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# Examining the efficacy of online learning in nurturing students' learning: an analysis of students' experiences

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## Abstract

**Purpose** – This research aims to understand how satisfied students were with their online learning experience and how actively engaged they were in their studies.

**Design/methodology/approach** – To study the breadth and depth of students' experiences and fully address the research aims, the researchers utilized a mixed method. Through a survey questionnaire with both closed-ended and open-ended questions, student responses were gathered. On a five-point Likert scale, the closed-ended questions were co-constructed. The research participants included students attending Pakistan's private university in Karachi. Participants from all programs were the authors' focus (i.e. undergraduate and graduate). A total of 552 students completed the survey questionnaire.

**Findings** – The study reveals students' level of satisfaction with their online encounters. Contextual restrictions, such as power outages, bad internet, a lack of a private place and administrative problems, make it difficult to access and connect during learning sessions. Additionally, the student's perception of online learning as being more secure and safe in terms of their physical safety was an intriguing finding. They also see the integration of online and in-person learning as advantageous because it might reduce travel expenses and time while also giving them access to independent study resources. Given its many benefits, this research supports the use of online learning in higher education. Online education promotes a healthy mix of teacher- and student-centered instruction.

**Research limitations/implications** – Moreover, the findings indicate that effective non-verbal communication occurs when students interact with a teacher and colleague face-to-face. In a face-to-face teaching situation, good body language may inspire, engage and motivate students. Better learning outcomes result from being able to interpret people's body language, whether it be eye contact or posture, and alter the topic and approach. Keeping in view the recent nature of the coronavirus disease 2019 (COVID-19) pandemic, no research has been carried out on this topic to date or on such a wide-scale transition to online learning, specifically in the context of higher education in Pakistan (Dincer, 2018). This research is unique in its kind as it focuses on the impact of online learning on the affective domain as well.

**Practical implications** – Given the contextual concerns, teachers must find alternative educational insights that will enable students to reduce listening demands, improve self-learning and promote engagement.

**Social implications** – Therefore, in the authors' context, it is a unique finding that students felt socially isolated. While numerous studies have examined anxiety, still there is still a dearth of literature regarding stress factors (Dincer, 2018). The current study provided substantial information on the impact of online learning on students' stress levels, and the consequence is that they were strained out because they felt socially isolated. Additionally, these findings are in alignment with the qualitative data showing a problem of student isolation and a lack of engagement. Since the face-to-face mode had provided them with the time and space, they were able to engage in educational socialization outside the boundaries of the classroom, such as casual conversations during breaks, gatherings at coffee shops and working on group projects at the library.

**Originality/value** – This research was conducted in the context of Pakistan.

**Keywords** Online learning, Technology-mediated teaching, Mixed-method research

**Paper type** Research paper

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## Introduction

The integration of technology during coronavirus disease 2019 (COVID-19) enabled the dismantling of barriers between classroom and home learning during the current decline. In several universities and formal educational institutes around the world, higher education uses hybrid and/or online teaching methods to ensure continuity and high-quality instruction (Akram *et al.*, 2021). The online instruction is theoretically seen as a flexible, engaging and affordable way to accelerate academic communication and professional contact between students and their teachers (Siddiqui *et al.*, 2022). According to international studies, online learning offers students, teachers and the learning content adequate connectivity and interaction at any time (Garcia-Gonzalez *et al.*, 2020). As a result, formal education systems changed as it became clear that there needed to be more than one classroom, one textbook and a small number of learning opportunities (Siddiqui *et al.*, 2023).

Many educational institutions, however, were compelled to close for an extended amount of time in order to protect the physical health of the students; therefore, the main adaptation of online learning mode has occurred as a need rather than a choice (Akram *et al.*, 2021). In the past research studies, access, quality and flexibility, to name a few, were only a few of the consequences of online learning that were examined (Siddiqui *et al.*, 2022). Due to the teachers' technological, pedagogical and content expertise as well as the ease of access to cutting-edge resources, online learning has received the highest ratings for effectiveness in developed countries (Garcia-Gonzalez *et al.*, 2020; Siddiqui *et al.*, 2020; Akram *et al.*, 2021). There are, however, counterarguments that contend that it is a fallacy to believe that online education is always the best option. The current discrimination has mostly increased as a result of the speedy adaptation during COVID-19 (Garcia-Gonzalez *et al.*, 2020; Siddiqui *et al.*, 2020).

Due to the teachers' technological, pedagogical and content expertise, as well as the ease of access to cutting-edge resources, online learning has received the highest ratings for effectiveness in developed countries (Coman *et al.*, 2020). The rapid adaption has mostly exacerbated the discrimination that is already present due to the diverse socioeconomic status quo (Garcia-Gonzalez *et al.*, 2020). For instance, the inability of underprivileged students to complete activities related to education due to a lack of physical places for home-based learning, a lack of resources, a lack of experience with digital gadgets, power outages and poor network connections results in significant losses (Siddiqui *et al.*, 2022). The discipline and experiences of students' learning have also been adversely impacted by online learning environments (Siddiqui *et al.*, 2021). Perhaps the barriers include teachers' limited pedagogical understanding and technical proficiency (Siddiqui *et al.*, 2020).

There is a wealth of literature on the benefits and drawbacks of e-learning instructional designs and administrative concerns, but little study has been done on how teachers' pedagogical insights affect students' learning experiences when they adapt their teaching methods to the online environment (Siddiqui *et al.*, 2020). We also believe that, despite the significant contribution of research in this area, each study adds new dimensions and reflective insights. Our study aims to comprehend students' active learning engagement and degree of satisfaction in an online learning environment.

In order to assess what works and where changes should be made in the existing environment of online teaching and learning, this research intends to collect the educational and professional experiences of teachers and students. The technology acceptance model (TAM) (Mishra and Koehler, 2006) serves as the primary framework for the theoretical presumptions (Davis, 1989). In our research framework, a student's acceptance of technology (TA) is one of the components.

This study examines the impact of online learning on Pakistani higher education students' learning outcomes throughout the epidemic. This study sought to learn about the experiences of students in order to analyze what works and where online learning could be improved. This study's main objective was to examine the present problems and difficulties that

students were experiencing in the wake of the pandemic from their point of view. The research purposes covered in this paper are discussed in relation to:

(1) Elements influencing students' online learning experiences;

(2) Potential risks associated with creating learning facilities and

(3) Contextually appropriate defenses against threats.

To be specific, it raises the following questions.

(1) What are the factors influencing students' online learning experiences?

(2) What are the issues and challenges related to online learning?

(3) What are the potential benefits of online learning?

*Theoretical framework*

In modern day, information technology and online learning platforms are seen as essential components in carrying out the teaching-learning process at universities. Since it saves the cost (both in terms of time and money) of travel and lodging, students who must travel great distances to attend in person find online learning to be a more affordable form of education (Coman *et al.*, 2020). Since students choose their learning path and exert less physical exertion, literature shows that this method is practical, helpful and improves students' performance (Tanis, 2020). In contrast to the benefits, a number of drawbacks, such as poor communication, passive participation in class discussions and assignments and a lack of peer connection, have led to students' low motivation and restricted learning habits (Siddiqui *et al.*, 2022).

According to Carrillo and Flores (2020), the elements of creating an engaging learning environment in which the students do not become stressed out and create a sense of comfort are the foundation of the aspects associated with online learning comfort. The degree of comfort is present in all areas, including during interactions and while expressing opposing viewpoints. Another factor is social presence, which refers to how students feel about the standard of student-to-student interaction (Roddy *et al.*, 2017). Social presence highlights the value of collaborative learning and sharing knowledge among students, for example, through online discussion boards (Kerzic *et al.*, 2019).

Literature, especially about high-quality online learning experiences, suggests that teachers' pedagogical strategies, such as their efforts to design interactive activities, create precise and authentic assignments, offer and discuss course materials and exhibit technological and subject-matter proficiency, motivate online students (Roddy *et al.*, 2017; Coman *et al.*, 2020). In the context of this study, we define excellent learning as students actively engaging in learning activities, interacting with peers through discussion forums, working in groups and with peers, and receiving feedback. It is also predicated on observing the results of active learning and getting prompt teacher feedback. It also entails attending classes regularly and feeling comfortable discussing issues and questions with the lecturers. Everything revolves around making the teaching-learning process enjoyable in a supportive learning environment (Siddiqui *et al.*, 2020).

Quality learning has been characterized in the context of the current research study in terms of the student's active participation in their learning activities. Students' interests in controlling their learning, participation in a collaborative learning environment, completion of learning tasks and level of comfort with their learning results can all be used to understand student engagement (Schulte, 2015) in the involvement of the class. They can be observed executing academic activities, thinking critically, asking questions, debating their original

ideas with peers and facilitators, receiving feedback promptly and enjoying the entire teaching-learning process in a face-to-face or online learning environment (Siddiqui *et al.*, 2022).

Access to and ease of use of online learning resources have a substantial impact on students' learning (Tanis, 2020). Despite teachers' pedagogical insights, challenges with adopting the online mode and technological disruptions could have a negative impact on learning experiences and outcomes, raising students' discomfort (Ifinedo *et al.*, 2020). In an online classroom, this cutting-edge technology can help students pay more attention and show more interest (Siddiqui *et al.*, 2022). For this research study, the employment of digital technology to boost student engagement, attendance and academic satisfaction during the COVID-19 pandemic is considered to be a part of the online learning mode.

While assuming that all professors and students would have received adequate input and guidance to use the virtual learning instruments, the construct of an online learning setting is a mediator that might create a link between faculty professional practices and students' involvement (see Figure 1). Before discussing the assumptions, it is important to mention that this research aims to gather teachers' and students' educational and professional experiences to examine what works and what improvements could be made in the current scenario of online teaching and learning. It is suggested in the literature that the model developed to explain the technology adoption dynamics is the TAM (Mishra and Koehler, 2006). To study an e-learning system's acceptance by students, the framework of the TAM model has been successfully used. In our proposed research framework, the component "Technology Acceptance" (TA) includes a student's active learning experiences, access and comfort of using e-learning instruments.

On the other side is the factor that a teacher's professional practices integrate features of an online course as perceived by the student, including the teacher's component in the design and organization of the e-course and the analysis of the student learning process. Additionally, this is the study that intends to survey the digital competencies of students through all the mentioned sub-components of the TAM model, along with the access and comfort of using e-learning tools, emotions and feelings, online modality, social presence and online social comfort. Our model can contribute to the literature as the factors of emotions and feelings have not been investigated in other research studies (Dincer, 2018).

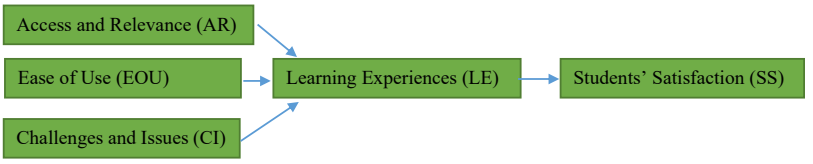
So these were our assumptions:

(1) Access and relevance of teaching instructions and learning materials significantly foster student learning experiences;

(2) Easy and smooth use of the online learning tool has a significant effect on learning experiences;

(3) The level of students' experiences resulted in students' satisfaction and

(4) Challenges and issues related to access to learning tools have an impact on learning experiences.




**Source(s):** The model developed by the authors

**Figure 1.**
Model developed

## Methodology and methods

To study the breadth and depth of students' experiences and fully address the research aims, the researchers utilized a mixed-methods methodology (Creswell and Clark, 2011). We identified and examined the factors influencing students' satisfaction with their online learning experiences and learning outcomes. Through the analysis of a substantial body of literature, it was possible to identify factors such as student struggles and issues with online learning, the comfort level with utilizing learning technologies and the accessibility and relevance of learning materials and assignments (Schoonenboom and Johnson, 2017). It is important to mention that the online learning tool was Blackboard. It was used for teaching all undergraduate courses.

The survey questionnaire used to obtain the data was adapted from Qin (2020). There were both open-ended and closed-ended questions on the survey form to get the breadth and depth of the students' responses. On a five-point Likert scale, the closed-ended questions were co-constructed.

### *Demographics*

The research participants included students attending Pakistan's private university in Karachi. Participants from all programs were our focus (i.e. undergraduate and graduate). Out of 552 respondents, 214 females and 338 male students participated in the study, i.e. 38.8% females and 61.2% males. As a part of the age slab, 67% were within the age group of 18–23 years, 30.1% were within the age bracket of 24–34 years, 2.4% from 35–45 years and 0.5% are from 46 and above, respectively. The majority of students were in bachelor's degree programs (79.5%) and master's (20.5%). 74.5% of students were from the business administration department, 6.7% from the computer science department, 12% from the education department and the remaining 6.9% from the media science department, respectively.

Both deductive and inductive methods of analysis were used to examine the data in the current study. The partial least squares structural equation modeling (PLS-SEM) 4.0 was first used to assess the suggested conceptual framework. The variables and their effects on the learning experiences and levels of satisfaction of the students were examined using this methodology. Thematic inductive analysis was used to examine the qualitative data gained from the students and teachers.

### *Validity and reliability checks using PLS-SEM*

Prior to evaluating the testing hypothesis using PLS-SEM, the construct validity, predictive relevance and accuracy of the model were all examined. Convergent validity is the correlation of the items of a single construct. Hair *et al.* (2011) claim that convergent validity is proven if the average variance extracted (AVE) is equal to or greater than 0.5. Our case satisfies the criteria because each construct's AVE value is greater than 0.5. As a result, it may be argued that the convergent validity of each construct has been proven.

Internal consistency of an instrument is another definition of reliability. The instrument's dependability was assessed using Cronbach's alpha and composite reliability. All of the variable values are greater than the cutoff, according to the reliability results (Hair *et al.*, 2011), which are presented in Table 1. This means that the internal consistency of the tool, or questionnaire, has been determined.

The discriminant validity evaluates each construct's uniqueness, or whether they are distinct from one another. The discriminant validity of the construct was examined using Fornell and Larcker, cross-loadings and heterotrait-monotrait (HTMT), among other methods. The results of Fornell and Larcker (1981) are presented in Table 2. All of the constructs' diagonal values should exceed their off-diagonal values based on the threshold.

Since all of the diagonal values in our situation are higher than the off-diagonal values and each variable appears to be distinct, discriminant validity is demonstrated.

Cross-loadings are another method for evaluating discriminant validity. Cross-loading findings are displayed in Table 3. It demonstrates how each item's factor loadings are loaded into their specific constructs. Therefore, it may be said that each construct's discriminant validity has been established.

HTMT ratios are the third element of discriminant validity. Construct discriminant validity was examined using these ratios. Table 4 lists the HTMT ratios. Henseler *et al.* (2015) assert that only discriminant validity will be proved when the ratios of HTMT are smaller than 1. All of the HTMT ratios in Table 4 are less than 1, according to the results, supporting the construct's discriminant validity.

## Data analysis (quantitative)

The stated hypotheses were evaluated after confirming the construct validity and reliability of the questionnaire. The findings were attained by employing the PLS-SEM statistical approach.

The overall results point to a favorable association between the independent variables and the dependent variables. The findings of the hypothesis testing (PLS-SEM) are presented in Table 5, which emphasizes the positive correlation between student learning experiences and access to and relevancy of the materials. Additionally, there was a significant correlation between learning experiences and tool ease of use. On the other hand, when online learning's difficulties and problems grow, students' positive learning experiences decline. According to the findings, students who have positive online learning experiences are more satisfied with their education.

The course work and teaching-learning materials were significant and in harmony with the course objectives, according to the examination of each construct, i.e. access and relevance of the material and its impact on learning experiences. The greater the *t*-value, the more significant this point is. 31.79 as shown in Table 6. The more information we have, the more confident we are in our ability to anticipate.

| | Cronbach's alpha | Composite reliability | Average variance extracted |
|---|---|---|---|
| AR | 0.842 | 0.888 | 0.614 |
| CI | 0.806 | 0.872 | 0.630 |
| EOU | 0.876 | 0.904 | 0.576 |
| LE | 0.912 | 0.928 | 0.592 |
| SS | 0.939 | 0.949 | 0.675 |

**Source(s):** Authors' estimations

**Table 1.**
Convergent validity and reliability

| | AR | CI | EOU | LE | SS |
|---|---|---|---|---|---|
| AR | *0.783* | | | | |
| CI | −0.108 | *0.794* | | | |
| EOU | 0.587 | −0.292 | *0.759* | | |
| LE | 0.644 | −0.302 | 0.736 | *0.769* | |
| SS | 0.552 | −0.397 | 0.744 | 0.834 | *0.821* |

**Source(s):** Authors' estimations

**Table 2.**
Fornell and Larcker

| Items | AR | CI | EOU | LE | SS |
|---|---|---|---|---|---|
| AR1 | *0.761* | −0.108 | 0.454 | 0.549 | 0.470 |
| AR2 | *0.808* | −0.093 | 0.497 | 0.527 | 0.454 |
| AR3 | *0.741* | −0.044 | 0.400 | 0.448 | 0.358 |
| AR4 | *0.817* | −0.067 | 0.485 | 0.502 | 0.434 |
| AR5 | *0.787* | −0.105 | 0.455 | 0.483 | 0.432 |
| CI1 | −0.040 | *0.804* | −0.228 | −0.221 | −0.320 |
| CI2 | −0.022 | *0.820* | −0.202 | −0.195 | −0.262 |
| CI3 | −0.112 | *0.804* | −0.257 | −0.269 | −0.323 |
| CI5 | −0.144 | *0.745* | −0.229 | −0.257 | −0.338 |
| EOU1 | 0.491 | −0.189 | *0.812* | 0.554 | 0.545 |
| EOU2 | 0.505 | −0.194 | *0.831* | 0.591 | 0.578 |
| EOU3 | 0.437 | −0.210 | *0.800* | 0.508 | 0.519 |
| EOU4 | 0.343 | −0.260 | *0.641* | 0.427 | 0.460 |
| EOU6 | 0.394 | −0.174 | *0.736* | 0.529 | 0.546 |
| EOU7 | 0.423 | −0.169 | *0.655* | 0.490 | 0.458 |
| EOU8 | 0.496 | −0.331 | *0.814* | 0.733 | 0.765 |
| LE1 | 0.562 | −0.281 | 0.552 | *0.751* | 0.662 |
| LE2 | 0.431 | −0.159 | 0.558 | *0.734* | 0.582 |
| LE3 | 0.426 | −0.392 | 0.590 | *0.819* | 0.716 |
| LE4 | 0.464 | −0.310 | 0.615 | *0.834* | 0.707 |
| LE5 | 0.488 | −0.257 | 0.565 | *0.824* | 0.681 |
| LE6 | 0.486 | −0.257 | 0.638 | *0.862* | 0.723 |
| LE7 | 0.489 | −0.185 | 0.578 | *0.780* | 0.653 |
| LE8 | 0.548 | −0.088 | 0.448 | *0.604* | 0.476 |
| LE9 | 0.600 | −0.104 | 0.530 | *0.678* | 0.526 |
| SS1 | 0.478 | −0.360 | 0.630 | 0.752 | *0.862* |
| SS2 | 0.447 | −0.242 | 0.655 | 0.605 | *0.744* |
| SS3 | 0.445 | −0.374 | 0.615 | 0.731 | *0.888* |
| SS4 | 0.519 | −0.354 | 0.641 | 0.764 | *0.887* |
| SS5 | 0.484 | −0.291 | 0.579 | 0.671 | *0.801* |
| SS6 | 0.396 | −0.293 | 0.520 | 0.613 | *0.780* |
| SS7 | 0.476 | −0.346 | 0.659 | 0.738 | *0.864* |
| SS8 | 0.334 | −0.354 | 0.546 | 0.611 | *0.807* |
| SS9 | 0.483 | −0.304 | 0.650 | 0.647 | *0.743* |

**Table 3.**
Cross-loadings

**Source(s):** Authors' estimations

| | AR | CI | EOU | LE SS |
|---|---|---|---|---|
| AR CI | 0.126 | | | |
| EOU | 0.677 | 0.339 | | |
| LE | 0.741 | 0.337 | 0.811 | |
| SS | 0.616 | 0.448 | 0.808 | 0.895 |

**Table 4.**
HTMT ratios

**Source(s):** Authors' estimations

| Hypotheses | Estimates | SD | *T*-value | *P*-values |
|---|---|---|---|---|
| AR → LE | 0.336 | 0.048 | 6.959 | 0.000 |
| CI → LE | −0.122 | 0.032 | 3.771 | 0.000 |
| EOU → LE | 0.504 | 0.052 | 9.697 | 0.000 |
| LE → SS | 0.834 | 0.019 | 45.014 | 0.000 |

**Table 5.**
Hypothesis testing

**Source(s):** Authors' estimations

| Construct | Loading | SE | *T*-value | *P*-values |
|---|---|---|---|---|
| I can communicate, via electronic instruments, with my teachers, when required | 0.761 | 0.028 | 27.290 | 0.000 |
| Instructions on how to participate in the learning activities, during the online courses, are available | 0.808 | 0.025 | 31.792 | 0.000 |
| I receive the course materials in timely manner | 0.741 | 0.037 | 20.093 | 0.000 |
| In my view, the learning materials are consistent with the course objectives | 0.817 | 0.026 | 31.774 | 0.000 |
| In my views, the course work is consistent with the course objectives | 0.787 | 0.038 | 20.723 | 0.000 |

**Source(s):** Authors' estimations

**Table 6.**
Impact of variables

Students also expressed high levels of satisfaction with how they used the tools, which shows that they were motivated enough to do so (Table 7). The institute also made things easier for them. However, the lower *t*-value of 15.524 indicates that working with a computer may have presented challenges; the qualitative analysis describes the type and degree of these challenges, which are examined in the following session.

The results also found that good learning experiences of students related to online learning led to a high level of satisfaction among the students. Their increased satisfaction level also indicates that the student and teacher interacted well with each other during online classes (see Table 8). The results highlighted that students were satisfied with online learning because they were able to develop higher-order thinking skills and inquiry skills. It was also found that they could collaborate and interact with each other and with their peers during online learning. Furthermore, they gained in-depth knowledge of the content, which improved their learning outcomes. However, the lower *t*-value of the following item indicated a significant result but could not predict our model well to the extent other items could (see Table 8).

The findings indicated that although they were satisfied with online teaching-learning experiences, however, they faced problems of connectivity and power failure (See Table 9). Furthermore, the biggest challenge found was that they were unable to balance their academic and personal life, which was traumatic as it leads to isolation.

## Data analysis (qualitative)

*Learning experiences*

The quantitative analysis and the qualitative comments are mostly in agreement. Overall, the students thought their learning experiences were worthwhile and productive. Interactive

| Construct | Loading | SE | *T*-value | *P*-values |
|---|---|---|---|---|
| The online tool has attractive features that appeal to users | 0.812 | 0.022 | 37.582 | 0.000 |
| The tool provides high-speed information access | 0.831 | 0.021 | 39.340 | 0.000 |
| The tool is reliable and stable (i.e. it does not crash, submitted tasks are not lost) | 0.800 | 0.027 | 29.521 | 0.000 |
| I do not have a positive attitude or evaluation about the way the electronic tool functions | 0.641 | 0.040 | 16.113 | 0.000 |
| I am satisfied with the support and assistance available to sort out technical issues, which are out of my skills | 0.736 | 0.032 | 22.659 | 0.000 |
| Working with computers is not difficult for me | 0.655 | 0.042 | 15.524 | 0.000 |
| Overall, I am satisfied with the online learning teaching tool | 0.814 | 0.015 | 52.949 | 0.000 |

**Source(s):** Authors' estimations

**Table 7.**
Impact of variables

| Construct | Loading | SE | *T*-value | *P*-values |
|---|---|---|---|---|
| The e-learning offer intellectually inspiring learning experiences | 0.751 | 0.036 | 20.756 | 0.000 |
| The online learning tasks are challenging and motivating | 0.734 | 0.031 | 23.968 | 0.000 |
| The online sessions help me to gain in-depth knowledge and understanding of the subject | 0.819 | 0.017 | 49.555 | 0.000 |
| The online sessions help me to acquire high order thinking skills | 0.834 | 0.019 | 44.750 | 0.000 |
| The online sessions help me to acquire inquiry skills | 0.824 | 0.021 | 39.589 | 0.000 |
| I develop collaborative learning skills during online sessions | 0.862 | 0.015 | 55.829 | 0.000 |
| The learning through online course help me develop self- learning habits and discipline | 0.780 | 0.027 | 29.204 | 0.000 |
| I receive timely feedback from my teachers | 0.604 | 0.045 | 13.360 | 0.000 |
| The feedback is useful to improve my learning outcomes | 0.678 | 0.038 | 18.059 | 0.000 |

**Table 8.**
Impact of variables

**Source(s):** Authors' estimations

| Construct | Loading | SE | *T*-value | *P*-values |
|---|---|---|---|---|
| I face problems related to internet connectivity during the online sessions | 0.804 | 0.034 | 23.430 | 0.000 |
| I face problems related to power failure during the online sessions | 0.820 | 0.032 | 25.412 | 0.000 |
| Online sessions affect the balance in my academic and personal life | 0.804 | 0.029 | 27.921 | 0.000 |
| During group work my fellow students are reluctant to communicate beyond allocated learning time | 0.745 | 0.053 | 14.162 | 0.000 |

**Table 9.**
Impact of variables

**Source(s):** Authors' estimations

lectures similar to those used in face-to-face learning modes were the teaching strategies employed. For additional learning reinforcement and revision, online learning provided them with the choice of recorded lectures. For example, students' comments suggest, "Online classes are best because you watch recordings when you want." This finding also confirms the flexibility of learning time, as face-to-face learning provides them with one-time learning of a specific topic, whereas online recording allows them to save the learning moment and return to it when needed.

Communication abilities, a caring approach, a professional perspective, hearing and responding to concerns, friendliness, interactivity and subject-matter expertise were all viewed as distinctive qualities of their teachers as similar to those observed in the face-to-face learning sessions. Additionally, they noted that in both online and/or face-to-face learning sessions, it is still difficult to get timely feedback from teachers, as was also shown in the quantitative analysis of lower *t*-value 15.

Some also reported that the learning tasks designed, i.e. readings, presentations and discussions, nurtured their self-learning skills as well as group learning skills.

> I found this innovative and positive change as it revolutionized the world of education. This is something that should be implemented as e-learning is already happening throughout the world. In online classes my self-learning skills are polished. Online is good because it helps me to research by myself on that particular topic or course.

Sharing experiences about assignments and feedback, their responses suggest, "I never received feedback on my assignments, whether online or in person". They observed that in both online and/or face-to-face learning sessions, it is still difficult to get timely feedback from

teachers, as was also shown in the quantitative analysis of lower *t*-value 15. They did not observe any distinct difference regarding teaching in either mode.

They acknowledge online learning as a transient continuity strategy but not as a regular replacement for face-to-face learning. For example, in contrast to their face-to-face learning experiences, the qualitative comments, however, show a problem of student isolation and a lack of engagement. Since the face-to-face mode had provided them with the time and space, they were able to engage in educational socialization outside the boundaries of the classroom, such as casual conversations during breaks, gatherings at coffee shops and working on group projects at the library. The students' responses indicate a lack of peer interaction during their online learning experiences; however, they did not express whether this social disconnect had any effect on their mental or emotional well-being. Perhaps, in the context of this study, complete isolation and a sense of being alone were not reported as major issues. However, it is clear that online learning creates a situation in which students miss out on their social lives within the institution. In contrast, some responses suggest that students who feel more comfortable working alone found online learning to be more pleasant than face-to-face instruction.

> It's not as interactive as physical classes – I miss my face-to-face sessions. No matter how effective is online learning, we should not replace it with face-to-face.

> Face-to-face learning is something I got admission for in the first place. Because I wanted to explore university life and make new friends and learn how to interact with teachers and students. And online learning doesn't teach you that.

> Very user-friendly. Saves our time in means of waiting for lectures or students, attendance, and access to course material my experience is very good and I'd prefer online sessions as compared to face-to-face also because of my social anxiety issues. I can better focus on online learning because it doesn't provide a class environment.

Overall, the students' concerns regarding their educational experiences were not particularly serious. They saw no clear distinction between the types of activities, the teachers' behaviors or any different tactics from face-to-face instruction. The absence of face-to-face communication with colleagues and teachers was the sole difference. Even though they were engaged in group projects, interacting on screens felt tiresome, isolating and unpleasant.

*Level of satisfaction*

As was already noted, the student's responses to online learning revealed degrees of academic satisfaction. Due to their distinctive personality traits, some felt more at ease in the virtual learning environment, while others emphasized the value of the socialization and interaction experienced in face-to-face learning. Although their comments showed different learning preferences, overall, they appeared content with the knowledge they had acquired from online learning.

The economic effectiveness of online learning, or the time and money it saves on travel, was also rated favorably by the students. Students who go directly from their work to the university or who attend their home institution from other cities highly value the opportunities for online learning. According to some comments, those who attend institutions in the evenings and/or on weekends feel comfortable because online learning preserves social distance and security concerns in the city. The students' responses also supported the notion that, despite other restrictions of online learning mode, students feel secure and satisfied if the learning tools and resources are effective and easily accessible.

> It saves time and expenses. I am happy with the online system and my university has the best LMS in the whole of Pakistan so it is not difficult to learn online. I feel much safer in my own home space

during this pandemic. Commuting in the evening and on weekends is sometimes risky. I feel safe working from home.

Its easily for both students & teachers and this COVID 19 virus is spreading all over the world so our lives are valuable & we are the ones who run the future so this online mode is perfectly fine for us I'm quite not sure about the overall experience but for me as being an introvert person, I feel more comfortable. I do agree with the fact that real life collaboration is different than on online which is better than the online one. Means it's fine as long as the pandemic situation hasn't ended, I'm cool with online Classes. As I do not have a Load Shedding Issue in my area but can't say about the internet, it varies from time to time. But I do have my Zong 4G back up for that as well

*Challenges and issues*

Some logistic issues prevent them from achieving personal fulfillment.

Inconvenient learning conditions at home, a sense of isolation that reduced motivation levels, connectivity concerns, a challenge accessing the Internet and other factors, according to their comments, may have made it difficult for them to maintain learning discipline and consistency.

Many students may not have been able to maintain or arrange physical study spaces at home as a result of the abrupt switch to online mode. Additionally, the majority of students do not have a tradition or infrastructure at home that would allow them to have a private room where they could focus intently on their studies in a quiet, comfortable setting. Many of them did not consider their home to be a workplace because the concept was non-existent in their circumstances.

Additionally, the comments from the students highlight the problems with power outages and poor connectivity in the context of this research. These problems prevent the students from productively participating in the learning sessions and may have contributed to their anxiety and lack of comfort with online learning sessions.

The misinformed blocking of online learning resources at the end of the administrative department is indicated by certain comments. When the students spoke with others, the main problem was not paying the course money on time. The administrative personnel at the university would notify the students about the payment by using the block option. The students became anxious when they were exposed to other classmates who might have perceived the block as a punishment. The procedures and routes of communication between a university and its students are also called into question by this.

It's very different. You become lazy in online classes while in face-to-face learning you can't. When you are in front of the moderator having eye contact with him. That is much better or the best learning type.

I don't have a good internet connection at my home, so most of the time I'm not even able to join the class. And also, blackboard ID can get blocked anytime without any notification or warning which is problematic and affects my studies. Face-to-face learning is something I got admission for in the first place. Because I wanted to explore university life and make new friends and learn how to interact with teachers and students. And online learning doesn't teach you that.

## Discussion

Overall, the findings indicate that there were no statistically significant differences in the ways that students learned online. Students have complimented online education as evidenced by statistics and their responses to open-ended questions. Students had experienced a combination of active and traditional learning strategies, i.e. listening to the lectures and discussions and working on projects in groups during online learning

experiences, which benefited them in developing skills of group learning, independent learning and concentrating on teachers' lectures. Similar techniques were applied in the virtual interaction settings, but face-to-face learning activities allowed students to communicate, collaborate and practice examples while being supervised by an on-site teacher. Therefore, other than the fact that one was live and the other was virtual, there was no obvious difference in the pedagogy of the two modalities. This finding is consistent with previous research studies showing that online education is considered the premeditated acquisition of knowledge, skills, attitudes and competencies. It encourages self-motivated, committed students whose active participation can ensure constructive, collaborative and creative teaching-learning activities (Ifinedo *et al.*, 2020). It enables students to create conducive learning environments that are flexible and dynamic and cater to individual differences effectively by using advanced media techniques. This can be achieved only when online learning tools are easily accessible. These emerging technologies are a source of enhanced interest and concentration among students in an online classroom (Lie *et al.*, 2020). The online learning mode, in the context of this research study, includes the use of digital technology to increase student engagement, attendance and academic satisfaction during the COVID-19 pandemic.

Online learning has several other benefits, some of which include its convenience and cost-effectiveness. Since they were taught how to use technology as a learning tool, the students deemed the learning tool to be more accessible and effective. Access to the recorded lectures also had the added benefit of preventing students from skipping class due to illness or other absences, as well as taking notes. Similar findings reported by researchers indicate that a learner-centered approach in education is promoted through the online learning education model (Roddy *et al.*, 2017). Virtual learners are facilitated in terms of setting their educational schedule to attend recorded lectures, make assignments and engage in organized learning activities such as discussion boards, quizzes and exams according to their convenient times and dates. The course material, handouts and recorded lectures are easily accessible to virtual learners. They are intellectually and technologically motivated in the virtual world (Coman *et al.*, 2020).

However, the biggest challenge was achieving live collaboration between the students and teachers and students and students, as they mentioned that approaching colleagues virtually for group work was irritating. Face-to-face has always been in the realm of fostering connections and collaboration among students. The students see the abrupt stop of face-to-face interaction as having a negative social impact. The students perceive online learning as a need rather than a choice.

Open-ended student comments demonstrate the academic significance of face-to-face instruction since they became aware of the importance of social presence and connection through their online learning experiences. Despite working on assignments in groups, social isolation was seen as a drawback of online learning. Moreover, the findings indicate that effective non-verbal communication occurs when students interact with a teacher and colleague face-to-face. In a face-to-face teaching situation, good body language may inspire, engage and motivate students. Better learning outcomes result from being able to interpret people's body language, whether it be eye contact or posture, and alter the topic and approach. Keeping in view the recent nature of the COVID-19 pandemic, no research has been carried out on this topic to date or on such a wide-scale transition to online learning, specifically in the context of higher education in Pakistan (Dincer, 2018). This research is unique in its kind as it focuses on the impact of online learning on the affective domain as well. Therefore, in our context, it is a unique finding that students felt socially isolated. While numerous studies have examined anxiety, still there is still a dearth of literature regarding stress factors (Dincer, 2018). The current study provided substantial information on the impact of online learning on students' stress levels and the consequence is that they were strained out because they felt socially isolated. Additionally,

these findings are in alignment with the qualitative data showing a problem of student isolation and a lack of engagement. Since the face-to-face mode had provided them with the time and space, they were able to engage in educational socialization outside the boundaries of the classroom, such as casual conversations during breaks, gatherings at coffee shops and working on group projects at the library.

However, unlike the serene concentration experience witnessed in online learning, some students found the face-to-face mode to be distracting. The results also imply that students who preferred to assume independent experience-based learning could have achieved better learning outcomes as a result of online learning. In our context, poor connectivity, frequent power outages and a lack of learning space at home made it difficult for the learning sessions to continue smoothly. These findings are different from those of the developed nations of the world. As a result, they view online learning as an emergency transfer rather than a replacement for face-to-face instruction (Coman *et al.*, 2020). Although addressing the logistical issues in the context of this research is outside the scope of this study, we suggest that a blended learning approach could give students the tools and mechanisms they need to address their logistical problems. Overall, online learning has its benefits and may be an enjoyable experience for both students and teachers due to the freedom from boundaries and the ability to teach and/or learn anywhere with Internet access.

## Conclusion and recommendations

In summary, given its many benefits, this research supports using online learning in higher education. Online education promotes a healthy mix of teacher- and student-centered instruction. However, given the contextual concerns, teachers must find alternative educational insights that will enable students to reduce listening demands and improve self-learning and promote engagement. Universities must also consider how to incorporate social activities and debriefing sessions that will allow students to connect with their colleagues, share their learning concerns and gains and find solutions to the issues of limited in-person social interaction. Such interaction could provide a positive avenue for understanding that they are not alone in their problems, that they are common and that they can be solved through collaborative efforts.

The administrative strategy of remembering fees on time to restrict the online tool could add to students' stress because they were also subject to contextual constraints. Instead of punishing students in this way, the institution should perhaps consider other options to assist them in adhering to the payment guidelines.

The idea of advancing with online learning is a new step that was taken into consideration because of COVID-19. For the government to regularly advance the virtual learning option, it must consider ways to expand its resources.

It is crucial to understand that the student's participation in this research led to them reflecting on their online learning experiences in order to examine their in-person learning experiences and see the differences and similarities between the two learning modes.

## References

Akram, H., Yingxiu, Y., Al-Adwan, A.S. and Alkhalifah, A. (2021), "Technology integration in higher education during COVID-19: an assessment of online teaching competencies through technological pedagogical content knowledge model", *Frontiers in Psychology*, Vol. 12, 736522, doi: 10.3389/fpsyg.2021.736522.

Carrillo, C. and Flores, M.A. (2020), "COVID-19 and teacher education: a literature review of online teaching and learning practices", *European Journal of Teacher Education*, Vol. 43 No. 4, pp. 466-487, doi: 10.1080/02619768.2020.1821184.

Coman, C., Țiru, L., Mesesan, S.L., Stanciu, C. and Bularca, M. (2020), "Online teaching and learning in higher education during the coronavirus pandemic: students' perspective", *Sustainability*, Vol. 12, available at: https://doi.org/10367.10.3390/su122410367

Creswell, J.W. and Clark, V.L. (2011), *Designing and Conducting Mixed Methods Research*, 2nd ed., Sage Publications, Los Angeles.

Davis, F.D. (1989), "Perceived usefulness, perceived ease of use, and user acceptance of information technology", *MIS Quarterly*, Vol. 13 No. 3, pp. 319-340, doi: 10.2307/249008.

Dincer, S. (2018), "Are pre-service teachers really literate enough to integrate technology in their classroom practice? Determining the technology literacy level of pre-service teachers", *Education and Information Technologies*, Vol. 23, pp. 2699-2718, doi: 10.1007/s10639-018-9737-z.

Fornell, C.G. and Larcker, D.F. (1981), "Evaluating structural equation models with unobservable variables and measurement error", *Journal of Marketing Research*, Vol. 18 No. 1, pp. 39-50.

Garcia-Gonzalez, M.A., Torrano, F. and Garcia-Gonzalez, G. (2020), "Analysis of stress factors for female professors at online universities", *International Journal of Environmental Research and Public Health*, Vol. 17 No. 8, 2958, doi: 10.3390/ijerph17082958.

Hair, J.F., Ringle, C.M. and Sarstedt, M. (2011), "Partial least squares structural equation modeling: rigorous applications, better results and higher acceptance", *Long Range Planning*, Vol. 46 Nos 1-2, pp. 1-12.

Henseler, J., Ringle, C.M. and Sarstedt, M. (2015), "A new criterion for assessing discriminant validity in variance-based structural equation modeling", *Journal of the Academy of Marketing Science*, Vol. 43 No. 1, pp. 115-135.

Ifinedo, E., Rikala, J. and Hamalainen, T. (2020), "Factors affecting Nigerian teacher educators' technology integration: considering characteristics, knowledge constructs, ICT practices and beliefs", *Computers and Education*, Vol. 146, doi: 10.1016/j.compedu.2019.103760.

Kerzic, D., Tomazevic, N., Aristovnik, A. and Umek, L. (2019), "Exploring critical factors of the perceived usefulness of blended learning for higher education students", *PLoS One*, Vol. 14 No. 11, e0223767, doi: 10.1371/journal.pone.0223767.

Lie, A., Tamah, S.M., Gozali, I., Triwidayati, K.R., Utami, T.S.D. and Jemadi, F. (2020), "Secondary school language teachers' online learning engagement during the Covid-19 pandemic in Indonesia", *Journal of Information Technology Education: Research*, Vol. 19, pp. 803-832, doi: 10.28945/4626.

Mishra, P. and Koehler, M.J. (2006), "Technological pedagogical content knowledge: a new framework for teacher knowledge", *Teachers College Record*, Vol. 108, pp. 1017-1054, doi: 10.1111/j.1467-9620.2006.00684.x.

Qin, Yi. (2020), "The research about the role and influence of teacher emotional support in online learning environment".

Roddy, C., Amiet, D.L., Chung, J., Holt, C., Shaw, L., Mckenzie, S., Garivaldis, F., Lodge, J.M. and Mundy, M.E. (2017), "Applying best practice online learning, teaching, and support to intensive online environments: an integrative review", *Frontiers in Education*, Vol. 2 No. 59, doi: 10.3389/feduc.2017.00059.

Schoonenboom, J. and Johnson, R.B. (2017), "How to construct a mixed methods research design?", *Kolner Zeitschrift fur Soziologie und Sozialpsychologie*, Vol. 69 No. Suppl 2, pp. 107-131, doi: 10.1007/s11577-017-0454-.

Schulte, M. (2015), "Distance faculty experiences: a personal perspective of benefits and determinants of telecommuting", *Journal of Continuing Higher Education*, Vol. 63, pp. 63-66.

Siddiqui, S., Thomas, M. and Soomro, N.N. (2020), "Technology integration in education: source of intrinsic motivation, self-efficacy and performance", *Journal of e-Learning and Knowledge Society*, Vol. 16 No. 1, pp. 11-22.

Siddiqui, S., Kazimi, A.B. and Siddiqui, U.N. (2021), "Internet addiction as a precursor for cyber and displaced aggression: a survey study on Pakistani youth. Addicta", *The Turkish Journal on Addictions*, Vol. 8 No. 1, pp. 73-80, doi: 10.5152/ADDICTA.2021.20099.

Siddiqui, S., Kazmi, A.B. and Ahmed, Z. (2022), "Online working amid COVID-19 pandemic. The role of emotional intelligence as aggression de-escalator: research reported from Islamic Republic of Pakistan", *Journal of e-Learning and Knowledge Society*, Vol. 18 No. 3, pp. 151-165, doi: 10.20368/1971-8829/1135620.

Siddiqui, S., Arif, I. and Hinduja, P. (2023), "Technostress: a catalyst to leave the teaching profession-A survey designed to measure technostress among teachers in Pakistan during COVID-19 pandemic", *E-learning and Digital Media*, Vol. 20 No. 1, 20427530221107506.

Tanis, C.J. (2020), "The seven principles of online learning: feedback from faculty and alumni on its importance for teaching and learning", *Research in Learning Technology*, Vol. 28, doi: 10.25304/rlt.v28.2319.

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