The Effects of COVID-19 on Education in Pakistan: Students' Perspective

Fouzia Malik
M. Phil Student
Benazir Bhutto Shaheed University

Dr. Fouzia Ajmal
Assistant Professor
Department of Education, IIUI
fouzia.ajmal@iiu.edu.pk

Zohran Jumani
Research Scholar
Iqra University

Abstract

Due to the wide spread of COVID-19, the educational institutes were closed on 20th March, 2020 and the individuals were advised to isolate themselves at home. This lockdown not only adversely affected the economy but all the educational activities were shut down which created a huge gap in students' learning and knowledge all over the globe. This quantitative study was designed to explore the impact of COVID-19 on the education of higher level students in the context of Pakistan. The five point Likert Scale questionnaire was provided to the learners enrolled in intermediate, undergraduate, graduate and postgraduate level. 74 respondents respond to the questionnaire. The data were analyzed through SPSS 23. The results of the findings revealed that students have been facing a lot of difficulty to grasp certain concepts during e-classes. The students lacked internet access along with not been given any prior guidance related to the usage of online platform. The challenges regarding online classes at the same time are being faced by the teachers as well along with the students. It was also analyzed that although teachers are providing all the necessary resources and feedback to the students but still students have been going through difficulties in grasping the concept, gaining knowledge and communicating with their teachers online. Due to immense number of online classes teachers have a huge workload on their part.
Keywords*: Education, COVID-19, effects, students, Pakistan*

1. Introduction

Since 1920 many significant pandemics in human history have been documented including smallpox, cholera, plague, dengue, AIDS, influenza, Severe Acute Respiratory Syndro me (SARS) West Nile disease, and tuberculosis. Influenza pandemics, in addition, are arbitrary b ut persistent outbreaks that can have a colossal impact on the environment and social surroundings all over the world. In the last phase of the year 2019, a pandemic unexpectedly emerged in the Wuhan Chinese area and spread very rapidly across China and other areas of the world

(Wickramasinghe et al., 2020). This viral disease forced the population of the countries to stay at home until utmost necessary. This created a huge pause in the educational activities in almost of the countries. The students were instructed to use ICT and continue their learning from online resources at home. Although it was not clear that to what extent online services will be effective including school children, who were unable to access them-be expected to slip academically behind other students. It was further supposed that the level of children's learning will also be influenced by the amount of internet-enabled devices which could be accessible at their homes, considering that their parents or siblings will also be at home. Moreover, the types of equipments they usually used for educational activities could be an influential factor in this regard. As compared to the native countries such as Canada, the internet users have been estimated to be near 35.32 million (data portal, 2020) whereas, Pakistan is known as the 10th largest internet using country with 76.38million users (data portal, 2020). However, the virtual teaching and learning was a big challenge for the teachers and students. With reference to the highlighted concerns all over the world, Pakistan has also been one of the COVID-19 targeted countries.

So far, many studies have been conducted in relation to COVID-19 in the medical sector and other areas related to health sciences. (Abdulamir, &Hafidh, 2020; Meng, Hua, &Bian, 2020; Gondauri, Mikautadze, &Batiashvili, 2020; Holshue et al., 2020; Usak, Masalimova, Cherdymova, & Shaidullina, 2020). In contrast, very little research is conducted in the area of education about how COVID-19 or even SARS influenced the education system (Bao, 2020; Sintema, 2020; Yan, 2020). Identifying the gap, current research study aims to explore the challenges persisting throughout the educational domain due to pandemic outbreak with respect to context of Pakistan. The results of the study served the purpose of notifying the stakeholders i.e. parents, schools etc. on the repercussions of shutdown of educational institutions due to outbreak of COVID-19.

COVID-19 stands for corona virus disease and even referred to as the 2019 novel corona virus or ‘2019-nCoV’ Bender (2020) and World Health Organization (WHO) used term “COVID-19” for corona virus disease and is also referred to as the new corona virus or '2019-nCoV' 2019. Likewise, the close report has been generated about the emergence of this virus from the local Huanan South China Seafood Market in Wuhan, Hubei Province of China (Zhu, et al., 2020). This virus was identified from the patients with the history of lower respiratory tract of pneumonia in

Wuhan, China on 29 December, 2019 and was able to transmit through mouth droplets of infected person or by contacting different surfaces of objects (Li, et al., 2020; Meng, Hua, & Bian, 2020).

1.1. Research Questions

1. What is the impact of COVID-19 on education?
2. What are the perspectives of students regarding online classes?

2. Literature Review

In Pakistan, 1st case of COVID was diagnosed in the month of February 2020 and in the beginning of march over 300,000 educational institutes including schools, colleges and universities had been closed so that the children and students could be protected from the inflammation (Mehreen Zahra-Malik, 2020). Only leading schools were able to make digital connection with students to maintain their learning through multiple applications. But majority of the students all over Pakistan were unable to continue their learning practice through smart phones or internet. It was statistically calculated that 22.8 million over 70 million are non-schoolers. Umbreen Arif, an educational advisor in central of Pakistan anticipated that due to this closure 50 million students in different institutes are at risk of falling behind in education. Moreover, according to Pakistan Telecommunications Authority (Pta gov, 2020) only one million school going children have regular access to the digital devices or bandwidth. Although, public sector launched just two weeks after schools were closed on 13th April. This channel was operated by state-owned PTV House and about 54 million people were their viewers. It broadcasted programming for grades 1-12 without any charge from four Pakistani ed-tech organizations i.e. SABAQ, Orenda Project, Knowledge Platform and Sabaq Foundation (Yousafzai, 2020). Additionally, a text message system with 250,000 users was added at the end of May to enable parents and students to communicate with devoted teachers (Malik, 2020).

On 18 March 2020, the UN Educational, Scientific and Cultural Organization reported that 107 countries had adopted national school closures due toCOVID-19, affecting 862 million children and young adults, nearly half of the world's student population (UNESCO, 2020) and this condition has quickly worsened from 29 countries with national school closures within a week. This step was taken to reduce social gatherings and contacts among students to avoid impact of pandemic. Hence, the flow of education was interrupted (Jackson, Vynnycky & Mangtani, 2016).A detailed review provided the evidences of reduced transmission of virus due to the schools

closure(Cowling, Ali &Ng, 2020).The same action was taken by rest of the countries around the world based on the certain theoretical reasons such as children contribute more to influenza exposure than adults due to low levels of tolerance which elevated the levels of transmission attributable to symptomatic illness (Wallinga, Teunis & Kretzschmar, 2006). However, the number of cases of children in the COVID-19 pandemic so far tends to be much smaller than predicted in their age, although data for this is inconsistent and some reports indicate that children may be as likely to be affected as adults but remain mostly asymptomatic or have a moderate sort of illness (Shen, Yang& Wang, 2020). Evidence of COVID-19 dissemination by child-child interaction or through school is not yet clear, although family contact plays an important role in the outbreak

Table 1: ***Timeline of Schools Closure***

Date	Country/population	Action	Reference
26thJanuary, 2020	China	Universities and schools around the country were closed	Hong, 2020
3rd March, 2020	13 countries/290.5 million students around the world	Closure of Schools and Universities	UNESCO, 2020
March 12, 2020	370 million children and youth Country wide	Closure of Schools and Universities	UNESCO, 2020
29th March, 2020	nearly 90% of the world'	Closure of educational institutes	Goldberg, 2020
April 06, 2020,	1, 576, 021, 818 affected learners out of 91.3% total enrolled learners in 188 countries in all levels of learning	Closure at all levels of learning.	UNESCO, 2020

SOURCE: Adopted from Toquero, C. M. (2020). Challenges and opportunities for higher education amid the COVID-19 pandemic: The Philippine context. *Pedagogical Research, 5*(4).

Education has been the pillar of every nation's progress; hence, its preservation is of utmost importance to the growth and progress of all nations. It increases the competitiveness and efficiency of individuals and thereby creates a professional population capable of moving the country towards sustainable economic growth (Khan & Mahmood, 1997).This was researched that educational institutions in Pakistan have faced a variety of difficulties in teaching/learning, Facilities and Services, Recruitment of Teachers / Recruitment of Students, Institutional Organization, Parental Participation and Political Pressure resulting from rapid technical breakthroughs, growing demand, rising need for consistency, diffusion of expertise, competition,

evolving nature of funding systems and globalization (Asaari, 2012; Mansoor & Akhtar, 2015). While dealing with the multiple problems, the pandemic of Coronavirus also affected the educational system of Pakistan. This wave of virus contributed to the school closure and schools, colleges, universities all educational institutes shut down for the protection of students.

Many researchers, in their studies highlighted that not only the teachers and administration both are putting their efforts to combat learning challenges but the parents of young children are also struggling with the challenges of virtual learning as they are directly associated with the educational activities of children (Barnard 2005; Fan and Chen 2001; Sheldon and Epstein 2005; Machado, 2019**).** With this pandemic, the parent participation may be amplified as their children participate in online learning, when students are more likely to experience organizational challenges, self-regulation, encouragement, and comprehension of learning resources while the teacher is not substantially present (Waters, Menchaca & Borup, 2014; Liu et al., 2010; Stevens & Borup, 2015).

It was also researched previously that the Lower-income parents tend to be less interested in their children's school experiences than middle-and upper-income parents (Smith 2006). This disparity was primarily due to the fact that lower-income parents are more likely to work long hours, have several positions, or have less consistency in their work schedules than parents in higher-income households (Smith 2006; Heymann and Earle 2000; O'Sullivan, Chen and Fish 2014). In contrast, parents with good financial conditions have higher standard of education (Frenette, 2019). This claim was supported by the findings of (Turcotte, 2010). According to him, educated parents are capable in helping their children to participate in online learning at home effectively. They can make their children to understand complex concepts, advanced content and other technical issues.

As it was discussed previously that majority of the studies have been conducted in medical domain (Chinazzi et al., 2020; Hopman, Allegranzi, & Mehtar, 2020; Kraemer et al., 2020; Wu & McGoogan, 2020; Zu et al., 2020) and not much educational domains have been explored with respect to COVID effects. This happened not because education is not specifically impacted by the effects of the COVID-19 outbreak but far more, research studies in education seldom integrate the impact of disease on the timely implementation of education to learners across the world.

Sintema (2020) conducted mixed method research in Zambia to explore the impact of COVID-19 on students' performance in. He conducted survey on Grade 12 national examinations 2020 focusing on mathematics, science and design and technology subjects. Next on, teachers and head of the Department were interviewed through semi-structure interview. The hypotheses was tested and negative impact of COVID-19 on the performance of students was found. Furthermore, findings of this study have shown that there is likely to be a decrease in the pass percentage of secondary school students in this year's national exams if the COVID-19 outbreak is not managed in the shortest period practicable provided that the academic calendar of schools has been suddenly disrupted by the early untimely closing of all schools in the region.

Likewise, Owusu-Fordjour, Koomson and Hanson (2020) conducted the descriptive research to discuss the possible effect of school closing on school children's learning and academic achievement in Ghana. The questionnaire based on 11 items Likert-scale was administered on 214 tertiary level students. The findings revealed that students are thus unable to learn adequately from home, rendering the online learning system very unreliable. Additionally, parents are not unable to support their children in how to use the online learning network, nor can they completely track the learning of their children at home without any problems. It was concluded that COVID-19 had a negative impact on students learning as majority of the learners were not able to learn by themselves. Moreover, majority of the students had limited internet access and technological awareness.

3. Methodology

Quantitative research approach was implemented in this study. Descriptive survey design was selected to collected data from the students of Karachi, which is a metropolitan city of Pakistan and consists of 16,094,000 population currently (United Nations, 2020). The online google survey was utilized to gather data from the students of intermediate college and tertiary level institutions since the pandemic situation did not allow the researcher to collect the data personally. The research was delimited to Karachi Pakistan.

3.1. Sample Size and Sampling Technique

Stratified random sampling technique was employed for this study. In this sampling process, the population is divided into homogenous groups and each group containing subjects

with similar attributes (Acharya, Prakash, Saxena, & Nigam, 2013). In present study the population is divided into four strata according to level of students' i.e. Intermediate students, students of Bachelors, Students of Masters and students of M. Phil./M.S Total 74 students of various levels were sampled for the current study.

3.2. Research Instrument

A close-ended questionnaire was used as a research instrument to collect data for the research study. According to Creswell (2014), closed questions are quickly compiled and go straight to the code, and do not unnecessarily discriminate based on how clearly respondents express themselves. The five likert-type scale (symmetric) questionnaire ranged from "Strongly agree'' (SA), "Agree" (A), Neutral (N)"Disagree" (D) to "Strongly Disagree" (SD) was designed as it is the widely used technique for descriptive survey researchers (Boone & Boone, 2012 ; Joshi, Kale, Chandel & Pal, 2015). The questionnaire comprised of two parts. Part A was based on demography of participants and Part B was based on 18 close-ended questions.

3.3. Data Collection and Data Analysis Procedure

Google form was used to design the questionnaire for online data collection and it was administered through social media platform i.e. WhatsApp to get the responses from the specific target group. The data were analyzed quantitatively and descriptive statistical analysis was done. Sekaran (2003) described that descriptive statistics is the phenomena of interest and is utilized for data analysis by classification and summarization of numerical data. It also includes frequency usage, diffusion of dependent and independent variable, measures of central tendency, variability and to obtain a more factual data. The data were analyzed using SPSS version23.0.

4. Results

The demographic table shows the variations of different variables such as; gender, age, socioeconomic status, family system etc. The total sample size was 74 participants with majority females comprising 74% of the sample size. Participants were majorly enrolled in undergraduate (46%) and not employed (67.6%).

Table 1

Frequency table for demographic variables (f = 74)

Characteristics	*f*	%
Gender		
Male	19	25.7%
Female	55	74%
Age		
15 - 20	36	48.6%
21 - 25	16	21.6%
26 - 30	9	12%
31 - 35	10	13.5%
Above 35	3	4%
Currently enrolled in		
Intermediate/High School	12	16%
Undergraduate	34	46%
Masters	12	16%
Postgraduate	16	21.6%
Employment Status		
Employed	24	32%
Not employed	50	67.6%

Table 2.1

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.628	.643	18

Cronbach's alpha reliability test was run on the entire scale used mentioned in table 2.1 and it depicts an accepted reliability of 0.64. According to a general rule as per research, **α** statistic of 0.6 - 0.7 is considered to be an accepted level of reliability (Hulin, Netemeyer, & Cudeck, 2001; Ursachi, Horodonic, Zait; 2015).

Table 2.2

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
55.77	75.38	8.68	18

Mean and Standard Deviation were tested for the scale used in this research using SPSS. Table 2.2 depicts the Mean ($\bar{x}$) of 55.77, Standard Deviation (σ) of 8.68 and Variance (σ^2) of 75.38 for the scale questionnaire.

Table 3

Results of the Questionnaire (N=74)

Items	SA	A	N	D	SD
	F %	F %	F %	F %	F %
Perspective of Students towards themselves					
I am able to learn effectively from home	10 13.5%	15 20.3%	22 29.7%	16 21.6%	11 14.9%
Learning alone makes it difficult for me to understand certain concepts	20 27%	23 31%	11 14.9%	13 17.6%	7 9.5%
I have quick and easy access to internet in my area which helps me to learn online on my phone/laptop	16 21.6%	12 16.2%	10 13.5%	19 25.7%	17 23%
I have better IT Skills to access different online learning platforms	13 17.6%	19 25.7%	19 25.7%	13 17.6%	10 13.5%
Online learning system is very effective and helps a lot of students	9 12.2%	15 20.3%	16 21.6%	23 31.1%	11 14.9%
If working, I face difficulty managing my job and online classes side by side	12 16.9%	12 16.9%	22 31%	10 14.1%	15 21.1%
I really like the idea of online classes as high-quality learning does not require face-to-face interaction	6 8.1%	14 18.9%	7 9.5%	18 24.3%	29 39.2%
Perspective of Students towards Parents					
My parents can teach me how to learn online using Internet at home	5 6.8%	9 12.2%	14 18.9%	21 28.4%	25 33.8%
My parents supervise my learning at home without any difficulty	5 6.8%	14 18.9%	14 18.9%	17 23%	24 32.4%
My parents are able to clear my concepts which are not clear during online sessions	3 4.1%	6 8.1%	12 16.2%	25 33.8%	28 37.8%
There is no interruption of family members or background noises during class	14 18.9%	15 20.3%	16 21.6%	11 14.9%	18 24.3%

Key: A=agree; SA= Strongly Agree; N=Neutral; SD = Strongly Disagree; D=Disagree

Table 3 depicts the frequency of responses collected through the survey questionnaire. The perspective of students was divided into three categories; student's own perspective towards themselves, perspective towards teachers and perspective towards parents. Items were divided according to these three categories. First category comprises of 7 items, perspective towards teachers comprises of 7 items and last category of parents includes 4 items.

Perspective of students towards themselves includes their learning, access to internet for online classes, their IT skills and their overall attitude towards online classes during COVID-19 pandemic. Results depict that the majority students face a lot of difficulty learning alone as compared to being in class. Mostly participants strongly agree (27%) and agree (31%) where they were asked if they faced difficulty in understanding certain concepts. Moreover, majority participants face difficulty learning due to lack of access of internet in their area. Students strongly disagree (23%) and disagree (25.7%) out of the 5 options when they were asked if they have quick and easy access to internet. A few students agree (20.3%) with online learning being effective. Not only this, those who are employed face difficulty managing their work and classes side by side (17%). Results also depicted that majority participants do not like the idea of online classes, they strongly disagree (39.2%) and disagree (24.3%) on the item where they were asked if they think that good quality learning does not required in-person interaction.

Perspective of students towards their teachers was also captured from the responses of the questionnaire through 7 items. The perspective includes communication with teachers, how well teachers maintain the class environment and if they make students feel comfortable. Students disagree (35.1%) and strongly disagree (29.7%) when they were asked if communication with teachers is easy in online classrooms. However, students agree (33.8%) with teachers maintaining interactive sessions similar to the classrooms.

Not only this, participants also agree (31.1%) that they are fine with the idea of online sessions as long as they are receiving feedback from the teachers. On the other hand, majority teachers did not (25.7%) guide the students on how to use the e-learning sites. Furthermore, students agree (33.8%) and strongly agree (24.3%) that their teachers also provide all the necessary resources required for the online lessons and they have to constantly remind (36.5%) about the ethical rules to be followed.

Besides, perspectives of students towards parents include 4 items. It includes the parental supervision during the COVID 19 online learning. Results depicted that students strongly disagree (33.8%) and disagree (28.4%) related to their parents teaching about the usage of online learning. Not only this, student's learning was also not supervised (32.4%) by their parents at home. Additionally, majority participants disagree (33.8%) and strongly disagree (37.8%) on the third item where they were asked if parents can clear their concepts of online lectures. There were diverse responses on student's disruptions related to background noises or family interruptions but majorly students strongly disagree (24.3%) on absence of background disruptions which could hinder online learning.

4.1. Discussion

The purpose of this research was to enhance the understanding of students' perspective of education during the COVID 19 pandemic and the onset of online classes. This topic has been a topic of research recently since this global pandemic has took place. There has been many researches exploring the students' perception of learning through online classes during this pandemic (Tran et al., 2020; Zhou, Wu, Zhou, & Li, 2020). The results were divided into three categories as mentioned in the previous section. They were categorized according to students' perception towards themselves and their own learning, student's perception towards their teachers and student's perception towards their parents. This section of the study would answer our research questions related to student's perspectives.

As highlighted in the results of this research that student face a lot of difficulty understanding certain concepts and learning alone which makes the online class system ineffective. This result aligns with the findings of other researches as well (Owusu-Fordjour, Koomson & Hanson; 2020) where online learning has been ineffective when it comes to learning and understanding concepts. Not only this, the same research also highlights that due to lack of access of internet by the Ghanaian students, online classes did not benefit the students much. The findings of this research match with the results of our study where students agree that they do not have an easy access to internet for online classes.

Lack of internet has been a major concern highlighted by a lot of researchers (Frenette, Frank, & Deng; 2020) for online classes. Frank's research also highlights that people from low socio-economic backgrounds have lack of internet access which makes it difficult for students to

learn online and/or attend classes. This current study highlights that majority student's face difficulty in terms of internet accessibility and ease of attending online classes.

With the transition to online classes, there have been a lot of great impacts on higher education (HEC, 2020). Further, answering research question of student's perception towards teachers; it has been observed that with the transition towards online learning platforms (Sahu, 2020) faculty has been making a lot of efforts to plan the lectures and provide necessary resources to the students which can be well found in this research as well. Sahu's research also mentions that with online learning, there have been a lot of challenges being faced by the students and faculty as well. There is lack of access of internet for the students and programs which require lab work are also going through a lot of hurdles in context of online learning. Similar findings can be found in our research where it was found that although teachers are providing all the necessary resources and feedback, still students have a difficulty grasping the concept, gaining knowledge and communicating with their teachers online.

Furthermore, other researchers also highlight the three main factors of online learning which is teachers, students and the virtual system (Akram et.al, 2020). This research mentions that COVID 19 has not only impacted the students but teachers and the economy as well. As it has been observed by the results of our research that teachers are maintaining interactive sessions but at the same time, they have a huge workload on their part as well which is why student's might face difficulty learning through an online platform.

Students have also been observed to mention that they have not been given any prior guidance related to the usage of online platform. This results aligns with another recent research (Mukhtar, Javed, Arooj & Sethi; 2020) where it has been mentioned that teachers themselves have not been trained by the institutes and universities regarding the usage of e-learning platforms. This argument can be justified here by the literature cited above. Moreover, students have also been facing a lot of issues maintaining academic integrity which can be well highlighted by the results of our research.

Moreover, World Bank group article (2020) states that parental and guardian supervision plays a huge role in supervising student's education and online learning. Majority results of our research highlights that parents are unable to supervise their learning. However, this finding contradicts with the finding of Philippine's research (Zhou, Wu, Zhou, & Li, 2020) where parents play a huge

role in supervising their child's learning and help them learn online. This could be due to cultural and social differences between their and Pakistani context due to which parents are unable to clear their child's concepts which have been left unclear in the online classes.

5. Conclusions

The COVID-19 pandemic has not only affected students across Pakistan but all over the world. Online learning platforms have been in current use all over the world and the perception of students might differ from person to person and based on the city of residence. This study highlights the perspective of Pakistani students towards online learning and it can be concluded that student's in Pakistan have been facing a lot of issues in context of e-classes. Online classes have been ineffective for majority of students majorly because they feel uncomfortable learning in isolation and because our country goes through a lot of connectivity issues, which creates a big hurdle when attending online classes.

However, these results also align with the results of current studies but due to cultural and social differences; a few results vary. The study does not only confine to students perception of learning but also how they perceive parental and guardian support in the context of learning supervision. It has also observed by going through literature that it is not only students who are affected but also the faculty and the whole educational system.

This study has provided us with a lot of valuable results which could be used for further research purposes but at the same time, it could have yielded more authentic and generalizable results if it was conducted on a larger scale, with different fields and universities all over Pakistan. More extensive research could have led to more in-depth answers of our questions, highlighting the perspective of students as well of parents and teachers in more detail.

5.1. Recommendations

It came to light that COVID pandemic has really affected students negatively in terms of learning and forming a negative perception towards e-learning sessions. However, many steps and measures could be taken to improve the scenario of online learning. This could be done by future researches which could be established new goals for online learning such as how technology and education would be well integrated together. Steps could be taken to help students' offline and encourage them to learn autonomously. Parental and guardians should also be conveyed to

supervise their child and further motivate them to learn well in this on-going pandemic. Researches could be done on how school and home learning could be integrated together to make online learning easier for the students.

Students, teachers and parents should also be trained on how to effectively make use of online platforms in this challenging time. This study would not only help the educational institutions on gaining student's perspective but also help the policy makers to devise an improved long lasting educational policy to target the challenges faced by educational institutions of Pakistan. The educational institutions have to produce more research studies and record the impact of the pandemic to the educational system. There is also a significant need for educational institutions to improve curricula activities and to make them more open to the learning needs of students even beyond traditional classrooms. Likewise, Integration of environmental and health courses in the curriculum is another suggestion to overcome problems may happen later on and there is a need to improve sustainable sanitation standards and make students aware about societal issues at all stages of education.

Furthermore, the COVID-19 pandemic has triggered school closures worldwide, meaning that environmental hygiene in schools should be a primary concern in the future to deter spread and outbreak of contagious diseases. Students should be equipped with health care materials that can allow them to follow procedures before proper hygiene and it will become a school culture. Conclusively, the educational institutes have to improve their medical services and student support services and should ensure the continuous supervision. The enforcement of clinical behaviors should be practiced in the proximity and outside of the academy.

References

Acharya, A. S., Prakash, A., Saxena, P., & Nigam, A. (2013). Sampling: Why and how of it. *Indian Journal of Medical Specialties*, 4(2), 330-333.

Akram, W., Adeel, S., Tabassum, M., Jiang, Y., Chandio, A., & Yasmin, I. (2020). Scenario Analysis and Proposed Plan for Pakistan Universities–COVID–19: *Application of Design Thinking Model*.

Asaari, M.H. (2012), *Academic leadership and work-related attitude*, unpublished doctoral thesis, University of Hull, Kingston upon Hull.

Barnard, W. M. (2004). Parent involvement in elementary school and educational attainment. *Children and Youth Services Review*, 26(1): 39–62.

Boone, H. N., & Boone, D. A. (2012). Analyzing likert data. *Journal of extension*, 50(2), 1-5.

Chinazzi, M., Davis, J. T., Ajelli, M., Gioannini, C., Litvinova, M., Merler, S., Viboud, C. (2020). The effect of travel restrictions on the spread of the 2019 novel coronavirus (COVID-19) outbreak. *Science*. https://doi.org/10.1126/science.aba9757

Cowling B.J, Ali ST, Ng TWY, *(*2020). Impact assessment of non-pharmaceutical interventions against COVID-19 and influenza in Hong Kong: an observational study. *medRxiv*; published online March 16. DOI:10.1101/2020.03.12.20034660 (preprint).

Frenette, M., Frank, K., & Deng, Z. (2020). *School closures and the online preparedness of children during the COVID-19 pandemic*. Statistics Canada= Statistique Canada.

Group, W. B. (2020, April 2). Educational Policies in The Covid-19 Pandemic: What Can Brazil Learn From The Rest Of The World? Retrieved From Http://Pubdocs.Worldbank.Org/En/511671585947801777/Educational-Policies-In-The-Covid-19-Pandemic-What-Can-Brazil-Learn-From-The-Rest-Of-The-World.Pdf

Hasler Waters, L., M.P. Menchaca, M. P., and J. Borup. 2014. "Parental involvement in K-12 online and blended learning." In R. E. Ferdig and K. Kennedy (Eds.), *Handbook of research on K-12 online and blended learning* (pp. 325–346). Pittsburgh, PA: ETC Press.

Hopman, J., Allegranzi, B., &Mehtar, S. (2020). Managing COVID-19 in Low and Middle income Countries. *JAMA*. https://doi.org/10.1001/ jama.2020.4169

https://datareportal.com/reports/digital-2020-Canada

https://datareportal.com/reports/digital-2020-pakistan

Https://www.macrotrends.net/cities/22044/karachi/population'>Karachi, Pakistan Metro Area Population 1950-2020. www.macrotrends.net. Retrieved 2020-06-23.

https://www.pta.gov.pk/en

https://www.thenews.com.pk/print/650286-donated-lessons-help-put-teleschool-on-air-within-two-weeks

Hulin, C., Netemeyer, R., &Cudeck, R. (2001). Can a reliability coefficient be too high? *Journal of Consumer Psychology*, *10*(1/2), 55-58.

Jackson C., Vynnycky E., Mangtani P. (2016). The relationship between school holidays and transmission of influenza in England and Wales. *Am J Epidemiol*; 644–51.

Joshi, A., Kale, S., Chandel, S., & Pal, D. K. (2015). Likert scale: Explored and explained. *Current Journal of Applied Science and Technology*, 396-403.

Khan, A. H., & Mahmood, N. (1997). Education in Pakistan: Fifty Years of Neglect [with Comments]. *The Pakistan development review*, 647-667.

Kraemer, M. U., Yang, C. H., Gutierrez, B., Wu, C. H., Klein, B., Pigott, D. M., ... Brownstein, J. S. (2020). The effect of human mobility and control measures on the COVID-19 epidemic in China. *Science*. https://doi.org/10.1126/science.abb4218

Liu, F., E. Black, J. Algina, C. Cavanaugh and K. Dawson. (2010). "The validation of one parental involvement measurement in virtual schooling." *Journal of Interactive Online Learning* 9(2): 105- 132.

Machado L. S. *et al*. (2019). Parent in science: The impact of parenthood on the scientific career in Brazil, *Proceedings of the 2nd International Workshop on Gender Equality in Software Engineering*, pp. 37–40.

Mansoor, Z. and Akhtar, R.N. (2015), The paradigm shift: leadership challenges in the public sector schools in Pakistan, *Journal of Education and Practice*, 6 (19), 203-211.

MehreenZahra-Malik, 2020 https://www.bbc.com/worklife/article/20200713-the-coronavirus-effect-on-pakistans-digital-divide

Mukhtar, K., Javed, K., Arooj, M., &Sethi, A. (2020). Advantages, Limitations and Recommendations for online learning during COVID-19 pandemic era. *Pakistan Journal of Medical Sciences*, *36*(COVID19-S4).

Owusu-Fordjour, C., Koomson, C. K., & Hanson, D. (2020). The impact of Covid-19 on learning-the perspective of the Ghanaian student. *European Journal of Education Studies*.

Sahu, P. (2020). Closure of universities due to Coronavirus Disease 2019 (COVID-19): impact on education and mental health of students and academic staff. *Cureus*, *12*(4).

Sekaran, U. (2003). Towards a guide for novice research on research methodology: Review and proposed methods. *Journal of Cases of Information Technology*, 8(4), 24-35.

Sheldon, S. B. and J.L. Epstein. (2005). "Involvement counts: Family and community partnerships and mathematics achievement." *The Journal of Educational Research*, 98(4): 196–206.

Shen K, Yang Y, Wang T, (2020). Diagnosis, treatment, and prevention of 2019 novel coronavirus infection in children: experts' consensus statement. *World J Pediatr*; published online February 7. DOI:10.1007/s12519-020-00343-7.

Sintema, E. J. (2020). Effect of COVID-19 on the performance of grade 12 students: Implications for STEM education. *Eurasia Journal of Mathematics, Science and Technology Education*, *16*(7), em1851.

Steps Afoot to Avoid Educational Loss of Students Amidst Corona Crisis. (2020). Retrieved July 01, 2020, from https://www.hec.gov.pk/english/news/news/Pages/Corona-Crisis.aspx

Stevens, M. and J. Borup, J. (2015). "Parental engagement in online learning environments: A review of the literature." In M. F. Rice (Ed.), *Advances in research on teaching volume 25: Exploring pedagogies for diverse K12 online learners* (pp. 95-111). Bingley, UK: Emerald Group Publishing.

Toquero, C. M. (2020). Challenges and opportunities for higher education amid the COVID-19 pandemic: The Philippine context. *Pedagogical Research*, *5*(4).

Tran, T., Hoang, A., Nguyen, T. T., Dinh, V., Chi, N. Y., & Pham, H. (2020). Dataset of Vietnamese student's learning habits during COVID-19.

UNESCO (2020*). Global monitoring of school Closures caused by COVID-19*. Retrieved from https://en.unesco.org/covid19/educationresponse

United Nations Educational, Scientific and Cultural Organization. COVID-19 educational disruption and response. (2020). https://en. unesco.org/themes/education-emergencies/coronavirus-school- closures (accessed March 19, 2020).

Ursachi, G., Horodnic, I. A., &Zait, A. (2015). How reliable are measurement scales? External factors with indirect influence on reliability estimators. *Procedia Economics and Finance*, *20*, 679-686.

Wallinga J, Teunis P, Kretzschmar M. (2006) Using data on social contacts to estimate age-specific transmission parameters for respiratory- spread infectious agents. *Am J Epidemiol*; 164: 936–44.

WHO. WHO Director-General's opening remarks at the Mission briefing on COVID-19. 2020. https://www.who.int/dg/speeches/ detail/who-director-general-s-opening-remarks-at-the-mission- briefing-on-covid-19 (accessed March 12, 2020).

Wickramasinghe, N. C., Steele, E. J., Gorczynski, R. M., Temple, R., Tokoro, G., Wallis, D. H., &Klyce, B. (2020). Growing Evidence against Global Infection- Driven by Person-to-Person Transfer of COVID-19. *VirolCurr Res, 4*(1)

Wu, Z., & McGoogan, J. M. (2020). Characteristics of and important lessons from the coronavirus disease 2019 (COVID-19) outbreak in China: summary of a report of 72 314 cases from the Chinese Center for Disease Control and Prevention. *JAMA*. https://doi.org/10.1001/jama.2020.2648

Zhou, L., Wu, S., Zhou, M., & Li, F. (2020). 'School's Out, But Class' On', The Largest Online Education in the World Today: Taking China's Practical Exploration During The COVID-19 Epidemic Prevention and Control As an Example. *SSRN Electronic Journal*.

Zu, Z. Y., Jiang, M. D., Xu, P. P., Chen, W., Ni, Q. Q., Lu, G. M., & Zhang, L. J. (2020). Coronavirus disease 2019 (COVID-19): A perspective from China. *Radiology*, 200490. https://doi.org/10.1148/radiol. 2020200490