were unaware of their institution's updated website and indicated that their institute facilitated an e-learning training program. Half of them agreed that their institution has adequate technology for e-learning. Thapa et al. (2021) found that educational institutions do not support users in improving their ability and skills to adapt to e-learning, which is inconsistent with this result. This result is also not similar to those of Uyar (2023), who found that the main issues reported by university students were network connection loss, insufficient equipment, and lack of internet access. The majority of students identified these problems as network connection loss, lack of equipment, and lack of internet access.

In addition, 36.0% said they did not seek technical support from their college. This result is consistent with earlier research on attitudes toward e-learning (Thapa et al., 2021). The researchers concluded that technical support was the students' primary neutrality area. Regarding participants' stressors, approximately half indicated that they experienced anxiety regarding their proficiency in e-learning and reported stress associated with a slow internet connection. In contrast, more than half of them acknowledged experiencing pressure from their educators to engage in e-learning for learning purposes. Concerning the remote utilization of e-learning, the respondents expressed their support for employing e-learning to effectively involve students residing in geographically isolated regions and alleviate the stress associated with travel. They also agreed that e-learning should be tailored to aid married students in efficiently managing their family

responsibilities and academic pursuits. In addition, more than half of them favored allowing working students to study from home.

The results concerning the relationships between attitudes toward e-learning and socio-demographic variables revealed no significant relationships between socio-demographic variables and attitudes toward e-learning. This finding is consistent with previous research on higher education students' attitudes toward e-learning (Kar et al., 2014; Thapa et al. (2021). In their study, Kar et al. (2014) determined no significant differences in university students' attitudes towards e-learning in West Bengal based on variables such as gender, stream of study, and locality. In addition, Thapa et al. (2021) reported the same results. The study of Ozaydin Ozkara and Ibili (2021) found that the students' results showed that students' attitudes toward e-learning did not vary according to age, gender, and subject area. In addition, Rhema and Miliszewska (2014) found no statistically significant results regarding the effects of other demographic characteristics on the attitudes toward e-learning. In another study, no statistically significant differences were found in the attitudes toward e-learning between freshman and senior students (Monib, 2023).

On the other hand, this result is not similar to those of Uyar (2023), who found that male students, students with prior e-learning experience, access to the internet at home, personal computers, and students enrolled in technical courses exhibited more positive attitudes towards e-learning. Also, Prakasha et al. (2022) showed that females had more positive attitudes toward e-learning than males, and males showed an avoidant e-learning attitude. They also found that the results showed that socio-economic status did not influence students' e-learning attitudes. Monib's (2023) research demonstrated a significant relationship between gender and perceived ease of using e-learning. Most males perceive e-learning in education as user-friendly, whereas females have a contrary opinion. Only a few significant relationships were found. First, these differences are not similar to Kar et al. (2014) and Thapa et al. (2021). The reason for these differences may stem from background and contextual factors.

CONCLUSIONS & RECOMMENDATIONS

In this research, we explored higher education students' attitudes toward e-learning and the effects of socio-demographic factors on these attitudes. The results revealed that most participants had positive attitudes regarding the primary advantage of e-learning, which is the convenience of studying from home, as indicated by most participants. As respondents expressed, this finding is closely followed by the advantage of learning at one's own pace. Additionally, a considerable proportion of the participants highlighted the comfort factor associated with e-learning, along with the cost-saving aspect of reduced expenses on accommodation and transportation. Other notable advantages include the ability to access course materials remotely and the option to record meetings online. Regarding the disadvantages, most respondents indicated that e-learning limits interaction with others, followed by social isolation, lack of self-discipline, and internet problems. The results also showed that e-learning was perceived to be less effective compared to conventional face-to-face learning. In addition, the results demonstrated that, in general, there is no significant relationship between socio-demographic variables and attitudes toward e-learning. Only a few significant relationships were found regarding demographic variables on the attitudes. Based on these results, it can be concluded that, in general, students in this research had positive attitudes regarding e-learning. The results showed that students tended to prefer traditional face-to-face learning. Practical problems of implementing e-learning may be a possible reason for this result. The results demonstrate that universities in higher education should improve e-learning to increase its features to be more user-friendly and technically sound and provide more practical experiences effectively and efficiently. The findings offer new insights for higher education institutions using e-learning for instruction. The enactment and implementation of e-learning programs should provide more appropriate strategies to develop based on existing evidence to improve university students' attitudes toward e-learning. Researchers believe that e-learning after the COVID-19 pandemic provides new opportunities for higher education. The enactment and implementation of e-learning programs should contain a hybrid use of face-to-face and e-learning instruction in their teaching programs.

Limitations

The study has certain limitations. The primary constraint of this study lies in its nature, which restricts the generalizability of the results. The study was limited to university students in a certain country, which may limit its applicability to the wider population of the entire country.

Author contributions: All authors were involved in concept, design, collection of data, interpretation, writing, and critically revising the article. All authors approved the final version of the article.

Funding: This study was supported by Kazan Federal University Strategic Academic Leadership Program ("PRIORITY-2030").

Ethics declaration: The authors declared that ethical permission was obtained from the Ethical Committee of the Sechenov First Moscow State Medical University (Code: 2023-157). The main ethical concerns in the study were informed consent and the privacy of the participants.

Declaration of interest: The authors declare no competing interest.

Data availability: Data generated or analyzed during this study are available from the authors on request.

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