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# The Nexus of Covid-19 and Behavioral Intentions of University Students Towards Online Education

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#### Abstract

The onset of the COVID-19 pandemic has significantly disrupted the traditional pedagogical educational system worldwide. The story of Pakistan is also not different from that of the rest of the world. Pakistan's higher education institutes were closed for classes due to the outbreak. Some universities started the virtual education system, and it is critically important to assess the behavioral intentions of university students toward online education during the COVID-19 pandemic in Pakistan. This is the first study investigating students' responses to online education during the COVID-19 pandemic. For this purpose, an online survey was conducted to obtain the students' responses from the higher institutions providing online classes during COVID-19. The results were evaluated using multivariate analysis and descriptive statistics. It was observed that there is a significant difference between male and female students concerning the positive consequences of COVID-19 on students. According to the findings, the students' intentions for online education are more concerned with saving time to complete the degree program. Higher education institutions should also provide online educational opportunities to students besides traditional physical modes. Online educational interventions will be helpful for students during unavoidable circumstances like political instabilities, natural disasters, viral disease outbreaks, etc. to complete degrees and diplomas.

#### Keywords:

Behavioral Intention; COVID-19; Online Education; Pakistan; Linkage; Multivariate Analysis.

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# **1- Introduction**

The novel coronavirus disease 2019 is officially abbreviated as "COVID-19" or severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) [1]. The spread of COVID-19 is quick and fast throughout the world [2], and the World Health Organization (WHO) declared COVID-19 a pandemic as an emergency for public health internationally [3]. Like SARS, COVID-19 can spread among humans via the transitional host, although the authentic transmission mode has not been determined yet [4]. The mean incubation time is estimated at 5.2 days, with significant differences between patients [5], and it can spread asymptomatically [6, 7]. According to the WHO, preliminary mortality is about 2%, but some findings range from 0.3% to 0.6% [8].

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As of April 2020, COVID-19 had affected higher education institutions in China and significantly disrupted higher education institutions worldwide. The spread of COVID-19 has led to the closure of educational activities all over the world. There is a global reliance on virtual education to prevent the interruption of the academic progress of university students during the COVID-19 crisis. The online education system is one of the alternative strategies to control the spread of COVID-19 and encourage universities and students to have an effective online learning environment so that learning will not be disrupted. There is a need to explore alternate studies to find out the influences of COVID-19 on educational institutions, how to best deliver course content online, engage students, and conduct assessments. In Pakistan, higher educational institutions use Google Meet, Microsoft Teams, Moodle, and Edmodo as learning management systems, along with Zoom, Skype, WebEx, Adobe Connect, etc. Therefore, it is of great concern that educational institutions should strengthen the curriculum by considering students' needs and using online learning instead of traditional classroom learning [9].

The Higher Education Commission (HEC) implemented online learning across all the universities in Pakistan, and universities have already suspended the semester midterm examinations. At the same time, the final examinations were planned to be evaluated through online courses. The transition from full-time classroom learning to online education has a major impact on learning. However, technology has been previously used to support teaching and learning, while the assessment aspect is often underdeveloped [10]. Using online grades in these classroom lessons is challenging. Students and teachers are unsure about managing current assignments, projects, and other ongoing assessments [11, 12]. Teachers have to shift the grading system to online. It is difficult to track how they take it online, and students can cheat during online tests and examinations [13]. Again, it is impossible to perform online laboratory experiments and tests, applications, and performance tests. Besides, students who do not have internet access will experience significant discomfort while their GPA (grade point average) is negatively impacted when participating in the evaluation process [14]. The rapid increase in pandemics worldwide has created a sense of uncertainty and fear about what will happen. It also caused enormous stress for university fraternities, including students. This stress can negatively affect student learning and psychological health [15, 16]. International students who are not at home are concerned not only with their health, safety, and education but also with the well-being of their families [17]. Online learning is not a new learning method for any university. Many teachers are trained to use online learning platforms to learn and complement classroom activities [18]. Switching to online mode is challenging and raises questions about teachers competencies and skills to interact with existing technologies [19, 20]. Teachers' training is important to equip them with online learning strategies and methodologies to facilitate students for effective learning [21]. In addition, many universities neither have sufficient infrastructure or resources for online learning interventions nor are their faculty equipped with online learning methodologies [22, 23].

Research findings have shown that COVID-19 influenced students psychologically, leading to worry, fear, and anxiety [24]. University students' concerns about COVID-19 may be due to the psychological consequences of the pandemic on academic and research activities [25] and their interests related to job placements [26]. Instead, anxiety among students results from the gradual increase in the distance between people due to quarantine. Anxiety disorders are known to occur without interpersonal communication and worsen more frequently [27, 28]. Also, disinfectant and mask shortages, rumored news, and fake reports significantly increased fear and anxiety among students [29]. However, contrary to previous research results, there was a non-significant relationship among various constituencies and genders [30].

According to the theory of the behavioral immune system, individuals may cultivate negative feelings such as anxiety, hate, anger, etc. [31, 32] and negative thinking abilities for their self-protection [33, 34]. Facing the prospective disease danger, people developed a tendency to avoid behavior (avoid contact with people with symptoms similar to pneumonia) [35] and adhere strictly to social norms [34]. According to theories of stress [37] and perceived risk [38], community health crises cause negative feelings and thinking abilities. Thus, these negative consequences enable communities to keep themselves protected from prospective pandemics. Prolonged negative emotions can reduce people's immune systems and disrupt the stability of physiological processes [39].

However, people can over-respond to pandemics if there is insufficient guidance from authorities, which can lead to excessive avoidance behavior and compliance [36]. Consequently, it is worth mentioning that the perspective of psychological change in a timely manner due to COVID-19 should be recognized. Because these changes produced by community health crises may influence cognition and feelings [31, 34]. Shortages of masks and medical equipment have also been reported. The current COVID-19 outbreak is causing anxiety, and the community urgently needs to understand its mental health [40]. Previous studies have demonstrated a deep and wide range of psychosocial effects on individuals, society, and people internationally during infection outbreaks. Individually, people may be afraid of getting sick or dying—a feeling of helplessness and stigma [41]. During the influenza outbreak, 10 to 30% of the population was deeply concerned about the possibility of contracting the virus [42]. People's negative feelings are exacerbated by the closure of schools and businesses [21]. During the SARS epidemic, many studies have investigated the psychological effects on an uninfected community and identified serious mental illnesses associated with younger age and an increased level of self-blame [43].

According to the review, most studies related to the COVID-19 outbreak focused on identifying infected patients, the genomic features of the virus [44], and their role in managing world health [45]. However, no scientific articles have investigated the behavioral impact of COVID-19 on university students in Pakistan. Therefore, this study is unique in that it investigates the behavioral intentions of university students toward online education during the outbreak of COVID-19 in Pakistan. This study aims to detect the behavioral intentions of students regarding online education. The positive and negative influence of COVID-19 on students' education was statistically evaluated to determine the consequences of COVID-19.

# 2- Methods

A methodology flow chart was followed for an in-depth literature review, the development of a questionnaire for an online survey, demographic attributes, behavioral intentions (for online education), the consequences of COVID-19, research locations, university selection, respondent selection, data processing and analysis, and the preparation of the manuscript. Further methodology is elaborated in the different sub-sections presented in Figure 1.



Figure 1. Methodology flow chart

#### 2-1-Study Population and Sampling

The target population covered undergraduates and postgraduate students of four government universities in the Punjab province of Pakistan, known as Punjab University (PU) Lahore, the University of Sargodha (SU), PMAS-Arid Agriculture University (PMAS-AAUR) Rawalpindi, and the University of Engineering & Technology (UET) Lahore. The Punjab province was selected purposefully as the largest province of the country; moreover, universities in Punjab initiated online learning mechanisms soon after the closure of academic institutions. Selected universities initiated online classes using learning management systems after the HEC notification at the end of March 2020. Following the outbreak

of COVID-19 in the country, the government of Pakistan ordered the closure of schools, colleges, and universities across the country for three weeks earlier and then for undefined period, all schools, colleges, and universities were closed and there was no definite reopening timeline during COVID-19 outbreak. A simple random sampling technique was used for the study population and samples. A questionnaire-based survey assessed university students' behavioral intentions toward online education during the COVID-19 outbreak in Punjab, Pakistan. Structured questionnaires were distributed to student groups of selected universities and different departments on different social media platforms, e.g., Facebook, WhatsApp, etc., to ensure the confidentiality and reliability of the data. 200 respondents completed the questionnaires that were used in the final analysis. The response rate of respondents was 80% for completing the questionnaire for the current study.

# 2-2-Research Instrumentation

A well-structured questionnaire was considered a research tool for the present study, comprising demographic information including name, gender, educational program, semester, department, age, background (rural, urban), distance from the city, family members, health facility in the area of living, number of days isolated, number of suspected or confirmed COVID-19 patients in the locality, and number of suspected or confirmed COVID-19 patients in the locality, and number of suspected or confirmed COVID-19 patients in the locality, and number of suspected or confirmed COVID-19 patients in the family. The next part was based on students' behavioral intentions regarding online education. The respondents provided their responses regarding various statements related to behavioral intentions. The response was recorded on a 5-point Likert scale (1 = Strongly Disagree, 2 = Disagree, 3 = Undecided, 4 = Agree, 5 = Strongly Agree). The following 10 statements deal with students' behavioral intentions regarding online education.

### Online education is easy to use:

- It improved learning skills based on course objectives;
- Online education is an advantageous notion;
- Easy to join the online class for learning;
- Easily adopt online education tools;
- Helpful to complete my degree program;
- Saved time for completion of the degree program;
- Critical thinking regarding the subject improved;
- Research ability for review of literature improved;
- Communication skills improved.

In the next segment of the questionnaire, the respondents were asked to provide their responses regarding the different positive and negative consequences of COVID-19 on students during the COVID-19 outbreak in Pakistan. The same Likert scale was adopted for the responses of respondents. Statements related to positive and negative consequences are listed below:

# Positive Consequences:

- Staying home is safe for all;
- Family member's reunion;
- Cleaning oneself is safe;
- Avoided unnecessary travel;
- Avoided unnecessary gathering;
- More savings due to fewer expenses.

# Negative Consequences:

- Lack of freedom;
- Feeling bored;
- Social activities ended;
- Lack of sports activities;
- Feel loneliness;
- Feeling stressful;

- Feeling depressed;
- Being feared;
- Being annoyed or angry;
- Financial crises increased.

#### 2-3-Data Analysis

Data were analyzed with the Statistical Package for Social Sciences (version 22). Descriptive statistics were analyzed to illustrate the respondents' demographics and other selected characteristics. Multivariate analysis (MANOVA) explored the significance between male and female students and their behavioral intentions regarding online education during the COVID-19 pandemic.

### 2-4-Ethical Statement

All participants voluntarily participated in the study after being informed about its purpose. The project and survey instrument (questionnaire) were ethically approved by the Research Ethics Committee, University of Sharjah, Sharjah, United Arab Emirates (REC number: REC-23-07-27-01-Other). The sensitive data, including the names of the respondents, were considered confidential and not included in published information.

# **3- Results**

### 3-1-Demographic Characteristics of Respondents

Figure 2 shows a summary of the demographic characteristics, that is, sex, background, family members, and education, of the online survey respondents. Out of 200 students, 60% were male, while 40% were female respondents. Similar results were found by the researchers [21]. Moreover, 40.5% of respondents belong to a rural background, while 59.5% have an urban living style.

The education information of respondents was comprised of the semester, study program, and department, as shown in Figures 2-c, 2-d, and 2-h, respectively. It was found that 29% of respondents were from the 4th semester, and the maximum number of respondents were found from the 2<sup>nd</sup> semester with a response rate of 47.5%, while the minimum response was obtained from 6th semester (11.5%) students. With respect to the study program, the maximum response was obtained from the BS program students (62%), while the minimum response was obtained from the BS program students (62%), while the minimum response was obtained from the MA program respondents (3%). Other programs, like MS and BSc, have response rates of 26.5% and 8.5%, respectively. There is also a perspective about the respondents depending on their departments, which is shown in Figure 2-h, and it was revealed that the maximum response rate was from Agriculture Department students (40.5%) while the minimum response was from Mechanical Engineering students (1%). 25% of respondents belong to the Biochemistry Department, while the Agricultural Extension, Education, Agricultural Engineering, and Soil Science departments have response rates of 15%, 12.5%, 2.5%, and 1.5%, respectively.

The information related to family members, COVID-19 patients in the family and area, and the number of days to stay in the home is given in Figures 2-e, 2-e, and 2-g. According to the information on family members, 58.5% of the students have more than 6 family members, 40.5% of respondents have 4 to 6 family members, and 5% have 1 to 3 family members. Based on the summary of COVID-19 patients, 98.5% were found in the respondent area, while 1.5% were within the respondent's family. Figure 2-g is information about the days of respondents isolation. 97.5% of respondents were isolated for more than 30 days; 2% of respondents isolated themselves in the range of 16 to 30 days; and 0.5% of students isolated themselves for less than 15 days.





Figure 2. Demographic attributes of respondents

# 3-2-Multivariate Analysis of Behavioral Intentions

A Multivariate Analysis of Variance (MANOVA) was conducted for the evaluation of the behavioral intentions of students toward online education. This method is most appropriate to simultaneously examine the impact of conditions on multiple dependent variables. Wilks' Lambda was used to test the overall difference between conditions. Results of MANOVA (Table 1) indicated that there was a significant difference among female and male respondents considering the variable of students' intentions towards online education in the presence of COVID-19 [Wilks' Lambda = 0.797, F (10,189) = 4.80, p < 0.001, partial Eta Squared = 0.203].

Table 1.	Wilks	Lambda	multivariate	test of	behavioural	intentions	of students
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Multivariate Tests <sup>a</sup>								
	Effect	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared	
	Pillai's Trace	0.937	283.476 <sup>b</sup>	10.000	189.000	0.000	0.937	
Intercent	Wilks' Lambda	0.063	283.476 <sup>b</sup>	10.000	189.000	0.000	0.937	
intercept	Hotelling's Trace	14.999	283.476 <sup>b</sup>	10.000	189.000	0.000	0.937	
	Roy's Largest Root	14.999	283.476 <sup>b</sup>	10.000	189.000	0.000	0.937	
	Pillai's Trace	0.203	4.804 <sup>b</sup>	10.000	189.000	0.000	0.203	
Condon	Wilks' Lambda	0.797	4.804 <sup>b</sup>	10.000	189.000	0.000	0.203	
Gender	Hotelling's Trace	0.254	4.804 <sup>b</sup>	10.000	189.000	0.000	0.203	
	Roy's Largest Root	0.254	4.804 <sup>b</sup>	10.000	189.000	0.000	0.203	

a. Design: Intercept + Gender; b. Exact statistic; c. Computed using alpha = 0.05.

The descriptive statistics of results related to the statements used for students' behavioral intentions toward online education are shown in Table 2. The statements are statistically explained with the help of the mean and standard deviation (SD) of the responses of male and female respondents. The mean and SD of respondents rate the statements on a 5-point Likert scale. For the statement "online education is easy to use," the mean for male respondents was 2.53 with an SD of 1.35, while the mean for female respondents was 2.45 with an SD of 1.12. Based on the mean and SD values, the male students' response was higher than that of the female students. The mean of male and female responses was 2.38 and 2.75, with SDs of 1.13 and 1.09, respectively, for the statement "it improved learning skills based on course objectives." According to this statement, the mean of the female respondents is higher than that of the male respondents, while the SD of the males is higher than that of the females. There seems to be some kind of polarization in male responses and low-rated numbers on the 5-point Likert scale. The responses of male and female respondents gained mean values of 2.61 and 2.50 with a standard deviation of 1.17 and 0.98, respectively, regarding the statement "Online education is an advantageous notion." Similarly, regarding the statement "easy to join the online class for learning," the male respondents mean 2.61 with a SD of 1.31, while the female respondents mean 2.83 with a SD of 0.99. The male respondents had a mean value of 2.53 with an SD of 1.33, and the female respondents had a mean value of 3.24 with an SD of 1.35 for the statement "easily adopt online education tools." As far as the statement "helpful to complete my degree program" is concerned, the responses were 2.98 and 3+.36 mean values with standard deviations of 1.32 and 1.57, respectively, for male and female respondents. Concerning the statement "saved time for completion of degree program," the male respondents' mean was 3.33 with a SD of 1.26, and the female respondents' mean was 3.69 with a SD of 1.07. The male and female respondents mean 2.59 and 2.80 with SD 1.27 and 1.55, respectively, for "critical thinking regarding subject improvement." Male respondents' mean and SD were 2.90 and 1.25, while female respondents' mean and SD were 2.51 and 1.26 for "research ability for review of literature improved." The mean of male and female respondents was the same (2.83) with SDs of 1.34 and 1.36, respectively, for the statement "communication skills improved."

Descriptive Statist	ics			
Statements	Gender	Mean	SD	Ν
	Male	2.53	1.35	120
Online education is easy to use	Female	2.45	1.12	80
	Total	2.50	1.26	200
	Male	2.38	1.13	120
It improved learning skills based on course objectives	Female	2.75	1.09	80
	Total	2.53	1.13	200
	Male	2.61	1.17	120
Online education is an advantageous notion	Female	2.50	0.98	80
	Total	2.57	1.10	200
	Male	2.61	1.31	120
Easy to join the online class for learning	Female	2.83	0.99	80
	Total	2.70	1.19	200
	Male	2.53	1.33	120
Easily adopt online education tools	Female	3.24	1.35	80
	Total	2.82	1.38	200
	Male	2.98	1.32	120
Helpful to complete my degree program	Female	3.36	1.57	80
	Total	3.13	1.43	200
	Male	3.33	1.26	120
Saved time for completion of the degree program	Female	3.69	1.07	80
	Total	3.47	1.20	200
	Male	2.59	1.27	120
Critical thinking regarding subject improved	Female	2.80	1.55	80
	Total	2.68	1.39	200
	Male	2.90	1.25	120
Research ability for review of literature improved	Female	2.51	1.26	80
	Total	2.75	1.27	200
	Male	2.83	1.38	120
Communication skills improved	Female	2.83	1.34	80
	Total	2.83	1.36	200

Table 2. Descriptive	statistic of beha	avioural intenti	ons of students

## 3-3-Multivariate Analysis for Positive Consequences

Results of MANOVA (Table 3) revealed that there was a significant difference between female and male respondents considering the variable of students' positive consequences in the presence of COVID-19 [Wilks' Lamda = 0.858, F(6,193) = 5.320, p < 0.001, partial Eta Squared = 0.142].

Multivariate Tests <sup>a</sup>									
	Effect	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared		
	Pillai's Trace	0.971	1066.597 <sup>b</sup>	6.000	193.000	0.000	0.971		
Intercent	Wilks' Lambda	0.029	1066.597 <sup>b</sup>	6.000	193.000	0.000	0.971		
intercept	Hotelling's Trace	33.158	1066.597 <sup>b</sup>	6.000	193.000	0.000	0.971		
	Roy's Largest Root	33.158	1066.597 <sup>b</sup>	6.000	193.000	0.000	0.971		
	Pillai's Trace	0.142	5.320 <sup>b</sup>	6.000	193.000	0.000	0.142		
Conton	Wilks' Lambda	0.858	5.320 <sup>b</sup>	6.000	193.000	0.000	0.142		
Gender	Hotelling's Trace	0.165	5.320 <sup>b</sup>	6.000	193.000	0.000	0.142		
	Roy's Largest Root	0.165	5.320 <sup>b</sup>	6.000	193.000	0.000	0.142		

Table 3.	Wilks I	Lambda	multivariate	test for	positive	consequences
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a. Design: Intercept + Gender

b. Exact statistic

c. Computed using alpha = 0.05

According to Figure 3, the level of agreement of respondents with regard to online education, almost 17.5% of respondents strongly agree with the statement "Online education is helpful to complete a degree program." Similarly, 16% strongly agree with the statement "easily adopt online education tools." As for the statements "saved time for completion of degree" and "critical thinking regarding subject improved" 14.5% and 14% of respondents strongly agree, respectively.



Figure 3. Percentages of agreement level of respondents regarding behavioural intention for online education

Table 4 is the statistical explanation of the positive consequences of COVID-19 on the behavior of university students. The majority of male students' response rate for staying home is safe for all was strongly agreed, with a mean value of 4.18. Male students feel that staying at home during the COVID-19 pandemic is very safe for all, while the female students' mean response was 3.96, representing agreement with the statement. So, all the respondents have a common feeling that staying home during this pandemic is safe for everyone. Male and female students showed positive feelings toward the reunion of family members, with a mean response of 4.08 and 4.16, respectively.

<b>Descriptive Statistics</b>							
Statement	Gender	Mean	SD	Ν			
	Male	4.1833	1.15942	120			
Staying home is safe for all	Female	3.9625	1.62608	80			
	Total	4.0950	1.36576	200			
	Male	4.0833	1.09685	120			
Family members re-union	Female	4.1625	1.03659	80			
	Total	4.1150	1.07122	200			
	Male	4.3333	0.91975	120			
Cleaning oneself is safe	Female	4.5625	0.80887	80			
	Total	4.4250	0.88219	200			
	Male	4.2667	1.01031	120			
Avoided unnecessary travel	Female	3.6375	1.46904	80			
	Total	4.0150	1.25004	200			
	Male	4.1417	1.04757	120			
Avoided unnecessary gathering	Female	3.6250	1.17328	80			
	Total	3.9350	1.12566	200			
	Male	3.5417	1.39565	120			
More saving due to less expense	Female	2.7875	1.56459	80			
	Total	3.2400	1.50790	200			

Table 4. Descriptive statistics for positive consequences

The statement that cleaning oneself is safe has a mean of 4.33 among male students, while 4.56 among female students indicated that male and female students feel cleaning oneself is safe. During the COVID-19 pandemic, travel has also been a major factor regarding pandemic precautions. For this purpose, the quarry statement avoids unnecessary travel and has a male mean response (4.26) toward strongly agree, while for female students, the response trend was to agree with a mean of 3.63. Male students avoid unnecessary gatherings with a mean of 4.14, which indicates agreeing with the statement. More savings due to less expense statements have a male mean response rate of 3.54 and 2.78 for female student response rate. Female student responses indicate that there is no influence on savings due to fewer expenses during the COVID-19 pandemic.



Figure 4. Agreement level of respondents regarding positive consequences of COVID-19

The data in Table 3 shows that almost 40–60% of respondents strongly agree with most statements related to the positive consequences of online education. The statements "staying home is safe for all" and cleaning oneself is safe" gained the strong agreement of almost 60% of respondents. While the statements "family members reunion" and "avoid unnecessary gathering" gained the strong agreement of almost 48 and 46% of respondents, respectively (Figure 4).

### 3-4- Multivariate Analysis for Negative Consequences

Results of MANOVA (Table 5) revealed that there was an insignificant difference between female and male respondents considering the variable of students' negative consequences in the presence of COVID-19 [Wilks' Lamda = 0.888, F (10,189) = 2.374, p .> 0.001, partial Eta Squared = 0.112].

Multivariate Tests <sup>a</sup>									
	Effect	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared		
	Pillai's Trace	0.944	316.090 <sup>b</sup>	10.000	189.000	0.000	0.944		
Intercont	Wilks' Lambda	0.056	316.090 <sup>b</sup>	10.000	189.000	0.000	0.944		
Intercept	Hotelling's Trace	16.724	316.090 <sup>b</sup>	10.000	189.000	0.000	0.944		
	Roy's Largest Root	16.724	316.090 <sup>b</sup>	10.000	189.000	0.000	0.944		
	Pillai's Trace	0.112	2.374 <sup>b</sup>	10.000	189.000	0.011	0.112		
Conton	Wilks' Lambda	0.888	2.374 <sup>b</sup>	10.000	189.000	0.011	0.112		
Gender	Hotelling's Trace	0.126	2.374 <sup>b</sup>	10.000	189.000	0.011	0.112		
	Roy's Largest Root	0.126	2.374 <sup>b</sup>	10.000	189.000	0.011	0.112		

Table 5. Wliks Lambda multivariate test for negative consequence	Table 5. W	ilks Lambda	multivariate tes	st for negative	consequences
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a. Design: Intercept + Gender

b. Exact statistic

c. Computed using alpha = 0.05

Table 6 illustrates the response rate of male and female students toward the negative consequences of their behavior during COVID-19. The response rate regarding the statement "lack of freedom" during the current pandemic indicated undecided on the 5-point scale, with a mean response rate of 3.22 for both respondents, while male and female responses were also separately on the undecided scale. Feeling bored statements had a total response rate of 3.68, while the male students' mean response was 3.67 and the female response was 3.70, indicating a trend toward agreeing with the Likert scale. Social activities received a similar response from male and female students, with a mean of 3.49 and 3.57, respectively. This statement trend is from undecided to agree on the Likert scale. The students also respond similarly to the argument that there is a lack of sports activities during COVID-19. The mean response value for male students was 3.61 and 3.70 for the female response, which is undecided, but the trend is toward agreement on the scale. Feeling loneliness's mean response rate was 3.05 from both respondents, indicating undecided to disagree with the statement.

#### Table 6. Descriptive statistics for negative consequences

Des	Descriptive Statistics								
Statement	Gender	Mean	SD	Ν					
	Male	3.2917	1.37441	120					
Lack of freedom	Female	3.1125	1.48404	80					
	Total	3.2200	1.41833	200					
	Male	3.6750	1.35450	120					
Feeling bored	Female	3.7000	1.54592	80					
	Total	3.6850	1.43039	200					
	Male	3.4917	1.37196	120					
Social activities ended	Female	3.5750	1.38505	80					
	Total	3.5250	1.37434	200					
	Male	3.6167	1.35463	120					
Lack of sports activities	Female	3.7000	1.23657	80					
	Total	3.6500	1.30615	200					
	Male	3.1333	1.32800	120					
Feel loneliness	Female	2.9375	1.27631	80					
	Total	3.0550	1.30787	200					

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Feeling stressful Feeling depressed Being feared	Male	3.1750	1.28117	120
	Female	2.9875	1.13063	80
	Total	3.1000	1.22372	200
	Male	2.9833	1.32832	120
	Female	3.1125	1.09074	80
	Total	3.0350	1.23751	200
	Male	2.6667	1.40428	120
	Female	3.2250	1.14709	80
	Total	2.8900	1.33296	200
Being annoyed or angry	Male	3.0250	1.39303	120
	Female	3.4625	1.07849	80
	Total	3.2000	1.29164	200
Financial crises increased	Male	3.1917	1.41002	120
	Female	3.5625	1.02924	80
	Total	3.3400	1.28164	200

Feeling stressful statements received varying responses from male and female students. Male students' response value was 3.17 within undecided on the scale, while the female mean response was 2.98 within disagree on the Likert scale. The mean response rate was 2.98 for male students, while for females, it was 3.11 for feeling depressed statements. Male students do not agree with the statement being feared, with a mean response of 2.66, while the female response was within the undecided category. Being annoyed or angry received an undecided response from both male and female students, and the argument that financial crises increased also received an undecided response.

The data presented in Figure 5 indicates that 41% of respondents strongly agree with the statement "feeling bored" and 31% strongly agree with the statement "lack of sports activities." Similarly, 30, 26, and 20% of respondents strongly agree with the statements "social activities ended," "financial crises increased," and "lack of freedom," respectively. These are the major negative consequences of COVID-19, as perceived by the students of higher education institutions.



Figure 5. Agreement level of respondents regarding negative consequences of COVID-19

# 4- Discussion

Studies have suggested that public health emergencies can have many psychological effects on students, which can be expressed as anxiety, fear, and worry, among others [31]. The results from Pakistan are not different from the rest of the world. According to the results, 60% of students were male and 40% were female and participated in the present research as respondents; almost the same percentages belong to urban and rural areas. Students belong to different

programs, including BS, BSc, MA, and MS, with percentages of 62, 8.5, 3, and 26.5, respectively. These results indicate that students in BS and MS were more responsive and took part in current research. Moreover, the results showed that the majority (58.5%) of the respondents have more than six family members. Almost all (98.5%) of the respondents indicated the presence of COVID-19 patients in their respective areas, while only 1.5% of respondents indicated the presence of COVID-19 patients in the family and relatives of respondents.

According to the findings, the students' intentions for online education are more concerned with saving time to complete the degree program. This finding agrees with the previous study recommending online education [46]. Therefore, most respondents favored online education because they were more interested in completing their degree programs on time and having smartphone access, as young people are more receptive to smartphone applications [47]. Similarly, some viewed online education as more helpful to completing their degree programs without any interruptions. Students' intentions about the positive consequences of COVID-19 presence highlighted the cleaning factor, as it raises awareness for maintaining cleanliness among masses of people regardless of area, age, gender, ethnic and religious group, and region or language. Contrarily, students' intentions regarding the negative consequences of COVID-19 emphasized that due to its presence, people are feeling bored, some people are realizing a lack of physical activities like sports, and a few respondents also indicated COVID-19 interrupted their social activities. Many individuals are missing social gatherings with their friends, family, relatives, and peers.

As the study participants belonged to four universities in Punjab province, Pakistan, the findings are therefore only applicable to similar contexts. For generalizability, a survey based on our findings should be conducted across the province and country. The findings offer an understanding related to the behavior of students towards online education that can be improved with a greater number of surveys for the improvement of online learning, which is the need of the day.

### **5-** Conclusion

The major focus of the present research was to find out the behavioral intentions of university students towards online education during the COVID-19 pandemic in Pakistan. A significant difference was observed in male and female students concerning the positive consequences of COVID-19 on students. As far as students' intentions for online education are concerned, the statement "saved time for completion of degree program" was ranked first, the statement "helpful to complete my degree program" was ranked second, and the statement "communication skills improved" was ranked third. Similarly, the responses of students regarding the positive consequences of COVID-19 were recorded as the statement "cleaning oneself is safe" was ranked in the first position, the statement "family members reunion" was ranked in the second position, and the statement "avoid unnecessary travel" was ranked in the third position. In cases of negative consequences, the statement "feeling bored" was ranked first, the statement "lack of sports activities" was ranked second, and the statement "lack of sports activities" was ranked second, and the statement "social activities ended" was ranked third.

Based on the results and findings of contemporary research, public and private sector academic institutions should develop infrastructure for online learning opportunities as a regular feature of their institution along with their regular physical classes. Moreover, the faculty and students should be trained for the application of ICTs, online learning gadgets, and applications to overcome challenges and issues related to the closure of academic institutions.

# **6- Declarations**

#### **6-1-Author Contributions**

Conceptualization, S.A. and M.Y.; methodology, S.A.; software, M.A.; validation, S.A., M.Y., and B.P.; formal analysis, S.A.; investigation, S.A.; resources, S.A.; S.F., and S.H.; writing—original draft preparation, S.A.; writing—review and editing, S.A.; visualization, S.F.; supervision, S.A.; project administration, S.A., funding acquisition, S.A. All authors have read and agreed to the published version of the manuscript.

#### 6-2-Data Availability Statement

The data presented in this study are available in the article.

#### 6-3-Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

#### 6-4-Institutional Review Board Statement

The project and survey instrument (questionnaire) were ethically approved by the Research Ethics Committee, University of Sharjah, Sharjah, United Arab Emirates (REC number: REC-23-07-27-01-Other).

#### **6-5-Informed Consent Statement**

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

#### **6-6-** Conflicts of Interest

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

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