Journal of Education and e-Learning Research
Vol. 11, No. 1, 36-45, 2024
ISSN(E) 2410-9991 / ISSN(P) 2518-0169
DOI: 10.20448/jeelr.v11i1.5290
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Examining the e-learning attitudes of Indonesian students during the COVID-19 pandemic

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Abstract

The COVID-19 epidemic has impacted higher education institutions across the country by switching traditional teaching practices to online learning. The attitudes of students towards e-learning are essential to research in order to determine the extent to which successful implementation of online learning. Thus, this research aims to evaluate the attitudes of Indonesian students towards e-learning throughout the pandemic. The study adopted a quantitative research approach through a survey questionnaire. The attitude of students was evaluated using the attitude scale towards e-learning. The questionnaire comprised 20 items assessing students' attitudes towards remote learning. A questionnaire was distributed to 342 (255 female and 87 male) undergraduate students who took online courses at an Indonesian state university. The statistical analyses including descriptive statistics, *t*-tests and one-way ANOVA were used in the present study. The results suggested that students' e-learning attitudes tend to be neutral. The *t*-test and ANOVA indicated that there was no statistically significant gap in students' attitudes with respect to gender, daily internet usage time or level of COVID-19. Meanwhile, age, study year and personal computer ownership exerted a statistically significant impact on e-learning attitudes. Teachers can better prepare for the adoption of online learning during COVID-19 and beyond by using the valuable insights provided by the findings.

Keywords: Attitudes, Attitudes toward e-learning, COVID-19 outbreak, Indonesia, Online learning, Undergraduate students.

Citation | Irwanto, I., Cahyana, U., & Ayuni, N. P. S. (2024). Examining the e-learning attitudes of Indonesian students during the COVID-19 pandemic. *Journal of Education and E-Learning Research*, *11*(1), 36–45. 10.20448/jeelr.v11i1.5290
History:
Received: 24 August 2023
Revised: 3 October 2023
Accepted: 22 December 2023
Published: 3 January 2024
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Publisher: Asian Online Journal Publishing Group

Funding: This research is supported by the Ministry of Education, Culture, Research, and Technology, Indonesia (Grant number: 33/UN39.14/PG.02.00.PL/VI/2023).
Institutional Review Board Statement: The Ethical Committee of the Universitas Negeri Jakarta, Indonesia has granted approval for this study on 13 December 2022 (Ref. No. 897/UN39.14/PT/XII/2022).
Transparency: The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.
Competing Interests: The authors declare that they have no competing interests.
Authors' Contributions: Conceptualization, literature review, methodology, formal analysis, writing original drafting, review & editing, I.I.; writing - review & editing, literature review, data curation, data analysis, writing - original draft, draft-writing, U.C.; writing -review & editing, literature review, data curation and validation, data analysis, N.P.S.A. All authors have read and agreed to the published version of the manuscript.

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Contribution of this paper to the literature
Teachers can better prepare for the adoption of online learning during COVID-19 and beyond by using the valuable insights provided by the findings. The findings are also expected to provide input for policymakers and educators to meet the needs of undergraduate students in order to improve their learning outcomes.

1. Introduction

In recent years, COVID-19 has impacted all aspects of life. During this situation, the suggestion to close universities in order to lower the risk of the virus spreading was taken into consideration (Akcil & Bastas, 2020; Irwanto, 2023; Malkawi, Bawaneh, & Bawa'aneh, 2020). As a result, universities across the nation are forced to move from face-to-face learning to e-learning (Al-Anezi, 2021; Gill et al., 2022; Uyar, 2023). Distance learning enabled students to attend their classes online. Many teaching activities in conventional classes had to be replaced with information and communication technology (ICT) based learning. The educational process was held in a digital classroom environment with the outbreak of the pandemic (Güllü, Kara, & Akgün, 2022; Mahfouz & Salam, 2021). In this context, teachers and students used learning management systems, digital tools and a variety of online resources to achieve learning goals. During the epidemic, e-learning appears to have emerged as the most popular educational model worldwide (Akcil & Bastas, 2020; Alsahou, Abbas, & Alfayly, 2022; Niroumand, Mastour, Ghalibaf, Shamshirian, & Moghadasin, 2022). Hence, COVID-19 has clearly caused digital change in education.

2. Literature Review

2.1. E-Learning

During the pandemic, there was a substantial increase in the adoption of new e-learning programmes worldwide. E-learning or electronic learning is a popular educational concept in higher education and has received increasing attention from educators and researchers. E-learning is viewed as a form of learning that can support remote learning through the internet (Lee, Guo, & Chen, 2021). Kerres (2013) considers it a "generic term for all variants of the use of digital media for teaching and learning purposes". It is also postulated as the use of ICT such as the internet to access and create online teaching resources (Rosenberg, 2001). In other words, it is the process by which online learners interact with their peers, teachers and teaching materials using the internet (Siragusa, Dixon, & Robert, 2007). E-learning allows students to actively participate in learning by incorporating texts, quiz interfaces, audio, images and video into the learning process. In other words, e-learning is a new method of learning that is based on a learner-centered approach rather than a teacher-centered approach.

E-learning has become an effective tool to facilitate distance learning processes throughout the pandemic. The advantages of e-learning over traditional learning have also been mentioned in previous literature. According to Ruggeri, Farrington, and Brayne (2013), e-learning lowers educational expenses and ensures that students receive timely and reliable content. E-learning gives students a great deal of flexibility allowing them to study anytime and anywhere at their own pace (Johnson, Reddy, Chand, & Naiker, 2021). E-learning also offers a flexible environment to foster undergraduate students' digital learning abilities through the use of available digital resources (Kuo, Kuo, Wang, & Ho, 2022). It means that e-learning is considered an appropriate learning strategy that is implemented in cases where conventional learning cannot continue due to campus closures during the pandemic. It can be assumed that e-learning contains all the necessary components to take the place of conventional teaching strategies and enable students to learn beyond time, place and limitations (Alami & El Idrissi, 2022). E-learning can facilitate the attainment of learning objectives and accommodate a variety of student learning styles by using a variety of information that can be easily accessed on the internet. This indicates that e-learning has a lot of potential to improve access to higher education and enhance the quality of teaching both in the present and in the future.

2.2. Attitudes towards E-Learning

Understanding undergraduate students' views on e-learning is an essential field of research because rapid and unanticipated changes in educational modes may impact their academic performance. In the literature, attitude is considered a "learned predisposition to respond to an object or class of objects in a favorable or unfavorable way" (Fishbein, 1967). It indicates that attitudes describe how students process information based on their opinions and views on certain objects by evaluating the degree of their likes or dislikes (Howarth, 2006). In the simplest way, e-learning attitudes can be postulated as the knowledge, feelings and actions of students towards e-learning. It is known that students' positive e-learning attitudes can guide their behavior and contribute to the application of effective online learning methods (Maio & Haddock, 2009). Students who have positive attitudes tend to enjoy and perform better in online learning and show positive behavior during the learning process. The present study believes that elevating students' e-learning attitudes is very beneficial for the teaching and learning process because students' attitudes affect their learning outcomes (Çevik & Bakioğlu, 2022). Accordingly, knowing students e-learning attitudes is essential to manage the learning process appropriately and enabling permanent learning.

Research on undergraduate students' perceptions of e-learning is easily accessible and its significance has increased during the COVID-19 pandemic. Existing studies reported that students held positive attitudes (Malkawi et al., 2020; Uyar, 2023; Zengin, Uzsen, Ardahan Sevgili, & Bal Yılmaz, 2023). In empirical research conducted by Hollister, Nair, and Chukoskie (2022), most students feel that they are more comfortable asking and answering questions in online lectures than in traditional lectures. On the other hand, earlier studies also found students to have negative attitudes (Güllü et al., 2022; Mahfouz & Salam, 2021; Oducado & Soriano, 2021). Most students agreed that conventional learning methods would give them better learning opportunities than e-learning (Güllü et al., 2022). In the existing literature, there are inconsistent conclusions about gender disparities in e-learning attitudes. Previous studies highlighted that gender plays a significant role in e-learning attitudes (Gill et al., 2022; Özüdoğru, 2022; Sezer, 2016). It is stated that males had more favourable views towards technology use and

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perceived ease of use of e-learning than females (Monib, 2023; Niroumand et al., 2022). Nevertheless, no gender difference was found in earlier studies (Akcil & Bastas, 2020; Nistor, 2013).

2.3. Previous Research in E-Learning

Previous research has also examined the impact of other sociodemographic variables on e-learning attitudes. For instance, age may influence student attitudes towards e-learning (Al-Anezi, 2021; Güllü et al., 2022). A study carried out by Aksoy (2021) found that students' attitudes towards distance education during the pandemic increased with age. Although numerous studies also provided conflicting results regarding age differences in e-learning attitudes (Erdogan, Bayram, & Deniz, 2008; Thapa, Bhandari, & Pathak, 2021). In another variable, study year differences have also been widely documented but they seem somewhat contradictory. However, several studies indicate that senior students had more positive views than freshmen, juniors and sophomores (Akcil & Bastas, 2020; Malkawi et al., 2020), others have reported that attitudes towards e-learning did not differ by grade level (Gill et al., 2022; Mahfouz & Salam, 2021). It is essential to assess variances in attitudes towards e-learning based on gender, age and academic year given the varied and even contradictory outcomes.

Although a number of studies have explored university students' attitudes (Akcil & Bastas, 2020; Al-Anezi, 2021; Gill et al., 2022; Hollister et al., 2022; Malkawi et al., 2020; Nistor, 2013), research focusing on how e-learning attitudes are affected by infrastructure and psychological variables during COVID-19 in developing countries including Indonesia is still limited. First, it is widely recognized that the e-learning environment imposes special requirements for remote learners such as having digital devices and internet access due to the fact that adequate infrastructure is highly required for student success during online classes. This is in parallel with existing studies that revealed that the availability of resources influenced students to adopt online learning technology (Salloum, Al-Emran, Shaalan, & Tarhini, 2019). According to Yesilyurt, Basturk, Yesilyurt, and Kara (2014), students who have computers and internet connections are reported to be more successful in academics. Thus, we believe that e-learning attitudes depend on adequate e-learning infrastructure support such as desktop computers and internet accessibility. Second, students' concerns about exposure to COVID-19 were not the only factors that changed as they moved from traditional classroom settings to online learning environments to support continued learning (Wang, Zhao, & Zhang, 2020). In Indonesia, at the end of January 2023, more than 6.7 million confirmed cases of COVID-19 were reported resulting in nearly 160 thousand deaths (WHO, 2023). The rapidly increasing cases of COVID-19 infection in Indonesia can lead to feelings of anxiety, stress, depression and fear among undergraduate students (Rodríguez-Hidalgo, Pantaleón, Dios, & Falla, 2020) which in turn have an impact on students' performance. In an empirical study, Meiyi and Liu (2022) confirmed that COVID-19 fear had a negative impact on academic performance and was positively correlated with anxiety. Based on these findings, the current study investigates the relationship between attitudes towards e-learning and characteristics related to personal computer ownership, daily internet usage frequency and COVID-19. The findings are expected to provide input for policymakers and educators on how to meet the needs of undergraduate students in order to improve their learning outcomes.

2.4. The Aim of the Research

It is known that the majority of higher education institutions in Indonesia have always adopted traditional teaching methods (Mailizar, Burg, & Maulina, 2021; Muhab, Irwanto, Allanas, & Yodela, 2022; Ramadhan et al., 2023). Such instructional strategies were often standard procedure at Universitas Nigeri Jakarta (UNJ) prior to the COVID-19 pandemic. Although an increasing number of studies are documenting the effectiveness of e-learning during COVID-19 in the context of higher education in Indonesia, there is limited information about the perspectives of undergraduate students on e-learning at UNJ. The attitudes of students towards e-learning are very important to investigate the extent to which the successful implementation of online learning in this university. Therefore, this study seeks to explore the e-learning attitudes among undergraduate students in terms of various variables. Assessing students' perspectives on e-learning provides valuable insights for universities to increase students' e-learning satisfaction in order to improve their educational outcomes. Accordingly, the research questions proposed in this study were:

1. What are the attitudes of students towards e-learning throughout the pandemic?
2. Do students' attitudes towards e-learning differ by gender, age, study year, personal computer ownership, daily internet usage time and COVID-19 fear level?

3. Method

3.1. Design

The study used a quantitative survey method. The descriptive cross-sectional survey design (Creswell, 2012) was employed to measure students' attitudes towards online learning. According to Fraenkel and Wallen (2006), a descriptive study should have a minimum sample size of 100. The present research took place during the second term of the academic year 2022-2023. The study targeted enrolled students at a state university in Indonesia. Eligible participants were all students aged at least 18 who had given their consent to participate. The study adopted convenience sampling to collect relevant data (Fraenkel & Wallen, 2006).

3.2. Participants

The study participants were 342 undergraduate students who had attended an online course at Universitas Nigeria Jakarta, Indonesia. The gender distribution of the respondents was 74.56% female ($n = 255$) and 25.44% male ($n = 87$). The participants are classified into two age groups: 84.80% ($n = 290$) of them are between the ages of 18 and 20 years old and 15.20% ($n = 52$) are above 20 years old. The mean age of the participants was 19.23 years (SD=1.18 years). A total of 162 students were in their 1st year, 81 were in their 2nd year, 66 were in their 3rd year and the remaining 33 were in their 4th year. In terms of daily internet usage duration, it was found that 2 students used between 1 and 2 hours, 35 students used between 3 and 4 hours, 98 students used between 5 and 6 hours and

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207 students used 7 hours or more. Most of the participants (92.69%; $n = 317$) who participated in the study had a desktop computer and only 7.31% ($n = 25$) did not have one.

3.3. Instruments

In the study, the demographic information form and the Attitude Scale towards E-Learning (ASEL) were employed to gather data. The demographic information form was designed by the researchers to identify some characteristics of individuals. The form comprises information about participants including gender, age, year of study, daily time spent using the internet, computer ownership and level of fear of the COVID-19 infection.

The attitude of students towards e-learning was measured using the ASEL developed by Haznedar and Baran (2012). The questionnaire is a 20-item 5-point Likert scale with options ranging from strongly agrees (5) to strongly disagree (1). The self-administered questionnaire consists of two constructs: avoidance of e-learning (10 negative statements, $\alpha = 0.82$, e.g. *I do not think e-learning will be beneficial*) and proneness to e-learning (10 positive statements, $\alpha = 0.91$, e.g. *E-learning increases productivity in learning*). Reverse scoring was relied on for the negative items. Avoidance of e-learning expressed avoidance attitudes towards distance learning whereas proneness to e-learning revealed approach attitudes towards remote learning throughout the COVID-19 pandemic. The questionnaire was translated and modified into Indonesian for the purposes of this research to avoid bias and ambiguity. Overall scores across all constructs ranged from 20 to 100. Higher scores represent higher attitudes towards e-learning. In the current study, the Cronbach alpha reliability coefficient for ASEL was 0.90 which indicated that the questionnaire is reliable (Taber, 2018). Students answered the attitude scale in about 15 minutes.

3.4. Procedures

The study received ethics approval from the first author's university. A survey using a self-administered questionnaire was done to assess students' attitudes towards online education. The survey was digitally distributed through an online survey platform (Google Forms) to reach a larger audience. Participants who selected the "agree" option are directed to proceed with the survey. Data collection was conducted between February and March 2023. Information about the purpose of the study and consent to participate was provided on the first page of the questionnaire. During the research, the researchers asked the lecturers to send a link to potential research participants. Participants could complete the questionnaire at any time during the five-week period. Access to the questionnaire was terminated at the end of the five-week period.

The researchers explained the purpose of the study to the lecturers prior to data collection. Researchers sent a survey link in early February 2023 to different lecturers through WhatsApp, a social platform commonly used in Indonesia. The lecturers were then asked to forward the survey link to their students. The students were given about five weeks to complete the survey. The questionnaire consisted of two parts. In the first section, the personal information form was employed to gather data on gender, age, year of study, frequency of internet use, personal computer ownership and fear of COVID-19. Gathering such information was important for investigating whether there is a correlation between attitudes and demographic characteristics. The second portion used a 5-point Likert scale to evaluate students' attitudes in the context of e-learning. A total of 342 respondents completed the questionnaire. No missing data was reported because all items in the ASEL were required to be answered. Therefore, 342 valid responses were then imported into SPSS 25 for further analysis.

The researchers invited the students to voluntarily participate in this study. Personal data collected from research participants were recorded anonymously. No incentive was offered. Students have the right not to fill out the questionnaire as an ethical consideration. The researchers ensured that student responses would be anonymous and confidential. No personal data such as participant names or email addresses was collected. All data privacy laws were respected.

3.5. Data Analysis

Skewness and kurtosis values were calculated to reveal whether the data follows a normal distribution. It was seen that the skewness values were less than +2 and more than −2 which is the assumption of normality (Hair, Hult, Ringle, & Sarstedt, 2017). The results suggested that the skewness values ranged from −0.837 to 0.556 and the kurtosis ranged from −0.782 to 0.730 confirming that the data is normally distributed. The quantitative data were analyzed using descriptive analysis. In descriptive statistics, the arithmetic mean (M) and standard deviation (SD) were presented to interpret the survey items. Since the normal distribution was not violated, independent *t*-test and analysis of variance (ANOVA) were calculated using SPSS version 25. In inferential statistics, the *t*-test and one-way ANOVA were calculated to explore whether students' attitudes had a significant difference regarding gender, age, year of study, etc. The Tukey post-hoc test was used to check the differences between the groups.

4. Findings

This study investigated undergraduate students' e-learning attitudes in Indonesia. In this section, the findings are presented in tables.

4.1. Students' Level of E-Learning Attitudes

There are two sub-dimensions of the scale that measure student' e-learning attitudes. The descriptive statistics for each sub-dimension are shown in Table 1.

Table 1. Findings related to attitude towards e-learning.

Sub-dimension	N	Min.	Max.	M	SD
Avoidance of e-learning	342	1.30	5.00	3.15	0.62
Proneness to e-learning	342	1.10	5.00	3.11	0.67
All sub-dimensions	342	1.35	5.00	3.13	0.56

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When Table 1 was examined, it was determined that the arithmetic mean of students' attitudes was 3.13 and the standard deviation was 0.56. This mean corresponds to the "neutral" range. The students' mean e-learning attitude scores were close to the average for "avoidance of e-learning" (M = 3.15, SD = 0.62) and "proneness to e-learning" (M = 3.11, SD = 0.67) by examining detailed survey sub-dimensions. It can be concluded that undergraduate students' attitudes towards e-learning are at a moderate level that the range of the scale was 1 to 5.

Further analysis was then carried out to explain whether students' e-learning attitudes differed statistically in terms of various variables. The results of the inferential analysis are summarized in Table 2 to Table 7.

4.2. Differences in Attitudes towards E-Learning by Gender

A t-test was conducted in order to find out whether the students' attitudes towards e-learning varied by gender. As shown in Table 2, students' attitudes towards e-learning did not vary by gender in terms of the "avoidance of e-learning" (t = 1.358; p>0.05) and "proneness to e-learning" sub-dimensions (t = 1.436; p>0.05). The results indicated that male and female students have similar attitudes. Therefore, it can be inferred that gender did not affect attitudes towards e-learning. Male students surpassed females in all sub-dimensions, though the difference was not statistically significant.

Table 2. Students' attitudes towards e-learning by gender.

Sub-dimension	Gender	N	M	SD	t	p
Avoidance of e-learning	Female	255	3.121	0.582	1.358	0.175
	Male	87	3.225	0.711		
Proneness to e-learning	Female	255	3.079	0.669	1.436	0.152
	Male	87	3.199	0.676		
All sub-dimensions	Female	255	3.100	0.545	1.600	0.111
	Male	87	3.212	0.613		

4.3. Differences in Attitudes towards E-Learning by Age

A t-test analysis was carried out to check if the attitudes towards e-learning differentiated according to the age group of the participants. As listed in Table 3, students' mean scores for "avoidance of e-learning" did not differ significantly by age group (p>0.05). However, students' mean scores for "proneness to e-learning" were found to differ significantly (p<0.05). Overall, it is clear that students' attitudes differed significantly by age (p<0.05). Specifically, students aged 21 and over had more positive attitudes compared to those between 18 and 20 years. Thus, it can be concluded that age affects attitudes towards e-learning.

Table 3. Students' attitudes towards e-learning by age group.

Sub-dimension	Age	N	M	SD	T	p
Avoidance of e-learning	18–20 years	290	3.128	0.617	1.396	0.164
	21 years or more	52	3.258	0.618		
Proneness to e-learning	18–20 years	290	3.066	0.663	2.875	0.004
	21 years or more	52	3.354	0.677		
All sub-dimensions	18–20 years	290	3.097	0.560	2.476	0.014
	21 years or more	52	3.306	0.563		

4.4. Differences in Attitudes towards E-Learning by Study Year

A one-way ANOVA was conducted to determine if the e-learning attitudes differentiated according to the year of study. When Table 4 is examined, the attitudes towards e-learning of fourth-year students were slightly higher than those of third-year, first-year and second-year students for all sub-dimensions.

Table 4. Students' attitudes towards e-learning by year of study.

Sub-dimension	Study year	N	M	SD	F	p
Avoidance of e-learning	First-year	162	3.209	0.609	4.009	0.008
	Second-year	81	2.948	0.569		
	Third-year	66	3.174	0.609		
	Fourth-year	33	3.282	0.712		
Proneness to e-learning	First-year	162	3.037	0.654	5.419	0.001
	Second-year	81	3.040	0.626		
	Third-year	66	3.168	0.674		
	Fourth-year	33	3.521	0.733		
All sub-dimensions	First-year	162	3.123	0.544	4.368	0.005
	Second-year	81	2.994	0.522		
	Third-year	66	3.171	0.580		
	Fourth-year	33	3.402	0.646		

The results revealed that there was a statistically significant gap in students' attitudes on the "avoidance of e-learning" (F = 4.009, p<0.05) and "proneness to e-learning" sub-dimensions (F = 5.419, p<0.05) in favor of fourth-year students (see Table 4). These differences were then investigated by Tukey's post hoc tests. As a result, fourth-year students had significantly higher attitude ratings than first-year and second-year students for all sub-dimensions. The specific difference was that the mean scores of first and fourth-year students for avoidance of e-learning were significantly higher than those of the second-year students. The mean score of fourth-year students for proneness to e-learning was significantly higher than that of both first and second-year students. Therefore, it can be concluded that the year of study variable has an impact on e-learning attitudes.

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4.5. Differences in Attitudes towards E-Learning by Personal Computer Ownership

A *t*-test study was performed to see if attitudes towards e-learning varied by possessing a personal computer. It was observed that students' attitudes did not vary by having a personal computer in terms of the "avoidance of e-learning" sub-dimension ($t = 1.275$; $p>0.05$) and that students who did not have a desktop computer had significantly more positive attitudes in terms of the "proneness to e-learning" sub-dimension ($t = 2.759$; $p<0.05$). According to Table 5, students who owned a personal computer rated themselves higher on e-learning attitudes than students who did not. Accordingly, it can be stated that having a personal computer affects e-learning attitudes.

Table 5. Students' attitudes towards e-learning by personal computer ownership

Sub-dimension	Owner of a PC	N	M	SD	t	P
Avoidance of e-learning	Yes	317	3.16	0.606	1.275	0.203
	No	25	2.996	0.76		
Proneness to e-learning	Yes	317	3.138	0.66	2.759	0.006
	No	25	2.756	0.733		
All sub-dimensions	Yes	317	3.149	0.551	2.34	0.02
	No	25	2.876	0.681		

4.6. Differences in Attitudes towards E-Learning by Daily Internet Usage Time

An ANOVA test was checked in order to explain whether students' attitudes towards e-learning varied by daily internet usage duration. According to Table 6, students' attitudes did not differ either in terms of "avoidance of e-learning" ($F = 1.426$; $p>0.05$) or in terms of "proneness to e-learning" ($F = 0.527$; $p>0.05$). Thus, it can be concluded that daily time spent using the internet did not affect attitudes towards e-learning. Students who used the internet for 1-2 hours each day had more positive attitudes than the others although this was not statistically significant. Overall, there was a decline in attitude scores along with increased daily internet use.

Table 6. Students' attitudes towards e-learning by daily internet usage time

Sub-dimension	Internet use	N	M	SD	F	p
Avoidance of e-learning	1–2 h	2	3.750	0.354	1.426	0.235
	3–4 h	35	3.283	0.596		
	5–6 h	98	3.160	0.566		
	7 h or more	207	3.113	0.644		
Proneness to e-learning	1–2 h	2	3.400	0.849	0.527	0.664
	3–4 h	35	3.177	0.603		
	5–6 h	98	3.150	0.691		
	7 h or more	207	3.076	0.675		
All sub-dimensions	1–2 h	2	3.575	0.601	1.116	0.343
	3–4 h	35	3.230	0.552		
	5–6 h	98	3.155	0.520		
	7 h or more	207	3.095	0.585		

4.7. Differences in Attitudes towards E-Learning by COVID-19 Fear Level

An ANOVA test was then carried out in order to determine whether or not the students' learning attitudes differed according to their levels of fear of virus infection. Table 7 illustrates that there was no statistically significant variation in the average scores for "avoidance of e-learning" ($F = 1.751$, $p = 0.156$) and "proneness to e-learning" ($F = 0.361$, $p = 0.781$) based on the participants' levels of concern about spreading COVID-19. Thus, it can be assumed that the levels of fear of virus infection did not affect attitudes towards e-learning. Nevertheless, students who were very afraid of exposure to COVID-19 showed more positive attitudes than others.

Table 7. Students' attitudes towards e-learning by the levels of fear of virus infection

Sub-dimension	COVID-19 fear level	N	M	SD	F	p
Avoidance of e-learning	Very fearful	53	3.304	0.796	1.751	0.156
	Fearful	137	3.161	0.619		
	Slightly fearful	119	3.082	0.542		
	Not fearful at all	33	3.076	0.524		
Proneness to e-learning	Very fearful	53	3.170	0.868	0.361	0.781
	Fearful	137	3.129	0.654		
	Slightly fearful	119	3.077	0.597		
	Not fearful at all	33	3.049	0.666		
All sub-dimensions	Very fearful	53	3.237	0.733	1.139	0.333
	Fearful	137	3.145	0.553		
	Slightly fearful	119	3.080	0.516		
	Not fearful at all	33	3.062	0.454		

5. Discussion

This research aimed to determine Indonesian students' attitudes towards e-learning using a questionnaire. In this study, 20 items are used to test respondents' attitudes towards e-learning in a higher education institution. The results of the analysis show that the mean score for "proneness to e-learning" is similar to the mean score for "avoidance of e-learning". According to Table 1, students' attitudes are at a medium level. Therefore, it can be concluded that the students have a neutral attitude towards e-learning. The neutral attitude of students may be related to students' recent experiences with online learning and the use of digital technology tools. E-learning had not been well adopted in universities in Indonesia before the pandemic. Muflih et al. (2021) and Alsahou et al.

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(2022) previously evaluated university students' views towards e-learning during the COVID-19 epidemic. The existing studies in the literature revealed that participants have neutral attitudes towards e-learning. However, the results of our study and Akcil and Bastas (2020) contradict findings from some existing studies which found that students hold negative attitudes (Güllü et al., 2022; Mahfouz & Salam, 2021; Oducado & Soriano, 2021) while others reported positive attitudes (Malkawi et al., 2020; Uyar, 2023; Zengin et al., 2023).

According to gender, it is important to note that the mean scores of male students are slightly higher than those of female students. Nevertheless, there was no statistical difference in any sub-dimension of the scale. According to the findings, gender does not impact attitudes towards e-learning. The absence of gender differences in attitudes might be due to the rapid popularity of technology among young adults and the ease of access to online learning (Yu & Deng, 2022). This finding is in line with Nistor (2013) who reported that differences in e-learning attitudes between genders were not significant. Akcil and Bastas (2020) also found that there was no gap in the e-learning attitude by gender. In contrast, earlier studies (Gill et al., 2022; Özüdoğru, 2022; Sezer, 2016) reported that e-learning attitudes significantly differed by gender. Male students surpassed female students in all sub-dimensions of the current study. However, the differences were not statistically significant. It implies that male students are more confident in using e-learning platforms because male students support the activities and application of educational technology in online learning during the pandemic and have a greater attitude score than female students. The generally accepted fact is that male students are more likely to use technology for learning than females (Sezer, 2016; Yau & Cheng, 2012). Male students have greater computer experience and ICT skills. These competencies will influence attitudes towards e-learning among students.

Regarding participants' age, the results highlight that there was an important disparity in the participants' attitudes towards proneness to e-learning whereas there were no differences between age groups for avoidance of e-learning. Overall, the findings indicate that a statistically significant difference in attitudes existed between undergraduate students aged between 18 and 20 years and those aged 21 years or older. It can be argued that age was a determining factor in attitudes towards e-learning. Our results related to the age group are similar to the findings of Güllü et al. (2022) who reported that the effect of age on students' e-learning attitudes resulted in a statistically significant difference. The results of our study contradicted the findings of earlier studies that significant differences in attitudes were not observed among different age groups (Erdogan et al., 2008; Thapa et al., 2021). In our study, the participants who were 21 years or older had the highest mean scores regarding attitudes towards e-learning. It is worth noting that older students showed more positive attitudes towards e-learning than younger students. Thus, one may note that being older is related to a positive attitude towards online learning. This finding is in agreement with Güllü et al. (2022) and Al-Anezi (2021) who found that the attitude scores of older students were significantly greater than those of younger students. The differences between age groups could be due to the experiences of older students with online courses at the university. Students' perceptions of online learning improve with increased internet exposure and the benefits of taking courses online.

Our study also revealed that a significant year gap was found in favor of fourth-year students on attitudes towards e-learning. In particular, there was a statistically significant difference among the years of study in terms of avoidance of e-learning and proneness to e-learning. In general, students from the four different years showed a moderate level of all sub-dimensions. The findings support several relevant previous studies (Akcil & Bastas, 2020; Malkawi et al., 2020) suggesting a significant effect of students' years of study on attitudes towards online learning. However, this contradicts the results of Gill et al. (2022) and Mahfouz and Salam (2021) who observed no changes in terms of the study year. In the current study, the results indicated that four-year students have the highest mean attitude scores compared to first-year, second-year and third-year students. The findings reflect that years of university studies could elevate the students' attitudes. This result is consistent with Yağcı, Sırakaya, and Özüdoğru (2015) and Baruth, Gabbay, Cohen, Bronshtein, and Ezra (2021). This may be due to the fact that students at higher levels gain more experience and exposure to digital technologies. Furthermore, they tend to use online learning more than other groups both on and off campus which improves their e-learning attitudes.

In general, there was a statistical difference between the e-learning attitudes of students who owned personal computers and those who did not. The ratings of participants who owned computers differed significantly from their counterparts who did not own computers for proneness to e-learning and e-learning attitudes in general. The findings imply that having a personal computer could shape the students' attitudes. This provides evidence that students who own personal computers have higher attitude scores on the avoidance of e-learning and proneness to e-learning sub-dimensions. This finding confirms the results of Güllü et al. (2022) and Uyar (2023). They agreed that the level of students' attitudes towards e-learning showed a significant difference in terms of having a computer variable. Computers have now become an essential tool in university life to support online lectures. Therefore, personal computer ownership is a possible reason that might increase students' satisfaction with online learning which eventually improves students' presence in online learning and promotes their attitudes. This reflects that during distance education, students are becoming increasingly aware that the use of mobile devices (e.g., computers and smartphones) can contribute to overcome many barriers to learning (Cahyana, Luhukay, Lestari, Irwanto, & Suroso, 2023; Irwanto, Afrizal, Lukman, Agung, & Wijayako, 2023; Irwanto, Afrizal, Lukman, Putricia, & Wijayako, 2023). This contradicts Oducado and Soriano (2021) and Brumini et al. (2014) who mentioned no significant differences in the attitude of the students towards e-learning based on ownership of a personal computer.

The findings related to the daily internet usage duration suggested no significant difference in sub-dimensions of e-learning attitudes. It can be said that daily internet usage time does not significantly affect students' attitudes. Therefore, the frequency of daily internet use may not have an impact on students' attitudes towards e-learning. Nevertheless, students who spent 1–2 hours a day online reported higher levels of attitudes than those who spent between 3–4 hours, 5–6 hours and 7 hours or more. This indicates that the longer students use the internet, their attitudes tend to decrease. This study also revealed that there was no significant difference in terms of students' attitudes towards e-learning based on daily internet usage duration (Aksoy, 2021; Niroumand et al., 2022). Another possible reason for this situation may be that students use the internet more for entertainment purposes; thus, they do not see internet use as a necessity to support their online learning. This is in accordance with the

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opinion of Sert and Başkale (2023) who revealed that students used social media more frequently during the pandemic than before.

Lastly, the results related to attitudes revealed no significant differences between fear levels for the coronavirus. The findings indicate that the level of COVID-19 fear does not significantly affect students' attitudes. Despite being statistically insignificant, undergraduate students' attitudes towards e-learning positively increased as their fear level increased. Students who were very afraid of being infected with COVID-19 reported higher levels of attitude than their counterparts who were afraid, slightly afraid or not afraid at all. This is in agreement with Arabshahi, Saeieh, and Kohan (2023) who revealed no significant effects of fear of COVID-19 on e-learning readiness. Contrary to our study, Majali, Al-Kyid, Alhassan, Barkat, and Almajali (2022) explained that fear of COVID-19 has a positive impact on implementing online learning programs. The reason might be that students in the current study are not prepared to be actively involved in distance learning during the pandemic. Another explanation might be related to low students' self-regulatory and their technical skills and poor instructional support, internet connectivity and infrastructure support. As a result, students fear that they will face many difficulties while taking online courses which in turn decreases student satisfaction with e-learning (Güllü et al., 2022). This also correlates with the thoughts of Gurban and Almogren (2022). It is clearly stated that the COVID-19 outbreak has caused undergraduate students to experience various social and psychological problems (Zengin et al., 2023). In this context, it can be argued that students' dissatisfaction with distance learning and their discomfort in the online learning environment could be another reason behind the findings. Students' perceived unusualness and difficulty using online learning platforms lead to decreased learning effectiveness and productivity which in turn decreases their attitude towards remote learning. Therefore, it is necessary for educators to provide psychological motivation that can increase student involvement with e-learning.

6. Conclusion and Recommendations

This study was conducted to evaluate students' attitudes towards e-learning concerning their gender, age, study year, possession of computers, daily internet use and fear levels of COVID-19. The study highlighted that students' attitudes tend to be neutral according to the self-reported survey conducted among 324 students. This study also explains the factors that influence student attitudes towards online learning. Our study found no significant difference in students' attitudes towards e-learning with regard to gender, daily internet usage time or level of COVID-19 fear. It is implied that gender, frequency of internet usage and level of fear related to COVID-19 had no bearing on the level of undergraduate students' attitudes towards remote learning. On the other hand, students' attitudes differ significantly based on age group, year of study and personal computer ownership. Students' age, year of study and computer ownership can affect students' attitudes towards distance education during the pandemic. Therefore, our study provides a basis for future research. This study also helps to fill a research gap in the literature and adds useful contributions to the body of knowledge. Our study contributes to the literature regarding e-learning attitudes during COVID-19 in developing countries such as Indonesia.

Several limitations of this study should be considered. First, we only involve undergraduate students in Indonesia. Future research involving students of different educational levels could help reveal the relationship between the variables of e-learning attitudes. Third, the cross-sectional method used in this study was implemented to investigate students' attitudes at a specific time. However, gathering data at a single point in time about attitudes is insufficient, as attitudes change throughout the academic year (Akcil & Bastas, 2020; Malkawi et al., 2020). Therefore, future researchers should investigate the issue longitudinally. Lastly, in the present study, the majority of participants were female students while the proportion of male students is relatively low and the number of students in the fourth year was very different from the other three academic year groups. Future studies should consider differences in gender and year of study in a more comprehensive manner to explore students' attitudes towards e-learning. Despite its limitations, our study makes a valuable contribution to our understanding of how students' attitudes differ with regard to different demographic factors.

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