A MASSIVE SHIFT OF TECHNOLOGY ADOPTION FOR TEACHING AND LEARNING FROM FACE TO FACE TO BLENDED MODE DURING COVID-19 AT THE UNDERGRADUATE LEVEL

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ABSTRACT

The world was not prepared to deal with the problems raised as a result of COVID-19. This new pandemic has affected all fields of life including teaching and learning. To facilitate children, institutions had adopted different mechanisms to facilitate the students. This paper is about the teaching and learning experiences of teachers and students during covid-19. An online survey was conducted to seek the perceptions, problems, and solutions from 16 social Sciences teachers, 15 Science teachers, and 345 students of higher secondary and postgraduate level, Govt. girl's degree college, Faisalabad. Data analysis showed that most Teachers delivered lectures in asynchronous mode. The findings revealed that the majority of teachers faced a lack of student-teacher interaction. Teachers believed besides their hard work to prepare lectures for students, the response of students is very poor. Married female teachers faced lots of problems delivering online sessions. Whereas students faced problems attending online classes due to internet connectivity, availability of electronic gadgets, electricity in rural areas, lack of technological information and expertise. The students

of the social sciences stream proposed audio lectures instead of video lectures whereas the students of Sciences proposed more interactive lectures rather than mere solved presentations.

KEYWORDS
Covid-19, Learning problems, Learning Solutions, Teaching problems

INTRODUCTION

The nature and scope of distance learning pace have increased due to rapid information technological growth (McBrien, Cheng & Jones, 2009; McFarlane, 2019). Now the learning process may be facilitated anywhere, anytime and at any pace through blended earning mode, web-based learning, mobile learning, etc. through the use of digital technology (Venera-Mihaela, Luliana, Nadeef, Lazar, 2013) under the umbrella of flexible and innovative mode, consists of the synchronous and asynchronous learning environment. Although real-time interaction among learners and instructors along with feedback is possible in the asynchronous mode of learning, while lectures without immediate feedback process exist in the form of audios or videos towards self-directed learning(Choudhary, Noor, Khushnood, 2020)

The transformation of digital technology in the teaching-learning process is essential to meet the educational gap of children concerning skills, knowledge, and learning behavior during COVID-19 (McFarlane, 2019). Now opportunities should be provided to learners to use informational technological tools to solve real-time problems in the teaching-learning process (Kozma, 2011).

Beteille, Ding, Molina, Pushparatnam, & Wilichowski, (2020) provided three pivotal opportunities regardless of country context to support teachers for effective continuation of education: coping, managing, continuity, and improvement and acceleration as the resilient, instructional, and technologically aware teacher can lead the smooth transitional phases. According to the Guidance Note on Education Systems' Response to COVID19, (2020) a cyclic approach would work well to mitigate the impact of COVID-19 on education that was drawn as below:

Figure 1: A Cyclic Approach to Education in Emergencies

During the coping, managing, continuity phase, it would be very essential to enhance intrinsic motivation, protect teachers financially and think of the ways to limit teachers' burnout because research has its evidence (Sahu, 2020). When the educational systems stabilize then come to the improvement stage which could be possible when teachers were aware of instructions, so it is the need of time that teachers should be made aware to build students psychological wellbeing and hygiene as well as their selves, equip teachers to access students, introduce teachers with remedial education for fast recovery and make reforms in the professional training of teachers to be flexible, short and blended. After it, comes the acceleration stage, for rapid recovery it is essential to made access to teachers for broadcasting and digital communication channels along with developing teachers' skills to use these technologies with full potential, and encourage teachers to use different technological tools and digital learning resources as World Bank, (2020) updated a list of digital resources for education during Pandemic.

Queensland Curriculum and Assessment Authority (QCAA, 2020) provided some useful opportunities to promote equitable learning outcomes for P-10 that educational institutes may elect skilled teachers to record their lessons to complete theoretical components of the curriculum under the conditions of social distancing kept in place and after it, the experimental part can be delivered through using various Ed-Tech tools later in the year. QCCA, (2020) suggested that assessment of learning will be an ongoing process that teachers can monitor via students engagement and progress during the period of learning at home and also from the formative assessments rather than summative assessments by adjusting or fixing the period for accomplishing the task, length, and authenticity of the response of the learners' that could be in the form of recorded speech rather than recorded demonstration. According to Daniel, (2020) suggested the use of asynchronous learning modes to remote teaching at first because they fit best in digital formats and provide flexibility as well then go on using disparate varieties of educational tech. According to Akram, Adeel, Tabassum, & Jiang, (2020) as quoted by Shahid, Mughal (2020) in Pakistan it was recommended that universities may work on a Cloud-Based Model that includes Cloud Server, Cloud management & upgrading, IT support departments, dedicated space at home, fast speed internet, technical support departments and by creating 24/7 help and contact centers for the easy and prompt access and dealing of educational queries.

Furthermore, the government of Pakistan also took the initiative to cope with the COVID situation and to provide education during a pandemic. "The National Education Response and Resilience Plan for COVID-19 provided a framework of strategies and interventions for Pakistan's education system to cope with the effects of COVID19. Given the COVID-19 emergency and the urgent need to develop a plan for a coordinated national approach, this plan has been developed through a rapid

a consultative process with provinces and key stakeholders".

Trade Union Advisory Committee (TUAC,2020) to OECD pointed out that if schools reopen in late April/May 2020 which was not very likely as data suggested that may be containment factors of epidemic suppressed but lasting effects of the disease was still ambiguous, but on the other side lockdown and social distancing measures also raise psychological challenges such as domestic violence, younger children depends more on parents than older children as they need continuous guidance and help to master digital devices if they have access. (TUAC, 2020) further indicated that teachers and students often lack digital devices and also working conditions of parents vary, all these situations put household conditions under pressure as parents have to work-from-home which is somewhat different and difficult unless they were well aware to accomplish tasks in time simultaneously managing and helping their children to support the learning process of children who has internet facilities and devices. It also indicated that with the rise of remote learning, digital protection and privacy risks may arise. TUAC provided short-term suggestions for successful remote education which could be summarized as all learners and teachers must have the hardware, software, and internet, teachers must be given e-trainings, to ensure both sides communication every learner must have personal e-contact, assistance manuals must be delivered to the students, schools could be partly opened as learning hubs for creation of digital lessons, maintaining regular learning, etc., financial facilitations must be provided, assessments of learning should be evaluated based on throughout performance rather than annual exams, postponing or adoption of e-techniques should be incorporated in exams under the condition of fair evaluation, deadlines of assessments and exams needs adjustment. The long-term suggestions of TAUC, (2020) included re-arranging curricula with individualized supportive and adaptive measures.

According to (WorldBank, 2020) few teachers were able to effective transition to online and therefore frontliners which were educators, need immediate support and training and parents also needs to understand that children may need their assistance along with support during this rapid and sudden transition and the inclusion of edtech-smart staff could offer effective educational transition. Learning through television in developing countries can mitigate the eduvational impact of COVID-19 (Watson, 2020). According to Watson, (2020) it was frequently reported in many of the research around the world that educational television has positive effects on learning at primary stages. In Pakistan a survey was also conducted for the preparedness in the COVID-19 circumstances (Khan, et al., 2020) and it was concluded that front-liners and masses were not aware of the gravity of the emergency situation of pandemic in Pakistan recommending an immediate awareness of knowledge, attitude and behavioral measures were promted to avert the threat of COVID-19 pandemic.

UNHCR, (2020) reported that in collaboration with UNICEF, educational supplements including radio along with its self-learning booklets to support remote learning were distributed by UNHCR to Nigerian communities to continue education in this crucial time and in Ghana TV sets in addition to these supplications. UNHCR established many learning centers in Indonesia that used distance learning modalities such as instant messaging and videoconferencing applications and in Kenya Radio and Television broadcasts were used to facilitate home-based learning. In Pakistan Government has also started TV Channel "Tele-School" and other offered other learning platforms such as "Taleem-Ghar" and "eLearn.Punjab" at the school level whereas Science classes mostly go on air through Google Meet, Zoom, Whatsapp. Some private sectors use LMS such as "Aldermin", "Spectrum", "E-Learning Pakistan" etc. and in universities of Pakistan majority were using "Moodle" and "Olive" etc. and more personalized learning goes on Zoom, Whatsapp, Meet and YouTube. Akram, Adeel, Tabassum, & Jiang, (2020) provided the cloud-based model for virtual teaching for universities during the COVID-19 pandemic which was one of the best design models that focused on virtual teaching and virtual learner. Konig, Jager-Biela, & Glutsch, (2020) indicated that teachers were confronted with the need to adopt online teaching with enhanced digital content and concluded that teachers have to develop technological pedagogical knowledge required for the creation and selection of relevant digital content. Basilaia & Kvavadze, (2020) concluded that to make successful online education, the state must provide the requirements such as infrastructure, fast internet connections, internet-accessible devices, and to look over all needed platforms and digital content according to the national curriculum.

Reimers, Schleicher, Saavedra, & Tuominen, (2020) surveyed 99 countries to search for online educational resources as the COVID-19 runs its course and most of teaching and learning goes online throughout the globe. The authors made a tedious effort in bringing out very useful resources of this crucial time to mitigate educational disparities and these resources were categorized mainly in curriculum resources, professional development resources, online teaching-learning tools so that all the stakeholders can benefit such as parents, teachers, administrators, learners, etc. According to Mundy & Hares, (2020) around 124 countries have closed their regular educational system that affected more than 1.25 billion learners from the globe as a result of the COVID-19 "mess" that has created "radical uncertainty" for educators, parents, communities, and learners and In 2020, parents of US and UK were gone through a survey for finding their willingness for the online education, the majority agreed that online education was the best alternative in this time of crisis but not all have the access to technology tools needed for the continuation of education. UNESCO, (2020) suggested training the teachers as well as students for this immediate alternative teaching and learning tactics, for the situations before, during, and after the COVID-19 crisis, with consultation in teacher-training institutions.

Due to lack of social interaction during COVID-19, global isolation among people create mental disorders which is considered as component of stress (Rodolfo et al., 2020) enhances the level of anxiety, anger, and hesitation along with uncertainty in life (Brooks et al., 2020) particularly young children (Labana, 2020) directly or indirectly linked with such negative emotions lead to psychological prospects like negative thinking approach, aggressive attitude, and poor behavior (Cacioppo et al., 2015).

RESEARCH OBJECTIVE

1. To explore current practices to teach at the college level
2. To explore perspectives, problems, and recommendations to help students in extreme and exceptional circumstances

RESEARCH QUESTIONS

1. What ways teachers were using to teach students at the undergraduate level during pandemic?
2. What are the perspectives of teachers and students for online teaching?
3. What problems teachers and students are facing?
4. What are the possible solutions as recommended by students to cope in extreme circumstances?

RESEARCH METHODOLOGY

This study was descriptive. The survey method was used for it. The sample of the study comprised of teachers and students from the science and arts subject area. The detail is as follows:

Table 1. ***Detail of respondents***

Field	N (%)	Respondent		Total
		Teacher	Student	
Science	Count	15	120	135
	% of Total	4.0%	31.9%	35.9%
Arts	Count	16	225	241
	% of Total	4.3%	59.8%	64.1%
Total	Count	31	345	376
	% of Total	8.2%	91.8%	100.0%

A questionnaire was designed to collect data from teachers and students. It consisted of 24 statements. The survey was circulated through a google form. The respondents which did not have access were called to collect responses.

The questionnaire consisted of four parts

a. Information of mode of teaching
b. Perspectives for online teaching
c. Problems of online teaching
d. Suggestions to cope/improve online teaching

Data Analysis

The collected data was analyzed with the help of SPSS. Descriptive statistics were used to interpret the data.

Table 2. Practice: *Use of internet applications*

Discipline	Zoom	What's app	YouTube channel	google meet	Others
Science	5(1.3%)	82(21.8%)	16(4.3%)	32(8.5%)	0(0.0%)
Arts	41(10.9%)	134(35.6%)	4 (1.1%)	20(5.3%)	42(11.2%)
% of Total	46(12.2%)	216(57.4%)	20(5.3%)	52(13.8%)	42(11.2%)

Table 2 shows that most of the teachers used whats app for the teaching and learning process during the Covid-19 period.

Table 3. Perception: *Satisfaction regarding Online Teaching*

Discipline	Respondents	SDA	DA	To Some Extent	A	SA	Total
Science	Teacher	0 (0.0%)	6 (4.4%)	5 (3.7%)	4 (3.0%)		15 (11.1%)
	Student	24 (17.8%)	48 (35.6%)	32 (23.7%)	16 (11.9%)		120 (88.9%)
Arts	Teacher	3 (1.2%)	0 (0.0%)	8 (3.3%)	5 (2.1%)		16 (6.6%)
	Student	28 (11.6%)	124 (51.5%)	3 (1.2%)	38 (15.8%)	32 (13.3%)	225 (93.4%)
Total		55 (14.6%)	178 (47.3%)	48 (12.8%)	63 (16.8%)	32 (8.5%)	376 (100%)

Table 3 shows that most of the respondents(science and art teachers and students) were not satisfied with online teaching and learning.

Table 4. Perception: *Recommendation for Online teaching*

Discipline	Respondents	SDA	DA	To Some Extent	A	SA	Total
Science	Teacher	5 (3.7%)	2 (1.5%)	4 (3.0%)	4 (3.0%)	0	15 (11.1%)
	Student	8 (5.9%)	40 (29.6%)	36 (26.7%)	20 (14.8%)	16 (11.9%)	120 (88.9%)
Arts	Teacher	0 (0.0%)	8 (3.3%)	5 (2.1%)	0 (0.0%)	3 (1.2%)	16 (6.6%)
	Student	58 (24.1%)	70 (29.0%)	33 (13.7%)	49 (20.3%)	15 (6.2%)	225 (93.4%)
Total		71 (18.9%)	120 (31.9%)	78 (207%)	73 (19.4%)	34 (9.0%)	376 (100%)

Table 4 shows that most of the teachers responded that they will not recommend online teaching in the future.

Table 5. *Perception: Online learning as substitute of face to face teaching*

Discipline	Respondents	SDA	DA	To Some Extent	A	SA	Total
Science	Teacher	5 (3.7%)	9 (6.7%)	1 (0.7%)	0 (0.0%)	0	15 (11.1%)
	Student	36 (26.7%)	52 (38.5%)	16 (11.9%)	12 (8.9%)	4 (3.%)	120 (88.9%)
Arts	Teacher	3 (1.2%)	9 (3.7%)	4 (1.7%)	0 (0.0%)	0	16 (6.6%)
	Student	81 (33.6%)	99 (41.1%)	12 (5.0%)	21 (8.7%)	12 (5.3%)	225 (93.4%)
Total		125 (33.2%)	169 (44.9%)	33 (8.8%)	33 (8.8%)	16 (4.3%)	376 (100%)

Table 5 shows that most teachers and students were of the opinion that online teaching and learning is not a good substitution to teach and learn at the undergraduate level.

Table 6. *Perception: Better understanding than face to face mode*

Discipline	Respondents	SDA	DA	To Some Extent	A	SA	Total

Science	Teacher	0 (0.0%)	12 (8.9%)	0 (0.0%)	3 (2.2%)	0	15 (11.1%)
	Student	36 (26.7%)	40 (29.6%)	16 (11.9%)	16 (11.9%)	12 (10%)	120 (88.9%)
Arts	Teacher	5 (2.1%)	3 (1.2%)	6 (2.5%)	2 (0.8%)	0	16(6.6%)
	Student	30 (12.4%)	128 (53.1%)	48 (19.9%)	9 (3.7%)	10 (4.4%)	225 (93.4%)
Total		71 (18.9%)	183 (48.7%)	70 (18.6%)	30 (8.0%)	22 (5.9%)	376 (100%)

Table 6 shows that most Science students strongly disagree that online teaching is better than face-to-face mode.

Table 7. ***Perception: Online teaching and learning is easy to use***

Discipline	Respondents	SDA	DA	To Some Extent	A	SA	Total
Science	Teacher	5 (3.7%)	10 (7.4%)		0 (0.0%)	0	15 (11.1%)
	Student	52 (38.5%)	44 (32.6%)		8 (5.9%)	16 (13.3 %)	120 (88.9%)
Arts	Teacher	0 (0.0%)	3 (1.2%)	0 (0.0%)	9 (3.7%)	4 (40%)	16 (6.6%)
	Student	33 (13.7%)	116 (48.1%)	43 (17.8%)	27 (11.2%)	6 (27%)	225 (93.4%)
Total		90 (23.9%)	173 (46.0%)	43 (11.4%)	44 (11.7%)	26 (69%)	376 (100%)

Table 7 shows that most of the teachers and students were of the opinion that online teaching and learning are not easy to use.

Table 8. ***Problem: One system and multi users***

Discipline	Respondents	Yes	No	Total
Science	Teacher	15 (11.1%)	0 (0.0%)	15 (11.1%)
	Student	0(0.0%)	120(88.9%)	120(88.9%)
Arts	Teacher	1 (0.4%)	15(6.2%)	16 (6.6%)
	Student	205 (85.1%)	20 (8.3%)	225 (93.4%)

Total	221 (58.8%)	155 (41.2%)	376 (100.0%)

Table 8 shows that most of the teachers and students were having a problem with having one computer/laptop/desktop while there were multi-users in their homes.

Table 9. ***Problem: Difficult to work from home***

Discipline	Respondents	Yes	No	Total
Science	Teacher	3 (2.2%)	12(8.9%)	15(11.1%)
	Student	112(83.0%)	8(5.9%)	120(88.9%)
Arts	Teacher	12(5.0%)	4(1.7%)	16(6.6%)
	Student	188(78.0%)	37(15.4%)	225(93.4%)
Total		315(83.8%)	61(16.2%)	376(100.0%)

Table 9 shows that most of the students and teachers had a problem working/study from home.

Table 10. ***Problem: Electricity Problem***

Discipline	Respondents	Yes	No	Total
Science	Teacher	9 (6.7%)	6(4.4%)	15(11.1%)
	Student	68(50.4%)	52(38.5%)	120(88.9%)
Arts	Teacher	13(5.4%)	3(1.2%)	16(6.6%)
	Student	126(52.3%)	99(41.1%)	225(93.4%)
Total		216(57.4%)	160(42.6%)	376(100.0%)

Table 10 shows that most students and teachers had electricity problems at their homes DURING Covid-19.

Table 11. ***Internet Availability***

Discipline	Respondents	Yes	No	Total
Science	Teacher	0 (0.0%)	15(11.1%)	15(11.1%)
	Student	76(56.3%)	44(32.6%)	120(88.9%)
Arts	Teacher	10(4.1%)	6(2.5%)	16(6.6%)
	Student	95(39.4%)	130(53.9%)	225(93.4%)
Total		181(48.1%)	195(51.9%)	376(100.0%)

Table 11 shows that nearly half of the respondents did not have internet available at their homes.

Table: 12. ***Problem: Electronic Gadget problem***

Discipline	Respondents	Yes	No	Total
Science	Teacher	12 (8.9%)	3(2.2%)	15(11.1%)
	Student	120(88.9%)	0(0.0%)	120(88.9%)
Arts	Teacher	15(6.2%)	1(0.4%)	16(6.6%)
	Student	90(37.3%)	135(56.0%)	225(93.4%)
Total		237(63.0%)	139(37.0%)	376(100.0%)

Table 12 shows that more than half of the science students, teachers, and art teachers had electronic gadget problems in their homes.

Table 13. ***Problem: Signal Problem***

Discipline	Respondents	YES	No	Total
Science	Teacher	3(2.2%)	12(8.9%)	15(11.1%)
	Student	52(38.5%)	68(50.4%)	120(88.9%)
Arts	Teacher	14(5.8%)	2(0.8%)	16(6.6%)
	Student	83(34.4%)	142(58.9%)	225(93.4%)
Total		152(40.4%)	224(59.6%)	376(100.0%)

Table 13 shows that most of the respondents did not face signal problems at their homes.

Table 14. ***Problem: Lack of Feedback***

Discipline	Respondents	Yes	No	Total
Science	Teacher	15(11.1%)	0(0.0%)	15(11.1%)
	Student	84(62.2%)	36(26.7%)	120(88.9%)
Arts	Teacher	14(5.8%)	2(0.8%)	16(6.6%)
	Student	210(87.1%)	15(6.2%)	225(93.4%)
Total		323(85.9%)	53(14.1%)	376(100.0%)

Table 14 shows that majority of the respondents complained about feedback either from the teacher's side or from the student's side.

Table 15. ***Problem: Lack of concentration due to illness at home***

Discipline	Respondents	Yes	No	Total
Science	Teacher	6(4.4%)	9(6.7%)	15(11.1%)
	Student	28(20.7%)	92(68.1%)	120(88.9%)

Arts	Teacher	13(5.4%)	3(1.2%)	16(6.6%)
	Student	39(16.2%)	186(77.2%)	225(93.4%)
Total		86(22.9%)	290(77.1%)	376(100.0%)

Table 15 shows that some respondents had a problem with online teaching due to illness in their homes.

Table 16. ***Problem: Lack of Concentration due to COVID Anxiety***

Discipline	Respondents	Yes	No	Total
Science	Teacher	4(3.0%)	11(8.1%)	15(11.1%)
	Student	36(26.7%)	84(62.2%)	120(88.9%)
Arts	Teacher	14(5.8%)	2(0.8%)	16(6.6%)
	Student	18(7.5%)	207(85.9%)	225(93.4%)
Total		72(19.1%)	304(80.9%)	376(100.0%)

Table 16 shows that very few respondents could not concentrate on online teaching and learning due to anxiety due to Covid-19.

Table 17. ***Problem: Lack of management due to multi users***

Discipline	Respondents	Yes	No	Total
Science	Teacher	14 (10.4%)	1(0.7%)	15(11.1%)
	Student	48(35.6%)	72(53.3%)	120(88.9%)
Arts	Teacher	0(0.0%)	16(6.6%)	16(6.6%)
	Student	198(82.2%)	27(11.2%)	225(93.4%)
Total		260(69.1%)	116(30.9%)	376(100.0%)

Table 17 shows that most science teachers and art students had management problems for online teaching and learning due to multi-users of systems in their homes.

Table 18. ***Problem: Distraction***

Discipline	Respondents	Yes	No	Total
Science	Teacher	12(8.9%)	3(2.2%)	15(11.1%)
	Student	120 (88.9%)	0(0.0%)	120(88.9%)
Arts	Teacher	15(6.2%)	1(0.4%)	16(6.6%)
	Student	86(35.7%)	139(57.7%)	225(93.4%)
Total		233(62.0%)	143(38.0%)	376(100.0%)

Table 18 shows that most of the science students had a problem of distractions for online teaching and learning.

Table 19. ***Other Problems***

Discipline	Respondents	Lack of Digital Literacy	Lack of Typing Skills	Lack of Gadget Usage	Lack of Equip.	Lack of Comm. Skills	Total
Science	Teacher	0 (0.0%)	5 (3.7%)	10 (7.4%)			15 (11.1%)
	Student	44 (36.7%)	0 (0.0%)	0 (0.0%)	60 (44.4%)	16 (11.9%)	120 (88.9%)
Arts	Teacher	44 (12.8%)	9 (3.7%)	6 (2.5%)	1 (0.4%)	0 (0.0%)	16 (6.6%)
	Student	66 (27.4%)	0 (00%)	9 (3.7%)	105 (30.4%)	45 (13.0%)	225 (93.4%)
Total		119 (31.6%)	11 (2.9%)	20 (5.3%)	165 (43.6%)	45 (18.7%)	376 (100.0)

Table 19 shows that most of the science teachers had a lack of gadget usage problem while science students lack digital literacy. In total, 43.9% of respondents had a problem due to lack of equipment while 18.7% of respondents had a problem due to lack of communication skills.

Table 20. ***Suggestion: Solution: Packages must be provided by Institute/Govt.***

Discipline	Respondents	Yes	No	Total
Science	Teacher	15(11.1%)	0(0.0%)	15(11.1%)
	Student	84(62.2%)	36(26.7%)	120(88.9%)
Arts	Teacher	16(6.6%)	0(0.0%)	16(6.6%)
	Student	216(89.6%)	9(3.7%)	225(93.4%)
Total		331(88.0%)	45(12.0%)	376(100.0%)

Table 20 shows that most of the respondents suggested that institutions/government must provide internet and gadget packages to the teachers and students.

Table 21. ***Suggestion: Training is required to use ICT***

Discipline	Respondents	Yes	No	Total
Science	Teacher	15 (11.1%)		15(11.1%)

	Student	120(88.9%)		120(88.9%)
Arts	Teacher	12 (5.0%)	4(1.7%)	16(6.6%)
	Student	192(79.7%)	33(13.7%)	225(93.4%)
Total		339(90.2%)	37(9.8%)	376(100.0%)

Table 21 shows that most of the respondents suggested that proper training is required for online teaching and learning.

Table 22. ***Interactive sessions***

Discipline	Respondents	Yes	No	Total
Science	Teacher	15 (48.4%)	0(0.0%)	15(48.4%)
	Student	10(32.3%)	6(19.4%)	16(51.6%)
Arts	Teacher	92(26.7%)	28(8.1%)	120(34.8%)
	Student	178(51.6%)	47(13.6%)	225(65.2%)
Total		295(78.5%)	81(21.5%)	376(100.0%)

Table 22 shows that most of the respondents suggested that interactive sessions must be provided through online mode.

Table 23. ***Suggestion: Feedback must be provided***

Discipline	Respondents	Yes	No	Total
Science	Teacher	7(22.6%)	8(25.8%)	15(48.4%)
	Student	16(51.6%)	0(0.0%)	16(51.6%)
Arts	Teacher	120(34.8%)	0(0.0%)	120(34.8%)
	Student	218(63.2%)	7(2.0%)	225(65.2%)
Total		361(96.0%)	15(4.0%	376(100.0%)

Table 23 shows that most of the respondents suggested that feedback must be provided by the students and teachers.

Table 24. ***Suggestion: Limited sessions per week***

Discipline	Respondents	Yes	No	Total
Science	Teacher	15(48.4%)		15(48.4%)
	Student	16(51.6%)		16(51.6%)
Arts	Teacher	84(24.3%)	36(10.4%)	120(34.8%)
	Student	121(35.1%)	104(30.1%)	225(65.2%)

Total	236(62.8%)	140(37.2%)	376(100.0%)

Table 24 shows that most of the respondents suggested that there must be limited sessions per week if online teaching is done.

Table 25. ***Suggestion: Recommendation: Can be part of face to face teaching***

Discipline	Respondents	Yes	No	Total
Science	Teacher	15 (22.4%)	0(0.0%)	15(48.4%)
	Student	52 (43.3%)	68(56.7%)	16(88.9%)
Arts	Teacher	15(25.0%)	1(6.3%)	16(6.6%)
	Student	45(18.7%)	180(74.7%)	225(93.4%)
Total		127(33.8%)	249(66.2%)	376(100.0%)

Table 25 shows that most of the respondents suggested that online teaching should not be part of face-to-face teaching and learning at the undergraduate level.

DISCUSSION

In Pakistan, the Covid outbreak happened in February 2020. The educational institutions were closed and the education was provided through digital media. The government also provided the facility of "Teleschool" for students. Many institutions had a well-established LMS system however, at the undergraduate level, due to the nonavailability of well-established online systems, teachers started teaching using different mobile apps and online resources. This study was conducted in a college where teachers used different software applications, online apps, and other media to teach students. The study showed that most of the teachers used whats app for the teaching and learning process during the Covid-19 period. Worldbank (n.d) also reported that several countries used Whatsapp to teach students at different levels. These countries include Bhutan, Dominican Republic, El-Salvandor, Jamaica, Kyrgyz Republic, Peru, West Bank, and Gaza. In Pakistan, very few teachers used Youtube channels to teach students at the undergraduate level. The findings of this study showed that in the absence of a well-defined system for online teaching, teachers were using different sorts of applications for online teaching. Newton (n.d) reported that during the pandemic, teachers (42.8%) say they alone are responsible for deciding what remote/online tools they will use, and you have a bleak picture.

In this study majority of the respondents (science and art teachers and students) were not satisfied with online teaching and learning. This finding is contrary to the Almusharaf and Khahro (2020) where researchers found postgraduate students of KSA satisfied with online learning. this might be due to the reason that the researchers researched a location where Moodle was used for online learning. however, in the

present study, the sample consisted of students and teachers of a college-level in Pakistan, where no systematic in-built system was in place for teaching and learning. Most teachers and students were of the opinion that online teaching and learning is not a good substitution to teach and learn at the undergraduate level. Therefore, the majority of the teachers believed that they will not recommend online teaching in the future. This might be due to the reason that teachers were not prepared to make the shift from face-to-face to online teaching. Newton(n.d) also reported that most of the elementary school teachers (56.7%) said that they were not prepared to facilitate remote learning during Pandemic 2019-2020.

In this study, most of the science students strongly disagree that online teaching is better than face-to-face mode. Nwaodua (Feb 2019) wrote that some educators recommended recorded videos for the experiments to be watched by students on Vimeo or Youtube channels. Although the content of the experiment can be the same as actual laboratory work, however, it can not provide real-time hands-on experience to the science students. For a deeper understanding of scientific phenomena, students need to "perform experiments" in the laboratory as well. It can be a delimitation of online learning that all courses cannot be taught through online media. To resolve this issue, some other new techniques can be used to improve the science learning of students.

Nwaodua (2019), suggested that online teaching should be complemented with "an in-person laboratory work". But there is a need to take care of distance learners as they live in different areas and can have a reservation to come to campuses. Nwaodua further suggested that the provision of science kits can be a better alternative and solution of this problem. Schools and colleges can take the laboratories of other localities for the laboratory work of their distant learners. In this way, students can get theoretical as well as practical experience and knowledge.

In this study, most of the teachers and students believed that online teaching and learning is not easy to use. There can be several reasons for it such as lack of digital literacy skills, resources, and interaction. Ní Shé et al. (2019) stated that online learning is different. Gutierrez (2020), stated that the overall experience of teaching a course can have variations depending upon the communication between an instructor and their students. Gutierrez reported Marita Barth, a professor of general chemistry at OSU stated that "teaching classes online isn't necessarily harder or easier to manage than traditional on-campus courses, it's just very different," said. "I think you need to work pretty hard to build a community with your students, and that's certainly more difficult to do online. You don't have nearly as much spontaneous interaction with or between students, so it certainly requires some conscious effort to get a supportive, active community of learners up and running."

Several teachers and students of this study were having the problem of having one computer/laptop/desktop while there were multi-users in their homes. This finding is in line with Ferri, Grifoni, and Guzzo (2020) described this limitation of technology and stated that that the technological challenges were mainly associated with unreliable Internet connections when several students and workers have simultaneously connected as well as the lack of technological devices for many students. This aspect has been reported by many studies (Outhwaite,2020; Bol,2020; Thomas, Rogers, 2020; Doyle,2020; Owusu-Fordjour, Koomson, Hanson, 2020), particularly in developing countries like Ghana, Malaysia (Owusu-Fordjour, Koomson, Hanson, (2020); Yusuf (2020); Omodan, (2020). The researchers described several factors leading to the pedagogical challenges that are linked with teachers and learners.

Thomas & Rogers (2020) also reported that the "lack of interactivity and motivation of students is connected with the social challenge related to the loss of human interaction between teachers and students as well as among students. To encourage children's engagement and curiosity, they suggest the use of more interactive resources to gamify education. Most of the students and teachers had a problem working/study from home. It could be due to the reason of unavailability of separate peaceful spaces to learn. This finding is in line with Outhwaite,2020; Bol,2020; Thomas, Rogers, 2020; Doyle,2020); Owusu-Fordjour, Koomson, Hanson, 2020) where researchers described the problems of online learning. The researchers stated that the provision of physical spaces for learning is also a problem for the students especially for the students of poorer economic backgrounds. It creates problems to received lessons and carries out home-based learning. Lack of parental support in this regard can increase the problem.

Bhamani, Makhdoom, Bharuchi, Ali, Kaleem, Ahmed (2020) conducted a study and collected data from 19 parents falling. The researchers suggested that although many parents had quickly addressed the learning gap and helped their children during the pandemic. However, there is a need to provide essential learning skills to children at home. As several teachers are using different plate forms and providing teaching facilities. There is a need to provide centralized data dashboards and educational technology may be used to keep the students, parents, and schools
updated.

The majority of the respondents of this study reported that there was an electricity problem during summer 2002. Which created problems for them to attend the online classes. Moreover, nearly half of the respondents of this study did not have internet available in their homes. Similarly more than half of the science students, teachers, and art teachers had electronic gadget problems at their homes. some respondents had problems with online teaching due to illness in their homes. most of the science teachers and art students had management problems for online teaching and learning

due to multi-users of systems in their homes. Team Embibe (2020), had pointed out several challenges faced by students. These include adaptability, technical issues, computer knowledge, time management, self-motivation, distraction, learning styles, communication, virtual engagement, and feedback. Similarly, there are challenges faced by teachers such as engaging students, time commitment, communication, assessment, feedback, learning management systems, fear of cheating, technical issues, course content,

Several science students had the problem of distractions for online teaching and learning. It might be due to the background noise from either the learner side or from the instructor side. Moreover, internet advertisements can also be distractions for students. In a weblog, Bhatt(2020), stated that although online education is necessary during the pandemic, as it provides an opportunity to learn, However, it can also cause distraction. Students can surf the internet during and after the lessons. Therefore, the impact of learning is uncertain and not always optimum. Bhatt further emphasized that "education is not limited to the syllabus only; it also includes discipline, manners, morals and interaction with other students and teachers. These traits are difficult to inject through online teaching". Many people such as Bhatt do not recommend smart classes for the students of schools.

Many science teachers had a lack of gadget usage problem while science students lack digital literacy. In total, 43.9% of respondents had a problem due to lack of equipment while 18.7% of respondents had a problem due to lack of communication skills. Several respondents suggested that institutions/governments must provide internet and gadget packages to the teachers and students. Most of the respondents suggested that proper training is required for online teaching and learning. This suggestion is in line with Almusharaf and Khahro (2020), where researchers also proposed professional development training for teachers, students, policymakers, and administrators.

In this study, most of the respondents suggested that interactive sessions must be provided through online mode. Bordoloi, Das, and Das, (2021), also described that "the extensive use of open educational resources, massive open online courses, social media and meeting apps during the Covid-19 lockdown, has opened up the minds of the knowledge-hungry people". It requires providing them the necessary educational inputs, training, and skills even during the current pandemic situation. This will create a huge impact on the ways of educational transactions in the coming days.

As majority of the respondents complained about feedback either from the teacher's side or from the student's side. Therefore most of the respondents suggested that feedback must be provided by the students and teachers. The majority of the respondents suggested that there must be limited sessions per week if online teaching

is to be done. However, most of the respondents suggested that online teaching should not be part of face-to-face teaching and learning at the undergraduate level.

Since several problems and possible solutions have emerged during this study. It requires attention for the definition of roles of teachers, students, and government. It also requires proper support from all stakeholders.

CONCLUSION

Online courses provide an excellent alternative opportunity way for students to increase their learning opportunities and stay competitive in the ever-demanding realm of education. During the COVID outbreak, online learning is one of the best options to deliver education at the doorsteps of students. The teachers, as well as students, used their resources to participate in this activity. However, there were challenges such as electricity failure, availability of electronic gadgets, insufficient gadgets at the homes, difficulty to understand science concepts via online learning, internet facility, and last but not least the lack of digital literacy skills. Majority of the respondents were not satisfied with the online teaching and learning process. Teachers believed that they will not recommend online teaching in the future. The COVID anxiety was also one of the factors to hinder teaching and learning. Teachers and students suggested providing proper training and facilities such as electronic gadgets and internet connection and packages for the smooth execution of online learning.

RECOMMENDATIONS

1. Proper training to use electronic gadgets must be provided
2. Teachers must be trained for pedagogical skills for online teaching.
3. Teachers must be trained to create content in digital media.
4. Science learning can be supported with hands-on experiences in the form of science kits.
5. Provision of internet devices must be made
6. The data providers must pride data packages at subsidized rates to teachers and students.
7. Asynchronous learning can be made for the ease of students.
8. Proper activities must be arranged for the students to be engaged in online learning.

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