Pakistan Journal of Social Research
ISSN 2710-3129 (P) 2710-3137 (O)
Vol. 5, No. 2, June 2023, pp. 1326-1336.
www.pjsr.com.pk

PERCEPTION OF STUDENTS REGARDING COVID-19: PRE-PANDEMIC VS. POST-PANDEMIC LEARNING COMPARATIVE ANALYSIS

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ABSTRACT
COVID-19 pandemic has impacted education system globally. Lockdown has been imposed in numerous countries to reduce spread of pandemic and this lead to immediate closure of educational institutions. This lockdown has impacted more than 90% of learners globally as regular in campus learning process can't be continued and thus educational institutions shift towards online learning process. The current study is investigating and evaluating perceptions of leaners in Pakistani educational institutes and study is comparing the difference in learner's perceptions of same students in pre as well as post pandemic time period. The study has a sample size of 386 respondents from Bahria University and response rate is 89%. From the sample size of 386, 345 responses were deemed to be suitable. The study is using SPSS version 25.0 software for descriptive as well as analytical statistics. The study results have shown that there exist statistically significant difference in perception of Pakistani students towards in campus learning methods pre pandemic and web based learning methods used in post pandemic time.
Keywords: perception, web based learning, pre and post pandemics.

INTRODUCTION
In past centuries, world has a history of some deadly pandemics like Spanish flu, SARS, influenza, Ebola etc. that are considered to be responsible for creating significant changes in demographic as well as geopolitical situations by creating alteration in trade, usage of technology and urbanization etc (Liu, Bao, Huang, Shi & Lu, 2020). The rise of globalization, exploitation of environmental as well as natural resources has raised the pandemics likelihood. Similarly COVID-19 is the deadliest pandemics that are being faced by human beings in current century. This pandemic has changed urban life in numerous aspects and this global health crisis has added some complexity in how numerous activities can be conducted too (Adnan and Anwar, 2020).In December 2019, COVID-19 first case was being recognized in Wuhan China and COVID-19 was being declared by World Health Organization a global health emergency on 30th January 2020 and afterwards on 11th march 2020 it was confirmed to be a pandemic (Cucinotta & Vanelli, 2020). In Pakistan Federal Health Ministry had confirmed initial two cases of COVID-19 on 26th February 2020. (Saqlain *et al*., 2020).

From the health perspective COVID-19 has effected all the age groups severely but highest death rates were being reported in old age individuals as well as patients with comorbidities (Goldman, 2020).COVID-19 pandemic lead to unexpected disorder in economy as well as society similar to historical pandemics. Moreover the challenges created by recent COVID-19 pandemics has impacted wellbeing of each and every one of us in one way or another throughout the globe. Students are considered to be a population set that has to face dramatic impact of COVID-19 waves due to disastrous changes in their everyday lives and especially to their prospects for both immediate and distant future. In order to control pandemic countries had to take measures like lockdown as a result of which educational institutions (schools as well as universities) of effected countries need to be closed. As a result of which this global health crisis has posed a crucial effect on higher education as it has forced all teaching as well as learning activities to face a sudden transition from in-campus (face to face) to purely digital (Toquero, 2020).

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COVID-19 has forced countries to order closure of their educational institutes which causes learning to be at functional standstill as first priority of each country's government was protecting citizens from viral exposure. In start of 2020 only China with some other effected countries were being closed but by mid-march 2020 approximately 75 countries had declared lock down and thus they have announced educational institutions closure. Pakistani authorities had announced closure of educational institutes throughout country by 13th March 2020 (Ali, 2020) and complete lockdown was being implemented by 186 countries that had ultimately impacted 73.8% of total enrolled learners by end of April 2020. Moreover, during the first Covid wave by April 1, 2020 the learners (approximately 1.598 billion) of 194 countries need to stay at home due educational institutions closure.

After the closure of educational institutions both students as well as administrations of institutions need to do experimentation with ways to complete the prescribed curriculum within academic year. This shutting down of educational institutions had created numerous challenges for both students as well as faculty. The closure of educational institutions had a disastrous impact on practices of students of higher education too with respect to their academic work as well as life. Students had to switch to online lecture, had to adapt to new communication channels, new methods of assessments, different workload and changes in their social life on short notice. Thus closure caused overnight changes in education pedagogy as well as mode of teaching methodologies. The conventional teaching system had to be changed to new teaching and learning system that can support students in their academics by giving online learning experience (Roy, 2020). Nobody knew that when will this pandemic ends so both teachers and learners were being forced to adopt web assisted learning due to lockdown in order to offer learning opportunities to their students (Kaur, 2020). Thus in short time students had to register themselves in these online learning courses and thus online platforms demand started rising dramatically due to lockdown.

This web assisted learning make use of internet, telecommunication, websites and different online platforms to perform numerous academic activities like lecture delivery, providing assignments a swell as study materials (Young *et al*., 2008). Many online platforms were available for both teachers and students before this pandemic too but they were not being used on massive scale before. In past some scholars have explored and made comparison of perception of students regarding e-learning versus class room learning with respect to social presence, satisfaction and social interaction and findings revealed that though e-learning mode lacks in social interaction as well as social presence but it offers numerous benefits like convenience as well as ease of time. However this new mode of online learning has imposed numerous risks like lack of interaction with peers, lack of teacher's physical presence, lower motivation level and lack of learning capabilities of individuals (Hannay & Tracy, 2018; Nguyen, 2015). In addition, this pandemic has created challenges to individual's emotional health too by creating fear, frustration, boredom and anxiety. Moreover, even after the removal of lockdown when cases of Covid start reducing in countries once educational institutions were being reopened, institutions would not be able to encounter the same situation that they were experiencing before this pandemic. Thus norms that were guiding numerous parts aspects of our lives had to be reformulated in post pandemic era. The current study is exploring the effect of this sudden transformation from physical (classroom) learning to web based learning due to uncertain circumstances caused by pandemic.

Problem Statement

During pandemic environment, the main focus of teaching as well as learning is to maintain consistency of delivering quality education. The lockdown to reduce pandemic has enforced educational institutes to adopt online teaching methodologies in short run which are inevitable to deal with the crisis. Scholar in past has found that online teaching methods has posed numerous challenges and students are not in favor of using web-based teaching methodologies (Papadakis, Kalogiannakis, Sifakin &Vidakis, 2017) but due to lockdown there was no other alternative available to educational institutions. In past web based learning has never been adopted to be a real or formal mode of education but this pandemic has compelled educational institutions to explore e-learning. Thus, the efficacy of these distant learning methods should be evaluated to assess teaching methodologies effectiveness. This empirical study is thus evaluating perception of learners regarding imposed changes in their learning methods as a result of pandemic at higher education sector.

Rationale of Study

Till time there are few investigations as to how universities globally have dealt with this pandemic or how are they planning for their upcoming semesters. This stocktaking however is very integral to support universities globally to deal with Covid pandemic in an effective way in future as this pandemic is expected

to continue till 2023. Information regarding how other universities in other part of world have behaved can be very helpful for a developing nation like Pakistan. Though study portals, education.com and QS are conducting international surveys to study impact of Covid19 on study as well as mobility plans of students as well as staff and results of these surveys will be presented in blogs as well as web talks. Few research papers have been published till date globally that have studied numerous aspects of COVID-19 but the main limitation of these papers is that in most of papers data is derived from initial stages of pandemics and sample size is small too in many papers so more empirical research is required in this area in future (Aristovnik *et al*., 2020). Moreover most of the studies conducted have explored the effect of COVID on student's mental health (Zimmermann, Bledsoe & Papa, 2020; Wang, & Zhao 2020; Huckins e al., 2020; Kaparounaki *et al*., 2020). Till time very few empirical studied have been published that have studied impact of COVID on students' academic work (Sahu, 2020; Edelhauser & Lupu-Dima, 2020; Iyer, Aziz & Ojcius, 2020).

Literature regarding how virtual learning that was being conducted during COVID-19 lockdown has effected academic practices especially in sector of higher education is still under development. Literature lacks work regarding comparison of student's performance in virtual environment due to lockdown versus traditional face to face classes before lockdown and thus in future more research should be conducted to investigate opinion of students regarding online learning during pandemics (Mailizar & Maulina, 2021; Hussein, Daoud, Alrabaiah & Badawi, 2020). Moreover some studies that are present in literature regarding this area were conducted in developed nations where there are abundant resources, enriched infrastructure of technology as well as support availability. However in developing nation like Pakistan there is lack of financial resources, technical support, poor IT infrastructure and IT skills level for both students as well as instructors and thus shifting towards virtual environment in a short span of time challenge for student and staff. Till date very limited empirical work has done in Pakistan to assess how changes in learning structure due to Covid affect students (Adnan & Anwar, 2020; Shehzadi, Nisar, Hussain, Basheer, Hameed & Chaudhry, 2020). Both the papers have limitation of using small sample size. Adnan & Anwar (2020) have stated that in future more research should be conducted in Pakistan to investigate student's perception after changes in learning structures by using large sample size. The current study is one step to empirically assess the difference in perceptions of students by learning through using online structure during Covid by using large sample size so that results can be generalized.

Significance of study

The results of current study are significant for educational institutes worldwide and especially in Pakistan as it would be helpful to understand educational reforms that will be needed in this time of pandemic as well as post pandemic time. This pandemic has transformed education system in a significant way as educational institutes had to adopt their course contents for online way of teaching in a very short span and thus student's experience of learning via this online mode can be incorporated in order to make this online learning more effective. Moreover there is no certainty regarding the life of this pandemic and thus all educational institutes had to be prepared to shift towards digital learning mode and thus they had to make modifications in their course structure accordingly. Thus the current study's results will be significant to educational institutes as an input to design their online teaching in future in a way that would be effective for students too. The recommendations provided by current study will guide professors as well as higher education management and portal designers to integrated virtual learning in future higher educational plans after pandemic and specifically in a developing nation like Pakistan where there is lack of IT infrastructure as well as skills. The results of current study are even more relevant by taking into consideration the fact that in Pakistan the online education system has never being experienced at a large scale before this pandemic and this is a massive social experiment.

REVIEW OF LITERATURE

In University life students enjoy the different phase of their studies as there is enhanced sense of belongingness between classmates, facilitators, academicians and university's identity value. In universities students have more social activities as well as facilities. University students are being provided with three major facilities that include education, research as well as support facilities (Kim &Bhullar, 2020). However this pandemic has an adverse impact on the belongingness relations students have in university as students have to switch towards online learning. Students could not make use of universities facilities too like libraries, laboratories etc. Along with students, Covid has affected fundamentally the staff of universities too (Aristovnik *et al*., 2020; Arora & Srinivasan, 2020).This pandemic time remained more stressful to

university teachers as well as students as it has changed learning as well as teaching activities altogether as lectures, seminars, workshops, exams as well as supervision need to be moved online in short span of time (Hodges *et al*., 2020).Educational institutions globally were being forced to move from traditional teaching as well as learning structure towards virtual structure(Van Nuland Mandzuk, Petrick& Cooper, 2020).

Lockdown as well as social distancing are the ways by which spread of COVID-19 can be reduced as a result of educational institution need to be closed globally. Thus this pandemic remained a trigger for educational institutes in order to pursue innovative ways in short span of time globally. Most of universities thus shifted towards online platforms like Zoom, Microsoft Teams etc. COI framework (Community of Inquiry framework) has offered a useful baseline for making intervention in online learning and teaching (Garrison, Anderson & Archer 2001). Web based instruction success is dependent on creation of learner's group according to COT framework. Learning of this learner group occurs by three interdependent components that include social presence, teaching presence and cognitive presence. Tratnik, Urh & Jereb, (2019) have explored that student who are learning using traditional mode are found to be more satisfied than online learners. Kemp and Grieve (2014) in study has found that undergraduate students want to have more face to face academic activities than on internet however the results show that level of academic performance was same in both the modes. Past studies has also showed that perception of students regarding online learning in higher education is greatly impacted by the factors including age, computer knowledge of learner, gender, learning patterns, awareness level of learner and interaction because of connectivity issues (Arora & Srinivasan, 2020).

On the other hand Driscoll, Jicha, Hunt, Tichavsky& Thompson, (2012) has explored no statistically significant differences among face to face and online leaning with respect to satisfaction with the condition that if online class is designed effectively. Though online leaning can be considered to be perfect substitute to traditional classroom learning but major concern is quality of learning that is dependent on way online content is being designed and executed. Thus both the policy makers as well as academicians are focusing on impact of this pandemics on higher education (Nicola *et al*., 2020; Gonzalez *et al*., 2020). Virtual leaning can be conducted effectively in developed nations that are advanced from digital perspectives (Basilaia & Kvavadze, 2020). In developing nation like Pakistan teaching, learning as well as administrative activities are being handled manually (Salam, Jianqiu, Pathan& Lei 2017).Moreover developing nation like Pakistan is having lack of access to reliable and fast internet that acts as a hindrance in process of offering virtual learning specially to those who are residing in rural areas (Wains & Mahmood, 2008). This sudden shift towards online mode of learning has thus become measure of organizational agility (Wu, 2020), and many academic institutes start concentrating more on transfer of educational content more towards digital world rather than concentrating on teaching or towards delivery methodologies. Zhong (2020) has explored that limited resources possessed by academic institutions, lack of social marginalization of students, lack of latest technology and interaction with teachers online are some of the main obstacles to online learning that have impacted capacities of students to participate effectively in virtual learning. Moreover due to pandemics circumstances are unique and thus students are perceiving this online learning to be a crisis learning (Toquero, 2020). Students are now unable to see their class fellow due to lockdown and thus real time information sharing and ideas is missing in this virtual learning environment. In a developing nation like Pakistan adoption of ICT and thus online learning opportunities are more limited due to limited higher education budget in Pakistan (Abbas, Ahmed, Khalid, & Yasmeen, 2017).

In past some scholars have conducted research on opportunities as well as challenges of e-learning before this pandemic but e-learning was found to be a non-compulsory method for amplifying teaching as well as learning cycle (Farid *et al*., 2015) and thus before this pandemic there were very few academic institutions who were using some e-learning ways along with conventional teaching style. As a result of lockdown decision by Pakistani government all licensed higher educational institutions were being instructed to make use of e-learning as well as learning management systems for conducting online classes (Ali, 2020).There were only few high ranked universities of Pakistan that were capable to start online classes immediately. Thus,it's very important to study how students of Pakistani students have dealt with this pandemic. The current study is one step to empirically assess the difference in perceptions of students by learning through using online structure during Covid versus in campus learning in pre Covid times. The current study is substantiating the following hypothesis

H_1: *There is a significant difference in the perception of students of higher education towards learning methods being adopted Pre and Post COVID-19 Pandemic*

The current study is taking a few learning aspects that include personalization, flexibility, accessibility, sufficiency, usability, quality of content, provision of guidance services, interactive communication, attitude, responsiveness and enthusiasm of instructor. The study is evaluating these aspects of learning in relation to pre versus post COVID-19 learning structures adopted by higher educational institutions of Pakistan. Flexibility is one of the integral components for measuring learning effectiveness (Sedera *et al*., 2004). Learning structure's flexibility is being assessed by measuring the readily usability of its learning content for learner. Scholars have determined that personalized learning experience increases the effectiveness of learning. Personalization in learning method can be measured by features like personalized information sharing, one to one discussions as well as queries handling. Role of accessibility and sufficiency of learning content is also very crucial to leaning effectiveness (Ozkan & Koseler, 2009). Scholars have explored that if learning management system is providing sufficient and accessible information is provided to learner then it is considered to be effective. Another important component of learning found in literature is its usability (Ozkan & Koseler, 2009; Sedera *et al*., 2004) which is helpful in reaching goal of learning by increasing frequency of learning efforts. Another crucial component on which effectiveness of learning structure is dependent is quality of information (Al-sabawy, 2013).The way content is being organized and presented also plays a role to increase quality of content (Shee& Wang, 2008). Another important factor is provision of guidance services that affect the learning system effectiveness and especially in online learning system guidance services like policies and ethics that are defining regulations, restrictions as well as directions regarding confidentiality of data and other subject matters are found to be significant (Hassanzadeh *et al*., 2012). Attitude of instructor is another important factor that affects quality of education system (Islas *et al*., 2009; Selim, 2007; Webster & Hackley, 1997).Attitude of instructor towards technology, change and command of instructor towards a technology has significant impact on learning results (Webster & Hackley, 1997). Another equal important factor is enthusiasm of instructor (Sun *et al*., 2008). Literature states that prompt responses of instructor towards inquiries and questions have significant impact on effectiveness of learning (Ozkan & Koseler, 2009; Sun *et al*., 2008).Moreover interactive communication of instructor are also very important.

RESEARCH METHODOLOGY

This study is a primary data based study and its nature is descriptive as it is conducted to assess the difference in perception among students in online classes throughout pandemic (post COVID-19) versus in campus (face to face) teaching before pandemic (Pre COVID-19). The current study is using same sample pre-test as well as post-test design in order to assess the perceptions of students. The current study is being conducted in non-contrived setting.

The study has used a structured questionnaire as an instrument to collect data from students. There are two main segments of research instrument i.e. demographic section and second segment assess numerous aspects of pre learning as well as post learning. In demographic segment there are several items to collect information regarding gender, age, grade and semester of student. The second segment comprised of 20 items each on five point Likert's Scale. All the items are being adopted from previous studies with little bit modification. There is one control factor too that sample consist of only those students who have studied by both means i.e. pure in campus before lockdown and pure online during lockdown. Some of aspects of learning that are being selected in current study include personalization, accessibility, flexibility, quality of content, provision of guidance services , attitude, responsiveness, interactive communication as well as enthusiasm of instructor. The items of flexibility and usability are being adapted from study of Sedera *et al*., (2004), personalization, accessibility, content quality, responsiveness and interactive communication of instructor are being adapted from study of Ozkan & Koseler (2009), instructor attitude as well as enthusiasm are being adapted from Lee *et al*. (2009) and items of provision of guidance services are modified from Chang & King (2005).

A significant study should have sample size greater than 30 and lesser than 500 according to rule of thumb. The sample size is having a legitimate impact on the statistical significance of research tests as well as outcome's generalizability. Thus by taking into consideration all these contemplations as well as to reduce the margin of error a sample size of 386 respondents has been taken. The current study is having 89% response rate. From the sample size of 386, 345 responses were deemed to be suitable. Outliers were looked for in the data. The Cronbach Alpha test is being used to assess the data reliability, and Shapiro Wilk Test was being conducted in order to assess data normality. In addition, an exploratory factor analysis is being performed. Descriptive statistics (means as well as medians) were used to define the population

and to see trends among variables, for making comparison of students' perceptions among pre- and post-pandemic learning approaches; a Paired t-test was used. The data gathered through online survey was transferred to an Excel spreadsheet, which was then encoded and sent to the Statistical Package for Social Sciences (SPSS) version 25 software programs

Research Analysis

The questionnaire was sent online to 386 students throughout Pakistan out of which349 responses were received, while the remaining 37 questionnaires were not returned back. Four questionnaires were discovered to be partially or incorrectly filled thus leaving 345 valid responses to be used in further analysis.

Demographic details of the respondents

Students from Pakistan's various universities made up the study's population. Due to the lockdown in the middle of the semester, the participants were being exposed to pre pandemic as well as post pandemic learning. In the current study primarily the students of BahriaUniversity have been taken as a sample whereby students of multiple fields like medicine, engineering, business, law, earth sciences were being contacted by sending online survey to collect data. Moreover students living in multiple cities were also included to diversify the opinion of students living in different cities. Data was collected from different Semesters (2–8) using an online questionnaire, where students have taken half session in the University and learned via physical classrooms based methodology and in remaining half session these students have continued learning at home due to lockdown enforcement. The sample consists of 224 male (65%), and 121 female (35%). Respondent's average age was 21 years. Individuals are categorized into different parts on the basis of their residence. The table shows that 132 (38.3 %) responses were collected from Islamabad, 58 (16.7 %) from Rawalpindi, 54 (15.6 %) from Lahore, 61 (17.7 %) from Karachi, and 40 (11.7 %) from Jhelum.

Statistical Analysis

The Cronbach Alpha was being measured to assess reliability of data, and the Shapiro Wilk Test was conducted to find out normality of the data. In addition, an exploratory factor analysis was performed. Descriptive statistics (means as well as medians) were used to define the population and see trends among variables, for making comparison of perceptions of students among pre-pandemic learning method versus post-pandemic learning approaches; a t-test was used. The data was being gathered through online survey and then was being transferred to an Excel based spreadsheet that was then encoded and then sent to the Statistical Package for Social Sciences (SPSS) version 25 software programs. From the sample size of 386, 345 responses were deemed to be suitable. Outliers were looked for in the data.

RESULTS OF DATA ANALYSIS

Kaiser Meyer Olkin (KMO) is an adequacy metric, whereas Bartlett's sphericity test is a statistical test that confirms the null hypothesis that variables are unrelated and also used to substantiate that gathered data found to be satisfactory for Exploratory Factor analysis. A KMO value of 0.5 or more is considered acceptable and the KMO for this investigation is 0.660, which is sufficient to proceed with the study. While the value for Bartlett's sphericity test should be less than 0.05, it is 0.000 in this study, indicating that it is significant.

Table 1: *KMO and Bartlett's test*

Kaiser -Meyer-Olkin measure of sampling adequacy		0.760
Bartlett's test of Sphericity	Approx. Chi-Square	6324.374
	Df	170
	Sig.	0.000

The data was judged as suitable material for exploratory factor analysis since the tests satisfied integral as well as basic assumptions for exploratory factor analysis. When the loadings of the factors were examined, all values were found to be more than the estimated value of 0.5. As a result, none of the factors are ruled out of the study. The ensuing two components were named Pre-Pandemic traditional class room based Learning and Post-Pandemic virtual learning on the basis of Exploratory Factor Analysis results. These two factors discovered account for a total of 62.135 percent of the variations in the data used in the study.

The reliability scale is determined using SPSS 25 and composite reliability and Cronbach's alpha. The customary threshold of 0.7 as a mark of acceptable reliability, with anything below 0.7 being undesirable and leading to the literature of poor internal consistency or instrument problems. All alpha

values are more than 0.7, indicating that the research instrument is legitimate and dependable. The Cronbach's alpha values for the scales used in the study are shown in table 2:

Table 2*: Cronbach Alpha value*

Pre-Pandemic Learning	Post-Pandemic Learning	No of Items
0.845	0.953	10

The Shapiro–Wilk test was being conducted in order to determine regular data distribution. The data was found to have normal distribution because the test was insignificant (greater than 0.05) for all aspects of learning evaluated in this study.

Table 3: *Shapiro–Wilk test*

Pre Pandemic	Post Pandemic	W	P
Flexibility	- Flexibility	0.958	0.075
Usability -	Usability	0.957	0.0567
Sufficiency	Sufficiency	0.955	0.0643
Ability to Access -	Ability to Access		
Quality of content -	Quality of content	0.957	0.0534
Guidance Services -	Guidance Services	0.958	0.0925
Personalization -	Personalization	0.870	0.0674
’Responsiveness of Instructor	’Responsiveness of instructor	0.947	0.8724
Interactive communication of instructor-	Interactive communication of instructor	0.956	0.7655
attitude of instructors-	attitude of instructor	0.963	0.9232
enthusiasm of instructor	-enthusiasm of instructor	0.944	0.0598
Total	- Total	0.984	0.0789

Results are found to be significant that shows that there is a deviation from normality. Moreover perceptions of students among Pre and Post Pandemic Learning were compared using paired t-tests. The Pre-Pandemic Learning scores of students (Mdn = 45) were significantly different from their Post-Pandemic Learning scores (Mdn = 33, p 0.000). All the desired results are depicted in table 4 below:

Table 4: *Descriptive statistics for pre and post pandemic learning*

		F	SA	QC	GS	P	U	RI	IC	AI	EI
Post Pandemic	**Valid**	345	345	345	345	345	345	345	345	345	345
Mdn= 33	**Median**	3.00	3.00	3.00	3.00	2.00	2.00	2.00	3.00	3.00	3.00
	Mean	2.95	2.92	3.50	3.25	2.30	2.15	2.25	3.10	3.00	2.95
	Min	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Max	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Pre Panedemic	**Valid**	345	345	345	345	345	345	345	345	345	345
Mdn=45	**Median**	4.00	4.00	4.00	4.00	3.00	4.00	4.00	4.00	3.00	4.00
	Mean	4.50	4.30	4.15	4.25	3.50	4.75	4.65	4.40	3.30	4.50
	Min	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Max	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00

F Flexibility, **U** Usability, **SA**Sufficiency and ability to access, **QC**Quality of Content, **GS** Guidance services, **P** Personalization, **RI** responsiveness of Instructor,**IC** interactive communication of Instructors, **AI** attitude of Instructor, **EI** enthusiasm of Instructor

The paired t-test was found to be highly significant, as p value of test is0. 001. The purpose of conducting paired t-tests were to make comparison among perceptions of students in Pre pandemic and Post Pandemic Learning. The findings showed that there is a significant difference the perceptions of students among Pre-Pandemic Learning scores (Mdn = 45) as well as post-Pandemic score (Mdn = 33), p

<0. 000. The Paired Test was found to be significant as p < 0.001. As a result, null hypothesis H0 of current , which states, " There is no statistically significant difference in perception of students of higher education towards learning methods being adopted Pre-Pandemic and Post-Pandemic in Pakistan," was rejected because significant differences were found, which shows that perception of students via Pre-Pandemic learning mode proved to be more favorable than Post-Pandemic learning mode. The findings of this study indicated that statistically significant difference were found in perception of students regarding Pre-Pandemic and Post-Pandemic learning methods. In a nutshell study results indicate that students will be having higher perception of Pre-Pandemic class room learning in comparison to Post-Pandemic web-based learning.

Table 5: *Paired T test (dependent)*

Paired T – Test					
				95% of Confidence Interval of the Difference	
Pre Pandemic	**Post Pandemic**	**t**	**P**	**Lower**	**Upper**
Flexibility	Flexibility	2.89	<0.001	0.489	0.678
Usability	Usability	4.86	<0.001	0.587	0.743
Sufficiency and ability to access	Sufficiency and Ability to access	3.71	<0.001	0.432	0.513
Quality of Content	Quality of Content	2.65	<0.001	0.541	0.734
Guidance Services	Guidance Services	7.85	<0.001	0.643	0.789
Personalization	Personalization	2.46	<0.001	0.346	0.478
Responsiveness of Instructor	Responsiveness of Instructor	4.26	<0.001	0.256	0.456
Interactive communication of Instructor	Interactive communication of Instructor	4.78	<0.001	0.547	0.689
Attitude of Instructor	Attitude of Instructor	6.89	<0.001	0.623	0.712
Enthusiasm of Instructor	Enthusiasm of Instructor	2.45	<0.001	0.467	0.572
Total	Total	5.55	<0.001	0.598	0.683

DISCUSSION

The current study has assessed and confirmed that Covid had a major impact on learning methodologies as well as students' opinions of those approaches. Because of the lockdown to reduce the spread of COVID-19 epidemic, physical i.e. classroom-based learning methods had to be substituted by virtual based e-learning. The current study examined perspectives of students regarding pre pandemic as well as post pandemic learning, oriented more towards numerous aspects of learning methods like flexibility, personalization, sufficiency, and ability to access, usability, quality of content, providing guidance services, attitude, enthusiasm, responsiveness, and interactive communication of instructor. The results of study depict that there is a statistically significant difference in the student's perceptions regarding pre versus post pandemic learning. The results show that there is significant higher perception of students about pre pandemic learning as responses are more affirmative about class room based learning they were receiving before pandemic and lockdown, on the other hand students perception towards post pandemic learning (pure online)is different. One of the factors explaining the dissimilarity in perception can be that it was their first experience that in a very short span of time they had to shift towards pure web-based learning due to lockdown which can lead to significant difference in their perception towards post pandemic learning. The students didn't get sufficient time to get used to novel methods as well as software's being used by the teachers. Some of the students are living in rural areas where there ae internet issues so they can't attend classes properly. The findings of the study have confirmed that blended e-learning methods t (pure in campus classes along with use of LMS and other online platforms to assist students) which were being used before lockdown are perceived better by students than pure web based method after lock down.

How current study results support the literature?

According to the results of this study, students found blended e-learning to be more alluring in comparison to web-based learning. The findings are similar with previous research (Shama & Alvi, 2021; Tratnik, Urh& Jereb, 2019; Farid *et al*., 2015; Arora & Srinivasan, 2020; Toquero, 2020) who explored in their studies that students face obstacles in pure virtual teaching mode and they perceive in-campus and blended learning mode better than pure web based learning. The findings of current study however differ from previous research Driscoll *et al*., (2012) which explored no significant differences among face to face and online leaning with respect to satisfaction when it is designed well among students in the study. As a result, teachers' primary attention should not be on the adoption of Web-based learning during emergencies like the COVID-19 Pandemic, but rather on the development and improvement of learning quality during the emergency (Afouneh *et al*., 2020).

CONCLUSION

It is the fact that COVID-19 pandemic has created hindrances in the lives of students and another bitter fact is that this pandemic will be having lasting impact on future academic lives too. Though pandemic has adversely impacted education globally but it has created more difficulties in developing nations. Lockdown as well as educational sector's indefinite closure to reduce spread of COVID-19 has paved way for online/ web based learning. However this abrupt switch from face to face learning to virtual learning found to be more challenging for students. Some of the reasons due to which students were being more adversely affected in web based learning includes their lack of internet accessibility, lack of class interaction, lower motivation and concentration level due to limited resources at home. Due to all these factors study results show significant dissimilarity in the perceptions of students regarding pre versus post pandemic learning. Though countries have adopted alternative mode of web based learning to continue their education process but in developing countries like Pakistan virtual learning setup need improvement like technical training of teachers and students, resource fulfillment of both students and teachers. Moreover it is recommended that in order to enhance post pandemic learning, academics should do more efforts like giving more discussion time so that students can involve in peer communication. Teachers should also try to motivate as well as promote learners to do discussions on topic with their class fellows to improve peer collaboration in virtual learning.

Future research should widen diversity of groups to be analyzed and should give insight into the problem by using larger sample from different other universities of Pakistan. Moreover the current study is based on perception of students on some aspects of learning. In future other aspects can also be included. In future research can also be upgraded by including lecturers and administrators in sample to get data about their perception of working in pre pandemic versus post pandemic.

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