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**Online Education during COVID-19: A Sociological Analysis of Experiences of Students of Social and Natural Sciences in Higher Education**

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### **ABSTRACT**

*Online education emerged with the onset of COVID-19 when educational institutions faced a transition from face-to-face to online learning. The situation unexpectedly prolonged, and there was a need to carry out educational activities without compromising the academic calendar for so long. The study aims to identify transition faced by students while a sudden shift to online learning concerning the two major disciplines Social Sciences and Natural Sciences. Previous studies show that the online learning system was a challenge for students. Different disciplines in every university need to be dealt with according to their requirements regarding their nature and subject matter during the online learning system. The study used the deductive approach, which employed the Social Constructivist Theory of Learning to understand and cover up the needs and requirements of this online learning mode in four public universities PMAS AAUR, FJWU, QAU, IIUI of twin cities of Rawalpindi-Islamabad. The study used a Quantitative Approach using random sampling technique. Initially, the online learning experience was challenging for students concerned with social and natural sciences but eventually online learning was adopted as a regular practice with an improved system. The results reveal that students found natural science subjects more demanding than social science subjects. Also, students and teachers related to natural sciences had to make an extra effort, especially when practical or lab work in the course was included. The study suggests that both disciplines should have a different design and course content development according to their nature and requirements. Along with that, there is a need to develop a better and more robust online learning system that could aid and facilitate in the future.*

**Keywords:** Covid-19 Pandemic, Online Education, Natural Sciences, Social Sciences, Students, Challenges.

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### **INTRODUCTION**

The pandemic COVID-19 has drastically impacted almost more than 190 countries, because of which over 1.6 billion learners have been affected. This problematic situation has disrupted the education system, consequently affecting the most vulnerable population. For instance, due to the lack of opportunities, learners from rural

areas, disabled persons, and even women for whom a lot of progress had been made would suffer. Another challenge is financing education. The low-income countries and lower-middle-income countries could face significant education funding gaps. (United Nations, 2020).

COVID-19 has created a situation where the world along with educational institutions had to face key challenges with special reference to the higher education community at the global level. The study provides an intra-period higher education time map across 20 countries to compare the gap between developed and developing countries in redeveloping curriculum and their preparation for the shift from on-campus to online learning in the face of COVID-19. The study by Crawford et al., (2020) shows similarities as well as differences between 20 countries taken in the study as developed and developing. In contrast to developed to developing countries except for the United States of America almost all the countries that had closed their universities have shifted to online learning and teaching mode.

Online learning has become an essential component of education. Thurman (2019) defines online learning by reviewing 30 years of literature as Learning experiences in synchronous or asynchronous environments using various devices (e.g., mobile phones, laptops, etc.) with internet connections where students can learn and communicate with professors and other students from anywhere (independently).

The outturn of COVID-19 has disrupted all the major social institutions and the face of the education system in Pakistan. As a developing country, Pakistan has been striving against economic challenges that doubled with the outbreak pandemic. At the beginning of March 2020, due to the coronavirus, the Higher Education System had to shift traditional face-to-face on-campus learning and teaching to online learning as universities were closed. The study revealed that students were unsatisfied with online learning because of many issues. Pakistan is less developed and lacks advancement in technology than other developed states. Thus, there needs to be a lot to be done to improve online learning for both students. (Akbar et al., 2020).

### **Literature Review**

Doing research on students' perception about online education during COVID-19 Muthuprasad et al., (2021) states that to not compromise on academic calendar for a long period of time the traditional education system moved to the online education system where students have different preferences about different elements included in the online education system. Through an online survey of 307 students, many of them were willing to get adapted to online learning during the pandemic and used smartphones while taking classes online. Besides their willingness to take classes online, they preferred recorded lectures more than live streamed lectures. they were of the view that online classes are convenient, flexible yet they faced internet issues especially in rural areas. The study also mentioned that there should be a hybrid mode for the subjects that involve practical work. It marks 14 the importance of designing a new curriculum for the new normal i.e., online mode of learning during COVID-19.

Adnan & Anwar (2020) studies the perception of students of higher education in Pakistan that reveals that the students underwent the sudden shift to digital learning during the pandemic Covid19. The findings after surveying undergraduates and postgraduates' states that the underdeveloped country like Pakistan where there are a lot of gaps in the system and provision of resources like access to internet, technical and monetary issues online learning could not be fruitful. Pupils have faced challenges

as only few universities were able to provide online education during the pandemic's initial months. Students were of the view that traditional learning was more effective than the online one as they have faced issues related to group studies, instructor response and lack of campus education provision. It was easy for some of the students to be self-motivated and complete their assigned projects while some faced difficulty to manage time effectively.

A quantitative study with Library and information sciences students of the public sector in Pakistan clearly explains individualized and certain about the online shift of learning during COVID-19. Nevertheless, they on their own show motivation and confidence regarding online learning and usage of computers and the internet. Although the motivation and confidence of online learning and using computers and the internet vary from level to level (Raffique et al., 2021; Basheer et al., 2018; Hameed et al., 2019).

The new mode of learning i.e., the online learning system has brought a lot of dynamics in the field of education. As there are two major disciplines in every educational setting. The study aims to identify whether the differences and issues faced by both the disciplines i.e., social, and natural sciences have been kept in view or not. Natural sciences are more concerned with lab work and practical work while within social sciences comes two categories: philosophical study or theoretical bases. As (Smith, 2005) shows e-learning did not go well and was appropriate for students of Mathematics thus results show Math courses and non-Math courses attrition is not the same. The high dropout rate has been noticed to be increased for Math's students more than others due to online learning rather than a face-to-face interactive session. The literature shows that philosophical study does not require face-to-face interaction as other fields do.

### **Theoretical Framework**

Vygotsky (1978) has seen learning as a social activity under a paradigm of social constructivism. The knowledge that they acquire is based on their previous knowledge. Constructivist theory is beneficial to explain learning experiences like developing various skill sets (thinking, communicating as well social skills) that help students in learning and constructing meaning as social constructivism is more concerned about student learners. the students would be able to develop, exchange, produce, negotiate, and build better understanding of their experiences to construct knowledge. A consensus based on the general constructivist learning theory has resulted in the formulation of these principles (Doolittle, 1999)

- *Learning should take place in authentic and real-world environments.*
- *Learning should involve social negotiation and mediation.*
- *Content and skills should be made relevant to the learner.*
- *Content and skills should be understood within the framework of the learner's prior knowledge.*
- *Students should be assessed formatively, serving to inform future learning experiences.*
- *Students should be encouraged to become self-regulatory, self-mediated, and self-aware.*

The education system has shifted paradigmatically over the past few years. The revolution of the 20s in computer communication marks an important change in economic as well as social domain. The field of education has been influenced the most with this revolution. The first ones who have fully taken advantage and embraced this change are the community of educators. This remarkable revolution has moulded the

classical ways by introducing new learning models that are influencing the field of education and society. Education has been changed at all levels due to the confluence of the computer network revolution as well as social and economic developments. The new attributes of the new introduced models shape the learning environment (Harasim, 2000). the idea that the 22 knowledge is the result of collaboration and negotiations that take place keeping in view the different lenses and paradigms is called Social Constructivism (Almala, 2006; Asada et al., 2020; Junoh et al., 2019; Basheer et al., 2019a;Muneer et al., 2019; Basheer et al., 2019b). The course based on constructivism uses educational technology tools to present content in various modes for example various videos, infographics, podcasts. The basic aim of which is to engage students into discussions and debates. It follows the problem and project-based course design, web tools have facilitated collaboration and communication among learners. The best way for it to work adequately is, first know the basis of prior knowledge the learners had and modify it accordingly as per the requirements of better outcomes (Funa & Talauae, 2021).

The online system can work for the students of developing countries like Pakistan with a little more effort and improvements in the system. It also promotes the idea of hybrid learning that has a lot of advantages as well where the subjects can be dealt with according to their subject matter and nature (either social science or natural sciences).

### Research Methodology

The study employs quantitative method to identify the transition from face-to-face interactive learning to online learning system in public universities of the twin cities of Rawalpindi-Islamabad. The targeted population were students who have experienced the transition period from face-to-face to online learning during the pandemic COVID-19 relevant to their field division based on social sciences and Natural Sciences in the quantitative phase. A stratified random sampling technique is used to recruit the representative of 384 students from PMAS Arid Agriculture University, Rawalpindi, Quaid-e-Azam University, Islamabad, Fatima Jinnah Women University, Rawalpindi and International Islamic University, Islamabad. The data is collected randomly from different departments of both natural sciences and social sciences disciplines.

### Results

**Table 1.1**

*Prior Online Learning Experiences*

Discipline	Yes	No	I did an online course	Total
	%	%	%	%
Social	12.8	43.5	2.3	58.6%
Natural	9.1	29.7	2.6	41.4%
Total	21.9	73.2	4.9	100.00%

The online learning system was new for students being students in the twin cities of Pakistan, Islamabad-Rawalpindi. Students were inclined to move from traditional face-to-face learning to online learning system and some of the institutions also provided with hybrid mode of learning involving the mmix methods of both on campus and online learning. The above table shows the distribution of students on the bases of three main modes of learning during the period of pandemic that interprets 73.2% of overall students had no prior experience of online learning while 21.9 % said Yes and 2.3% did an online course before online learning. When seen discipline wise, within the social sciences 43.5% students had no prior experience of online classes while 12.8% students had taken online classes and 2.3% said that they took an online course before pandemic. Within Natural Sciences 29.7% were having no prior experience of online learning while 9.1% said yes and 2.6% did an online course before pandemic. Thus, majority of the students in both social and natural sciences did not have prior experience of online learning. In Pakistan, there are a lot of technological lags. As Zarei and Mohamadi (2021) reported in developing countries, students and teachers were not much aware of online learning system as well they found it difficult to manage technological infrastructure.

**Table 1.2**

*Familiarization with Online Learning Platform*

<b>You got familiarized with online learning platform through</b>			
<b>Discipline</b>	<b>On your own</b>	<b>Through training</b>	<b>Total</b>
	<b>%</b>	<b>%</b>	<b>%</b>
<b>Social</b>	46.1	12.5	58.6
<b>Natural</b>	33.3	8.1	41.4
<b>Total</b>	79.4	20.6	100.0

As mentioned earlier students moved to online learning which was possible through certain online learning platforms like zoom, Microsoft teams etc. most of the students were not familiar with the system thus their familiarization with learning platform was an integral part to keep up with online learning. Regarding familiarization with online learning platforms the table demonstrates 79.4% said they got familiarized on their own, 20.6% through training in total. Within social sciences, said on their 46.1% said they got familiarized with their own while 12.5% said through training. In natural sciences, 33.3% marked on their own and 8.1% marked through training. Hence, majority of them got familiar on their own. The fact is also evident by one of the studies conducted in Ghana, that says students were familiar with some of the learning platforms like google classroom and social media but still they find online learning full of challenges mostly due to lack of preparedness and proper direction.

**Table 1.3***Arrangement of Internet Facility*

<b>The internet facility was</b>			
<b>Discipline</b>	<b>Arranged your own</b>	<b>Provided by Institution</b>	<b>Total</b>
	<b>%</b>	<b>%</b>	<b>%</b>
<b>Social</b>	<b>50.0</b>	<b>8.6</b>	<b>58.6</b>
<b>Natural</b>	<b>31.8</b>	<b>9.6</b>	<b>41.4</b>
<b>Total</b>	<b>81.8</b>	<b>18.2</b>	<b>100.0</b>

Technological infrastructure including internet facility is one of the crucial parts of better online learning experience. As study by Almendinger et al., (2020) states the problem and lack of internet facility and connectivity students have faced. The table demonstrates 81.8% students arranged internet on their own and 18.2% were being provided by the institution out of total student respondents. In social sciences the ratio is 50.0 who arranged on their own internet and 8.6% were being provided by the institution. In natural sciences, 31.8% arranged their own and 9.6% were being provided by the institution. There are three basic variables that covers up the whole scenario about connectivity problems that students might have found including, internet accessibility, availability, and affordability. 32.8% students, when asked about reliability marked the internet was quiet reliable. Laksana (2020) reported that internet out of all the other issues is one of the biggest barrier students have faced. So, it should come under the responsibilities of an institution to provide students with internet facility which was lacked as shown in the table most of the students have arranged their own internet.

**Table1.4***Association Between Disciplines of Students and their Online Learning Experiences*

<b>Sr No</b>	<b>Statements</b>	<b>Chi-Square</b>	<b>Sig</b>
<b>1</b>	You took online lectures usually	8.726a	0.013
<b>2</b>	The online classes took place in a form of	.665a	0.717
<b>3</b>	Which subjects in Natural Sciences did you find difficult	23.137a	0.000
<b>4</b>	Which subject in social sciences did you find difficult	6.790a	0.451

5	To what extent do you agree or disagree that the course content development should be different for online mode of learning as compared to traditional mode of learning	1.980a	.739
6	To what extent do you agree that during online mode of learning you acquire new skills	3.851a	.427
7	How was your overall experience with online learning?	4.091a	.394
8	If you evaluate your performance and reaction to online mode of learning how much responsible were you while taking online classes	6.288a	.098

## Gadgets and Technology Used

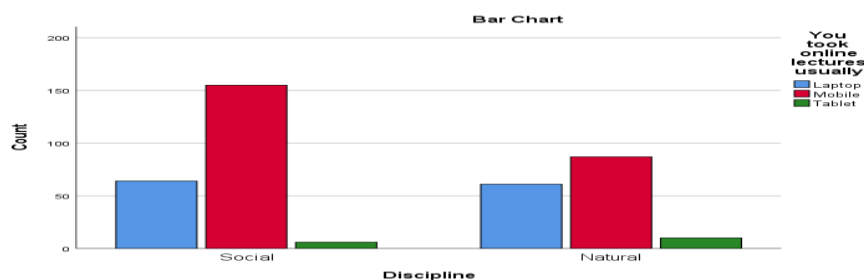
The results of cross tabulation and Chi Square test of Question 1 reveals that there is a difference of gadgets and technology being used by natural and social sciences students during the pandemic and shows association between discipline of students and the technology used by students in online classes. ( $X^2(1) = 8.726, p < 0.05$ ). In Social Sciences, students used mobiles during taking lectures and Natural science students used Laptops and mobiles equally. 63.2% of total students used mobiles. As a survey conducted with 307 students overall concludes that students preferred smartphones during online learning than laptops (Mutuparsad et al., 2021).

## Instructional Method of Online Class

The results of cross tabulation and Chi Square test reveals that there is no association between natural sciences and social sciences students regarding how online classes are taken. ( $X^2(2) > = 0.665, p = 0.717$ ). Though majority of students preferred recorded lectures that is also evident by the literature. Mutuparsad et al., (2021) also reported that recorded lectures were the preference of students than the live streamed. The study suggests a hybrid mode of subjects that involves practical work and designing a new curriculum for online learning.

**Figure 1.1**

*Instructional Method of Online Class*

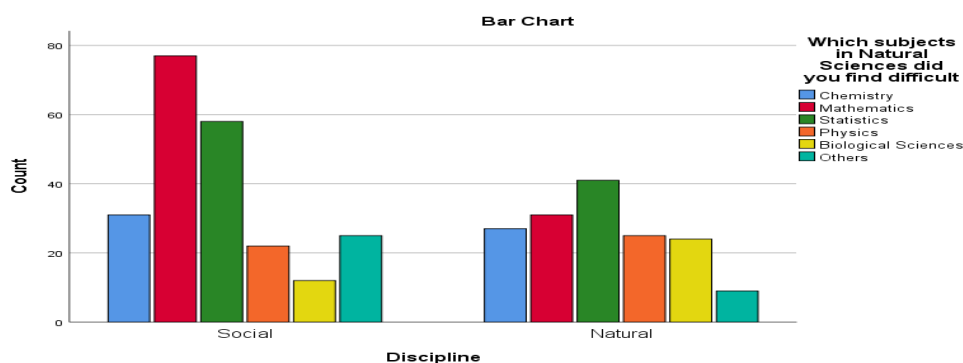


## Natural Sciences Subject Difficulty Level

The results of cross tabulation and Chi Square test reveals that natural and social sciences students experienced differently for courses of natural sciences primarily due to difference in disciplines. ( $X^2(1) = 23.137, p < 0.001$ ). Looking into the bar graphs, we can find that more of students in social sciences had difficulty in Mathematics as compared to students of natural sciences having difficulty in Statistics. Thus, both found natural science subjects difficult during the online learning especially the social science students.

**Figure 1.2**

*Natural Sciences Subject Difficulty Level*

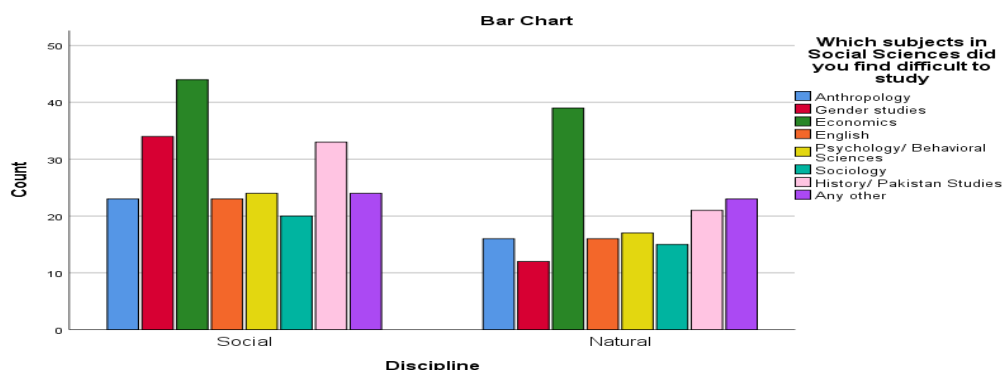


## Social science Subjects Difficulty Level

The results of cross tabulation and Chi Square test reveals that there is no association of opinion between natural sciences and social sciences students regarding difficulty of social studies subjects. ( $X^2(2) > 6.790, p = 0.451$ ). Looking into the bar graphs, we can find that students in both social sciences and natural sciences agreed that studying economics was difficult. Economics is a subject that include both the qualitative and quantitative aspects. Thus, students found it difficult during online learning.

**Figure 1.3**

*Social science Subjects Difficulty Level*



## Course Content Development for Traditional and Online Mode

The results of cross tabulation and Chi Square test reveals that there is no association of opinion between natural sciences and social sciences students for different online



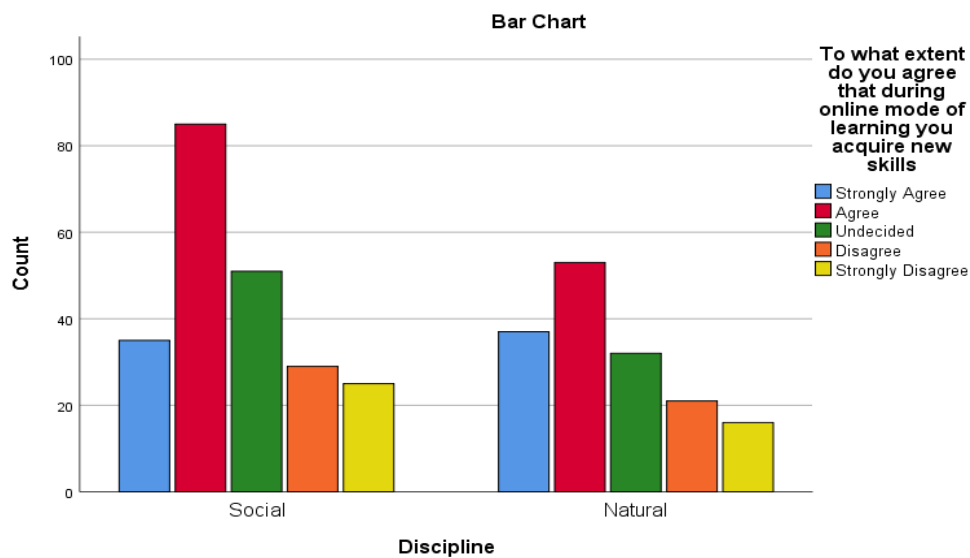
courses curriculum and different on campus courses curriculum. ( $X^2(2) \geq 1.980$ ,  $p = 0.739$ ). 42.4% students agree it should be different within both disciplines.

### New Skills Acquisition

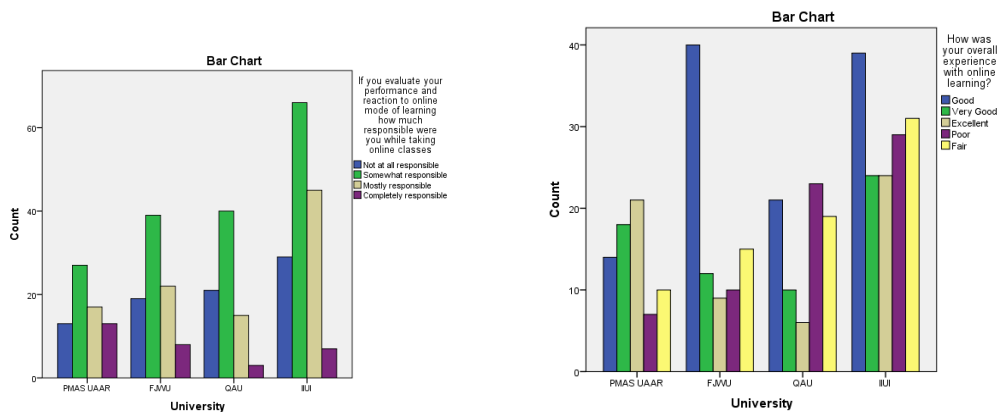
The results of cross tabulation and Chi Square test reveals that there is no association of opinion between natural sciences and social sciences students regarding new skills acquisition during online mode of learning. ( $X^2(2) \geq 3.851$ ,  $p = 0.427$ ). Looking into the bar graphs, we can find that most students in both social sciences and natural sciences agreed that they will acquire new skills during online mode of study. It means that their experience remained the same regarding new skills acquisition.

**Figure 1.4**

*New Skills Acquisition*



### University wise Evaluation of Performance and Overall Online Learning Satisfaction



These two figures show, if we see university wise, students rate them somewhat responsible throughout the online learning in each university. however international Islamic university, Islamabad shows students were mostly responsible. As far as, the satisfaction of students regarding online learning is concerned students marked it good in each university while in IIUI students equally marked good to excellent about overall online learning satisfaction. Thus, the students from IIUI were responsible and more satisfied than other universities.

In conclusion, Within the division of two basic disciplines, social and natural sciences, the students find online learning challenging but eventually, they get used to it. Every subject has a different nature and subject matter. The study reveals that students found lab work-related subjects or applied subjects like mathematics and statistics more challenging to understand than theoretical subjects. Keeping in view the different nature of the online learning mode from on-campus, there is a need to design better instructional methods, content development, and course designs to make online learning and teaching experiences better and more fruitful which is also supported by the theoretical framework of the recent study.

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