

A study on changing student opinion on e-learning in the pandemic period

Pandemi döneminde e-öğrenmeye yönelik değişen öğrenci görüşleri üzerine bir araştırma

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Abstract

The COVID-19 pandemic has affected every organization and every aspect of life worldwide. The pandemic has caused unexpected confusion across academic institutions, with almost all universities forced to shift from traditional face-to-face classrooms to e-learning education. Universities have leveraged advanced technologies to continue their activities, with recent technologies increasing learning effectiveness. This research aims to track the changing opinion of engineering students on e-learning applications. The research was conducted with 408 Maltepe University, Istanbul, Turkey engineering students. The results showed that engineering students' opinions had changed dramatically toward e-learning due to the prolongation of the epidemic period. This study confirmed the downward trend, consistent with the outcomes of recent studies. Furthermore, the study results showed that students prefer face-to-face or hybrid education to online learning. Social isolation, technical problems encountered, and inefficient education at home with limited opportunity to interact with the instructors play an important role in this changing decision. This study also may guide and decrease the response time on possible shutdowns that may occur in the future due to various reasons.

Keywords: E-learning, COVID-19, Behavioural Ergonomics, Opinion of Students

Jel Codes: I10, I21, C12

Öz

COVID-19 salgını dünya çapında her kuruluşu ve yaşamın her yönünü etkiledi. Pandemi, neredeyse tüm üniversitelerin geleneksel yüz yüze sınıftan e-öğrenme eğitimine geçmek zorunda kalmasıyla akademik kurumlar arasında beklenmedik bir kafa karışıklığına neden oldu. Üniversiteler, faaliyetlerini sürdürmek için ileri teknolojilerden yararlanmaya başladılar. Bu araştırmanın amacı, mühendislik öğrencilerin e-öğrenmeye ilişkin değişen tutumlarını izlemektir. Araştırma İstanbul Maltepe Üniversitesi'nde öğrenim gören 408 kişilik bir mühendislik öğrenci grubu ile gerçekleştirilmiştir. Sonuçlar, salgın döneminin uzaması nedeniyle öğrencilerin e-öğrenmeye yönelik tutumlarının önemli ölçüde değiştiğini göstermiştir. Bu çalışma, son çalışmaların sonuçlarıyla tutarlı olarak düşüş eğilimini doğrulamıştır. Çalışmanın sonuçları, öğrencilerin çevrimiçi öğrenme yerine yüz yüze eğitim veya hibrit eğitim modelini tercih ettiğini göstermiştir. Bu değişen kararda sosyal izolasyon, karşılaşılan teknik sorunlar ve evde eğitimin yetersiz ve öğretmenlerle etkileşime geçme imkanının kısıtlı olması önemli rol oynamıştır. Bu çalışma ileride çeşitli nedenlerle meydana gelebilecek olası kapanmalarda reaksiyon süresini azaltabilir.

Anahtar Kelimeler: E-öğrenme, COVID-19, Davranışsal Ergonomi, Öğrenci Görüşü

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Introduction

The emergence of the major international COVID-19 public health crisis in late March 2020 caused most education institutions worldwide to abruptly close to decrease the speed of spread (Wong, Goh, Tan, Lie, Tay, Ng & Soh, 2020). Instead, during the pandemic, e-learning has become the main method of education. After a significant period of e-learning, a questionnaire was applied to comprehend students' changing perceptions of the learning mode.

Rapid developments in information technologies have made it easy for educational institutions to transfer the e-learning style. However, the abrupt change to e-learning mode has led to confusion and uncertainty among many students, instructors, and managers, especially those not used to teach using virtual platforms – nonetheless, this “new normal” has become widely accepted. In addition, the COVID-19 pandemic has triggered a digital transformation of e-learning (Bonafini, Chae, Park & Jablokow, 2017).

Previous studies before the pandemic generally suggest that e-learning tools were positively accepted (Ahn & Bir, 2018). However, before the pandemic, the e-learning mode of education was relatively uncommon and was seen instead as an extension of face-to-face education. Some institutions and universities pushed forward with this style of tuition; however, when the COVID-19 pandemic broke out, most institutions had no choice but to apply this method of education. Some institutions were fortunate, having invested in e-learning technologies, whereas others were ill-prepared for the change.

Early studies during the pandemic period showed that e-learning received higher rates of support from students because they experienced freedom in university life and had spare time and flexibility (Bączek, Zagańczyk-Bączek, Szpringer, Jaroszyński & Woźakowska-Kapłon, 2020; Elzainy, El Sadik & Al Abdulmonem, 2020; Fields & Hartnett, 2020; Heng & Sol, 2020; Sreehari, 2020; Norah & Shabir, 2020). However, as time passed, students' perceptions of e-learning began to decrease due to social needs and the ambiguity in virtual classrooms (Abdelmola, Makeen, Hanafi & Ageeli, 2021; Lockee, 2021; Maatuk, Elberkawi, Aljawarneh, Rashaideh & Alharb, 2021; Nworie, 2021; Wang, Li, Malik & Anwar, 2021). Therefore, evaluating the engineering students' changing opinions on e-learning constituted the aim of this study.

The hypotheses of the study are:

1. H1: There is a change in engineering students' opinion on e-learning arrangements concerning their initial judgment in the early period of the pandemic.
2. H2: There is a significant difference among grades in changing opinions on e-learning.
3. H3: There is a significant difference between genders in changing opinions on e-learning.

The research questions of the study are as follows:

1. If there was a change in engineering students' opinion, which group changed from positive to negative or vice versa, and at what level?
2. What are engineering students' evaluations of the efficiency of e-learning?
3. Which advantages and the engineering students express disadvantages of e-learning?
4. Which type of education model (face-to-face, e-learning, or hybrid) is requested more for future semesters?

A literature review of the e-learning mode of education and the COVID-19 pandemic is provided in the next chapter. Then, in the methodology section, details of the quantitative research method were expressed. The online survey method was selected and applied to 408 students, and the descriptive analyses were conducted using SPSS software version 25.0. Finally, the findings are interpreted in the results and discussion section, and recommendations for students and directors are provided for future education planning.

Literature review

The COVID-19 pandemic has led to global shutdowns in almost all areas of life, including universities and other educational institutions. Consequently, universities have switched to an e-learning model. This choice was challenging for some institutions, as they did not have sufficient infrastructure and expertise. For others, it was relatively easy due to their readiness level, experience, and infrastructure capabilities.

According to Ribeiro (2020), “online learning is not a novel discovery, dates back to the 1980s, and it has regularly been viewed from the perspective of good-to-have alternative but not a serious-mission model to guarantee steadiness of instructional activities”.

Fry (2001) described e-learning as “the use of the internet and other important technologies to develop materials for educational purposes, instructional delivery and management of programs”. Another definition by Means, Toyama, Murphy, Bakia & Jones (2009) is “the educational usage of technological devices, tools, and the internet”. Finally, a recent definition by Singh & Thurman (2019) is “a tool that can make the teaching-learning process more student-centred, innovative, and even more flexible”.

Overall, e-learning is completely dependent on information technologies. Specifically, it needs a suitable internet connection and physical devices. Students and teachers should have basic computer skills, and IT departments should be ready and capable of assisting quickly to students and instructors in all technical aspects of e-learning.

According to previous studies, the advantages of e-learning can be summarized as: (i) remote teaching of course content eliminates the time and physical location constraints; (ii) e-learning can be personalized according to individual needs; (iii) self-pacing; (iv) elimination of compulsory attendance; (v) proven to be a budget-friendly model of education decreasing total education cost; and (vi) high levels of interaction among students and instructors, which is a particularly important aspect of e-learning. (Leszczyński, Charuta, Łaziuk, Gałązkowski, Wejnarski, Roszak, & Kołodziejczak, 2018; Kannankara, 2020; Smedley, 2010).

However, online classes also have limitations; infrastructure and technical problems resulting from poor internet connections and related quality problems are important (Favale, Soro Trevisan, Drago & Mellia, 2020). In addition, some benefits like flexibility and self-pacing may become problems if students lose self-discipline. Likewise, losing personal attention is also another limitation outside of face-to-face learning settings. As noted above, successful e-learning also requires the support of IT departments (Barteit, Guzek, Jahn, Bärnighausen, Jorge & Neuhann, 2020; McCoy, Pettit, Lewis, Bennett, Carrasco, Brysacz, Makin, Hutman & Schwartz, 2015; Kolbaek, 2018). Additionally, teachers may encounter difficulties tracking and testing students’ learning levels.

Synchronous e-learning enables real-time communication via voice and video. This is a preferable type of e-learning if the lecture requires instant feedback and discussion. In asynchronous learning, however, students study independently from time and location. Therefore, asynchronous methods are more student-centred as they give more flexibility. In addition, online and offline computer applications such as email and instant messaging can be used in asynchronous e-learning (Zelenak, 2006).

Games and gameplay are new types of e-learning delivery tools. However, gamification in e-learning is still a developing trend and has great potential (Zelenak, 2006).

Overall, as long as education continues to be a major economic prospect, e-learning and tools will continue to develop and be more cost-effective than physical classrooms.

Method

This study used a quantitative research method, and an online survey was developed and applied using Google forms. The survey was sent to the students via the Blackboard platform and emails. Compared to other methods, web surveying allows a moderately larger group to be readily reached.

The 11-item questionnaire was prepared in three sections: demographic details, opinions on e-learning arrangements, and education model preference. The first section comprised two questions collecting participants’ demographic data, current grades, and gender. The second section had two questions about participants’ computer skill levels and previous e-learning experiences. The last section contained seven questions about the participants’ current e-learning experiences and future expectations.

In this study, the sample group (n = 408; male students = 146, female students = 262) (graduate=68, undergraduate=340) comprised students of the Natural Science and Engineering Faculty of Maltepe University, Istanbul, Turkey. The Natural Science and Engineering Faculty of Maltepe University has 1200 students, and this sample size is deemed large enough to represent the population (Neuman, 2014).

Ethical approval was not sought for the present study because the survey was conducted before January 1, 2020.

Results

Collected data was analyzed, and the results are as follows:

The Kolmogorov-Smirnov test result was 0.200 (i.e., >0.05), indicating that the data were normal. An independent sample t-test was performed on each hypothesis to test whether there was a statistically significant difference in their means.

The Cronbach’s alpha test showed that the survey had sufficient internal consistency and reliability. In terms of the overall questionnaire, Cronbach’s alpha test value was 0.756. In addition, the reliability coefficient was over 0.70, indicating that the questionnaire used is reliable and has internal consistency (Nunnally & Bernstein, 1994).

H1(There is a change in engineering students’ opinion on e-learning arrangements concerning their initial judgment in the early period of the pandemic) was not rejected with a Sig. (2-tailed) value of 0.011 (<0.05); this shows a significant difference between the initial judgment and current opinion on the e-learning model.

However, H2 (There is a significant difference among grades in changing opinion on e-learning) was rejected with a Sig. (2-tailed) value of 0.713 (>0.05) indicates no significant difference among grades.

H3 (There is a significant difference between genders in changing opinions on e-learning) was also rejected with a Sig. (2-tailed) value of 0.593 (>0.05) indicates no significant difference in results between genders.

The results in Table 1 show that every variable has almost the same mean value as the others, indicating that every parameter has an almost equal effect on the result.

Table 1: Mean Values of Variables versus Group Variables

	N	Mean	Std. Deviation	Std. Error Mean
Opinion on e-learning at first in Pandemic Period	Female (262) 64%	3.33	.986	.061
	Male (146) 36%	3.70	1.091	.090
	First Year Student (80) 20%	2.93	.897	.100
	Second Year Student (71) 17%	3.01	1.089	.129
	Third Year Student (96) 24%	3.68	.775	.079
	Fourth Year Student (93) 23%	3.67	1.046	.108
	Graduate (68) 17%	3.97	1.036	.126
Opinion on e-learning today in Pandemic Period	Female (262) 64%	3.07	1.082	.067
	Male (146) 36%	2.77	1.192	.099
	First Year Student (80) 20%	2.21	1.076	.120
	Second Year Student (71) 17%	2.28	1.278	.152
	Third Year Student (96) 24%	2.32	.957	.098
	Fourth Year Student (93) 23%	3.04	1.474	.153
	Graduate (68) 17%	3.10	1.329	.161
Efficiency of e-learning	Female (262) 64%	3.07	1.082	.067
	Male (146) 36%	2.77	1.192	.099
	First Year Student (80) 20%	2.43	.792	.089
	Second Year Student (71) 17%	2.77	1.365	.162
	Third Year Student (96) 24%	2.90	1.000	.102
	Fourth Year Student (93) 23%	3.35	1.100	.114
	Graduate (68) 17%	3.35	1.117	.135

Table 2: Students’ Changing Opinion on E-Learning

	Changed to positive	Same	Changed to negative
Female (262) 64%	47 (18%)	57 (22%)	158 (60%)
Male (146) 36%	16 (11%)	34 (23%)	96 (66%)
Undergraduate (340) 83%	54 (16%)	70 (21%)	216 (63%)
Graduate (68) 17%	9 (13%)	21 (31%)	38 (56%)

Table 3: Students’ Efficiency Perception on E-Learning concerning Face-to-face Education

	Less Effective	Same	More effective
Female (262) 64%	68 (25%)	108 (41 %)	86 (32%)
Male (146) 36%	59 (40%)	58 (40%)	29 (20%)
Undergraduate (340) 83%	107 (31%)	148 (44%)	85 (25%)
Graduate (68) 17%	20 (30%)	18 (26%)	30 (44%)

Table 4: Advantages of E-Learning Expressed

	Ease of staying at home during lecture time and after	Reaching the lecture and course materials anywhere, anytime
Female (262) 64%	165 (63%)	97 (37%)
Male (146) 36%	54 (37%)	92 (63)
Undergraduate (340) 83%	170 (50%)	170 (50%)
Graduate (68) 17%	49 (72%)	19 (28%)

Table 5: Disadvantages of E-Learning Expressed

	Inefficient education	Lack of interaction with the instructor	Social isolation	Losing self-discipline	Technical problems
Female (262) 64%	38 (15%)	63 (24%)	56 (21%)	18 (7%)	87(33%)
Male (146) 36%	6 (4%)	48 (33%)	68 (47%)	15 (10%)	9(6%)
Undergraduate (340) 83%	34 (10%)	91 (28%)	100 (29%)	32 (9%)	83 (24%)
Graduate (68) 17%	10 (15%)	20 (30%)	24 (35%)	1 (1%)	13 (19%)

Table 6: Most Requested Future Education Model Expressed

	Full face-to- face	Full e-learning	Just theoretical lectures online	Hybrid
Female (262) 64%	63 (24%)	57 (22%)	51 (20%)	91(34%)
Male (146) 36%	24 (16%)	5 (3%)	29 (20%)	88 (61%)
Undergraduate (340) 83%	82 (24%)	48 (14%)	80 (24%)	130 (38%)
Graduate (68) 17%	5 (7%)	14 (21%)	0 (0%)	49 (72%)

Detailed evaluation of research questions:

1. If there was a change in opinion, which group changed from positive to negative or vice versa, and at what level?

Results of Table 1 showed that 85% of participants changed their ideas, and 15% kept them as before. It can be seen in Table 2 that students’ opinions changed negatively on e-learning. Most groups (56% to 66%) responded with their views as “changed to negative”. The minority of all groups (from 13% to 18%) expressed their views as “changed to positive”. It was understood that around 50% of the participants changed their ideas to negative ones. The study results show that the acceptance level of e-learning decreases the more the students experience it. In the early stages of students’ experiences with e-learning, the acceptance level was more than 70%; however, this began to decrease and ultimately fell below 50% (Fields & Hartnett, 2020; Heng & Sol, 2020; Norah & Shabir, 2020; Lockee, 2021; Maatuk et al., 2021; Wang et al., 2021). Notably, a large percentage of each group negatively changed its opinion on e-learning.

2. What are students’ evaluations of the efficiency of e-learning?

The results of students' efficiency opinions on e-learning concerning face-to-face education are given in Table 3. Different results were found for this second research question, as female respondents generally rated e-learning equally efficient as face-to-face education. Male students rated e-learning as "less effective" and "equally effective", with equal percentages of 40% for each response. While undergraduate students most commonly responded that e-learning was equally efficient as face-to-face learning, graduate students generally found it more effective than face-to-face education. This may be attributed to the fact that graduate students benefited more from e-learning opportunities than undergraduate students because of their course requirements. When the mean values of the efficiency of e-learning were evaluated, it was found that each group's supporting results were at almost the same level as those shown in Table 1.

3. Which advantages and the students' express disadvantages of e-learning?

When the results were examined in Table 4, two main advantages were identified: the opportunity to stay at home while attending the lecture and the ability to listen to and repeat the lecture anytime and anywhere. While 63% of male students selected "Reaching the lecture and course materials anywhere anytime" as the most important advantage of e-learning, female students selected "Ease of staying at home during lecture time and after" with the same percentage. Undergraduate students rated both advantages with the same percentage, i.e., 50%. The graduate student respondents most commonly selected "Ease of staying at home during lecture time and after" as the main advantage, with 72% selecting this option.

Students' perceptions of the disadvantages of e-learning are given in Table 5. For female students, technical problems were most commonly identified as the main disadvantage, whereas social isolation was chosen as the most important disadvantage for male students. Social isolation for both undergraduate and graduate groups was identified as the most significant disadvantage of e-learning. Therefore, social isolation may be the most important issue for rejecting e-learning arrangements for the highest proportion of respondents who filled in the questionnaire. Losing self-discipline was another important issue stated by the students, as staying at home without any other option for an extended period during a lockdown can result in a loss of self-discipline.

4. Which type of future education model (face-to-face, e-learning, or hybrid) is requested?

The engineering students' most-requested future education model is given in Table 6. As shown, the highest proportion of respondents in every group requested a hybrid learning model. Overall, it may be concluded that engineering students prefer lectures via the face-to-face model and e-learning platforms.

Discussion and conclusion

As a result of the COVID-19 outbreak, there was a sudden, unplanned, rapid transition to the e-learning education mode. This was a challenging situation to manage and adapt to. Initial studies revealed that students were generally more satisfied with e-learning (more than 70%) (Lall & Singh, 2020; Martin et al., 2019). The main aspects contributing to this positive opinion were the opportunity to stay at home during education time, the ability to listen to lectures at their convenience, and better planning and ease of use of time at home (Ardiansyahmiraja et al., 2021; Schrenk et al., 2021). However, in later studies, student satisfaction decreased to 60% as the situation became perceived as boring. Unfortunately, there was no choice due to the ongoing health crisis (Abdelmola et al., 2021; Elzainy et al., 2020; Norah & Shabir, 2020). Students felt that this situation would not end within a predictable timeframe, which began to strongly discourage them students and, accordingly, the positive aspects of e-learning began to be overlooked. Their social needs began to come to the forefront, overshadowing all of the advantages of the e-learning model.

In this study, students' acceptance levels of the e-learning model fell below 50% as a continuation of this trend. This study confirmed this downward trend, consistent with the outcomes of recent studies from various countries. Another important outcome of this study was that the students would prefer a blended model of education in future, once again in line with findings from recent studies.

Thus, it is recommended that future studies plan and conduct surveys in different countries and regions to make more reliable decisions regarding e-learning preferences.

The results of this study showed that participants were generally unhappy with the e-learning-only model; however, they also experienced several advantages from this approach. The main issue for students was their social needs during the pandemic (Abdelmola, 2021; Maatuk et al., 2021; Nworie, 2021).

According to the study results and the author's experience, the following concluding remarks and recommendations for students, administrators, and governmental bodies are listed below.

Ease of staying at home during lecture time and after (advantage), inefficient education in the e-learning model (disadvantage), and lack of interaction with the instructor (disadvantage):

The study's findings align with the literature (Lockee, 2021; Maatuk et al., 2021; Nworie, 2021; Wang et al., 2021). These advantages and disadvantages are expressed as very important pros and cons of the e-learning model by the students. Course material should be reviewed and adapted to leverage this advantage, eliminate the disadvantages, and turn them into opportunities. Instructors should be better prepared for the use of the e-learning model. They could potentially compile more course material as lecture time is generally used more effectively in the e-learning model than in the face-to-face education model. Instructors should refrain from conducting their lectures as a monologue and instead should encourage students' participation in the lecture through small questions. As a result, students should feel that they are important active members of the lecture rather than a passive listener. In addition, information technology infrastructure should be renewed and improved by governmental bodies to make better use of new interactive technology and course materials.

Reaching the lecture and course materials anywhere, anytime (advantage) and technical problems (disadvantage): This advantage and disadvantage pair show the importance of information technologies in modern daily life and parallel to the recent literature (Sreehari, 2020; Elzainy et al., 2021; Abdelmola et al., 2021; Norah & Shabir, 2020). In particular, ensuring digital equity is a crucial issue. The ease of access to course materials and determining the time and place of study were expressed as the main advantages of e-learning among participants. Administrators must invest in information technologies and human capital to effectively utilise this advantage and eliminate technical problems. Online education platforms administrated by university departments should be checked for the potential to develop new features. Data privacy is also an important issue in future educational and daily life. Cyber security measures should be revised and updated; backups must be stored in a safe environment and kept reliable. New technological developments should be closely tracked and translated rapidly into e-learning platforms to ensure access to course materials more quickly and easily.

Social isolation and losing self-discipline (disadvantages): These two disadvantages stated by students may be the most critical decision-making issue responsible for decreasing the acceptance ratio of e-learning from over 70% to below 50%, which was found in line with recent studies (Bączek et al., 2021; Sreehari, 2020). The psychological needs of students under the e-learning model are the most important aspect and, at the same time, maybe the hardest aspect to resolve. The other problems identified above may be solved by investing, training, or hiring expert personnel. However, psychological problems require a detailed analysis and specific study. Social and collaborative learning may be applied as a new model to increase the interaction between students and instructors. Suppose the administrators of universities are not successful in making considerable changes in psychological issues such as social isolation, losing self-discipline, and loneliness. In that case, the e-learning model will not attain its full potential despite its advantages.

Governments, Societies and educational institutions should be ready for possible future shutdowns for several reasons, such as pandemics, wars, social unrest or environmental issues. In addition, understanding the opinion of people during long periods of shutdowns may be helpful for future events and decrease the response time of the organizations.

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The author has no conflict of interest to declare.

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