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Role of ICT in Teacher-Student Communication during Covid-19 in Pakistan

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ABSTRACT

ICT tools provided an alternative and effective direction to teaching and learning during COVID. The goal of this research is to investigate the effects of ICT on teacher-student communication during COVID-19. Quantitative research design was employed. A sample size of 40 teachers and 100 students from four public secondary schools was selected. Data were gathered through a closed-ended questionnaire carrying 14 statements. Purposive sampling was used. Data were analyzed through SPSS software. Standard deviation and independent sample t-test were run. Overall, it was found that all participants (teachers and students) find ICT tools useful in teacher-student communication but there were difference of opinion between male and female teachers about the role of ICT in communication based on different applications whereas male and female students showed similar responses.

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1. Introduction

Information & Communication Technology (ICT) has converted this world into a global village through the fast communication system. Information & Communication Technology (ICT) is often seen as improving the learning process not only in classrooms but beyond (Pelgrum & Law, 2003). Traditional classrooms rely heavily on face-to-face communication. COVID-19 changed the whole scenario as schools were closed and there was a fear of the loss of academic sessions. The concerned authorities took the initiative of online classes during COVID in order to save learners' time which was not possible without the important role of Information & Communication Technology (ICT) in education. Pakistani teachers were not equipped with ICT and lacked expertise in the use of Information & Communication Technology (ICT) tools. The current study aimed at the role of Information & Communication Technology in teacher-student communication during covid-19 at the school level in Pakistan. According to Peeraer and Van Petegem (2012), Information & Communication Technology plays important role in teacher-student communication.

Similarly, United Nations Educational, Scientific and Cultural Organization (UNESCO), also reflects information and communication technology (ICT) as a type of scientific, engineering and, management technique that is used to handle information and a teacher is someone who plays a major role in the educational field. Ratheeswari (2018) claims that a teacher is responsible for bringing improvements to our society by introducing certain transformations regarding education.

Effective communication is very important for all ages and all races. Communication between teacher and student plays key role in classroom learning. Sudden changes due to COVID have created a communication gap among teachers and students. According to Brun and Cooper (2009), communication plays a distinctive role when used as an important

communication tool between teachers and students during online learning and teaching along with many other roles in daily life. The effectiveness of ICT tools in teacher-student communication needs to be investigated.

The research will contribute investigating the effectiveness of ICT tools in teacher-student communication. It will also enable policymakers to support the use of ICT in classroom even after the pandemic.

1.1. Objectives Of the Study

The main objectives of this study were to:

- Investigate the role of information and communication technology (ICT) tools in teacher-student communication during covid-19.
- Find out the differences in the opinions on the basis of gender.

1.2. Research Questions

Current research will answer the following research questions.

1. To what extent do Information and Communication Technology (ICT) tools facilitate teachers and students during Covid-19 in Pakistan?
2. What is the difference between the opinion of male and female students about the role of information and communication technology (ICT) on teaching-learning process?
3. What is the difference in the opinions of students and teachers about the effectiveness of information and communication technology (ICT) for teaching-learning process?

2. Literature Review

The effect of Information & Communication Technology (ICT) on education has drawn increasing criticism during the past ten years (Becker, 2000). ICT adoption in teaching practice remains limited, and little change appears to have occurred in the classrooms. As a result, much research is being conducted on the factors that influence or limit the use of ICT tools for teaching purposes. Future teacher preparation is an important factor. Culp, Honey, and Mandinach (2005) found that professional development for teachers has been identified as a top priority in education policies and is the most important aspect of ICT integration.

It is crucial that pre-service teachers are exposed to effective use of ICT during their training in teacher education institutions (TEIs) because they play a significant role in the long-term use of ICT in schools (Steketee, 2005). Australasian Journal of Educational Technology also reports less use of ICT for teaching and learning by teacher education stakeholders (Drent & Meelissen, 2008). The majority of teacher educators are unprepared to use new ICTs in the classroom, even in developed nations. As argued by Lim, Chai, and Churchill (2011), it is, therefore, critical to investigate the applications of ICT in a more constructive learning environment. Lim et al. (2011) identified teacher-educator professional development as an important strategic action to accomplish the task of teaching-learning in a better way. When compared to young people's far greater engagement with digital media outside the school, the utilization of Information & Communication Technology (ICT) in schools is frequently portrayed in a negative way (Buckingham, 2007; Cuban, 2001).

The process of communication revolves around verbal and non-verbal interconnection. (Velentzas & Broni, 2014). Administrative or private matters need communication for their accomplishment. Communication can be delineated as a specific process of transferring information from one person to another (Keyton, 2017). Excellent communication skills can extend your tenure as a self-made teacher. So, effective communication must be important and for capable academics, this is not a forgotten thought (Hilliard & Newsome Jr, 2013). Web-based learning can be termed as learning which refers to the use of internet browsers and other applications (Apps) (Tinio, 2002). It is also named as E. Learning or online learning and caters to the learning needs of students at all levels. New technologies offer new opportunities to meet learners and get attached to their teachers (Duta, Panisoara, & Panisoara, 2015). However active teachers are associated with how they should impart influential teaching. They present ideas, information, and expectations in a number of ways: for instance by speaking, by gestures and alternative visual communication, and by written words.

Teacher-student interaction is the most important interaction of all types of interactions as stated by Hiltz, Coppola, Rotter, Turoff, and Benbunan-Fich (2000) Hence many governments

have started global investments in ICT to improve teaching and learning in schools (Buabeng-Andoh, 2012). The study done by Yao, Rao, Jiang, and Xiong (2020) discovered that live broadcasting education with more teacher-student interaction is more favorable to enhancing students' academic achievement than self-study-based recorded video teaching. Teachers should assume the roles of "leader" and "accompanier" in the process of online teaching, as well as "transmitter" through effective guidance and communication. Pretty nearly, all university activities, such as lectures, seminars, and official meetings, were held online. The media used for digital activities varies as well. Higher education in this frame of reference must undoubtedly be capable of adapting to the advancement of ICT. According to the results of regression analyses, information and communication technologies (ICT) tools, particularly digital teacher competence and teacher education opportunities to acquire capabilities and skills, are important in adapting to online teaching during COVID-19 education cuts (König, Jäger-Biela, & Glutsch, 2020). Similarly, Oliveira, Grenha Teixeira, Torres, and Morais (2021) pointed out that the use of ICT platforms was mostly optimistic for learning, while private adaptation was mostly negative. These findings provide higher education institutions with unique ideas into actions they can take, such as cataloguing the learning opportunity with benchmark, institutional-wide platforms, appropriate training for students and teachers, and appropriate remote evaluation processes.

ICT tools have been proven to be a useful during pandemic. According to Benty et al. (2020) during the Covid-19 pandemic, the use of ICT in learning kept improving the achievement of students in the learning process. Using ICT to conduct lectures became a critical requirement during the pandemic. Effective communication between teacher and student is the most important to carry on teaching/learning process. Literature is replete with the uses of ICT tool for learning and teaching. This research will fill the gap by finding the effectiveness of ICT tools in student-teacher communication.

3. Methodology

3.1. Design of the Study

The current research aimed at examining the role of ICT tools in teacher-student communication during COVID-19. Non-experimental research design is selected due to its appropriateness to answer questions related to human characteristics like; beliefs, attitudes etc. and being more close to the real life situations. Hence quantitative research inquiry best suits the current research. Questionnaire was used as a tool to assess the feedback of the respondents.

3.2. Population of the Study

The students and the teachers of 9th and 10th grades from four public schools were selected as the population of the current study. They must have been using information and communication technology during Covid-19.

3.3. Sampling

The purposive sampling method is used as the investigation's sampling methodology because it indicates that there is an equal chance that every member of the population would be chosen. Effective use of ICT during the COVID-19 served as the purpose of sample selection. Four schools were selected on the basis of chosen criterion and data from 100 students and 40 teachers, randomly selected, who were teaching and learning in the public sector was obtained. A sample size of 100 is a representative of students' population and only forty teachers were available which could fulfill the criteria. Hence, a sample of 40 teachers and 100 students selected.

4. Data Collection and Analysis

100 questionnaires from students and 40 questionnaires from teachers were filled. Eight different schools were selected to fill up the questionnaire, which included only public schools. Permission was taken from the headmasters/ Principals of schools through permission letter. All data were collected during COVID 19. A questionnaire designed for students and teachers, was sent to teachers at least one night before meeting. Researchers ensured students and teachers to keep their information confidential and private and ensured their sincere feedback. New scales had to be created as a result for these structures. Following the standard scale development process supported in the literature (Churchill Jr, 1979) and based on the stages of measurement

scale creation and validation suggested, a multi-item scale that measures the effect of online learning on teacher-student communication has been designed and verified.

The data were checked for missing information and outliers before analysis. Then, the responses were analyzed using SPSS software. Descriptive statistics (mean and standard deviation) were used and inferential tests were applied to find the effects of ICT tools on teaching-learning process.

4.1. Description of the Tool

A closed-ended questionnaire is used to elicit respondents' views. It comprised of 14 statements which have to be answered on Lickert scale by the respondents (Teachers and students too) with 5 options from strongly disagree to strongly agree.

4.2. Results and Data Analysis

This current research was conducted by using sample size of 100 students and 40 teachers as participants from grade 6 to 8. All of the students and teachers were users of ICT tools. Participants were selected from four public school located in Lahore, Punjab. In response to the statement, responses are reported in the following tables.

Table 1: Responses by Students

S.No.	Statements	N	Mean	SD
1	Use of zoom/meet for online classes	100	1.90	1.096
2	Creation of what's app group	100	3.40	1.119
3	Effectiveness of online teaching	100	3.89	.447
4	Effectiveness of GCR	100	3.49	.990
5	Disconnection during online classes	100	2.76	1.248
6	Cooperation of students	100	3.35	1.095
7	Students answer the question	100	2.54	1.352
8	Facility for asking questions during online classes	100	3.39	1.171
9	Students ask questions during online classes	100	3.78	.760
10	Teachers ask questions during online classes	100	3.49	.904
11	Means of communication	100	3.60	.943
12	Use of gadgets	100	3.03	.332
13	Number of classes during week	100	3.58	.831
14	Purpose of communication	100	3.60	1.303

Table 1 displays the responses from students 14 statements related to online teaching and learning and provides the mean and standard deviation for each statement based on the responses of the participants (students). The participants were asked to rate their level of agreement to each statement on a scale from 1 to 5, where 1 represents strong disagreement and 5 represents strong agreement. The table provides mean and standard deviation for each statement based on the responses of the student participants. In response to statement number 1 (Use of Zoom for online Teaching), the mean score is 1.90 (SD=1.09), which suggests that the participants did not find the use of Zoom/Meet for online teaching very effective. In response to statement number 2 (Creation of WhatsApp group), mean score is 3.40 (SD=1.19), suggesting that the participants found the creation of WhatsApp group useful for communication to some extent. Similarly, in response to statement number 3 (Effectiveness of online teaching), mean score of 3.89 (SD=0.44) suggests that the participants found online teaching to be effective. Mean score of 3.49 (SD=0.99) in response to statement 4 (Effectiveness of GCR) indicates that the participants found GCR (Google Class Room) effective. Moreover, in response to statement 5 (Disconnection during online classes), mean value of 2.76 (SD=1.24) suggests that the participants experienced some level of disconnection during online classes. Cooperation of students (statement 6) indicates mean score of 3.35 (SD=1.09), which suggests that the participants found the students to be cooperative in the online learning environment. While answering statement 7 (Students answer the questions) mean score of 2.54 (SD=1.35) suggests that the participants felt that students did not answer questions adequately during online classes In response to statement number 8 (Facility for asking questions during online classes) indicates mean value to be 3.39 (SD=1.17), which suggests that the participants found the facility for asking questions during online classes to be helpful. In response to statement 9 (Students ask questions during online classes) mean score value is 3.78 (SD=0.76), which suggests that the participants felt that students were proactive in asking questions during online classes.

Statement number 10 (Teachers ask questions during online classes) shows mean score of 3.49 (SD=0.90), which suggests that the participants felt that teachers were proactive in asking questions during online classes. Similarly, statement 11 (Means of communication) shows mean score to be 3.60 (SD=0.94), which suggests that the participants found the means of communication used in online teaching to be effective. In response to statement 12 (Use of gadgets), mean score 3.03 (SD=0.33) indicates that the participants find the use of gadgets in online teaching effective. The statement number 13 (Number of classes during a week) shows mean score to be 3.58 (SD=0.83), which suggests that the participants found that numbers of classes during a week in online teaching were not affected. In response to last statement (Purpose of communication), mean score value of 3.60 (SD=1.30) indicates that the participants found the ICT tools useful for purpose of communication.

Table 2: Responses by Teachers

Sr.No	Statements	N	Mean	SD
1	Use of zoom/meet for online classes	40	2.70	1.490
2	Creation of what's app group	40	3.60	1.188
3	Effectiveness of online teaching	40	3.95	.224
4	Effectiveness of GCR	40	4.11	.240
5	Disconnection during online classes	40	1.85	.870
6	Cooperation of students	40	3.35	1.089
7	Students answer the question	40	2.80	1.322
8	Facility for asking questions during online classes	40	3.00	.973
9	Students ask questions during online classes	40	3.70	.801
10	Teachers ask questions during online classes	40	3.30	1.129
11	Means of communication	40	3.15	1.348
12	Use of gadgets	40	2.20	1.399
13	Number of classes during week	40	3.60	1.188
14	Purpose of communication	40	3.69	.804

Table 2 displays the mean and standard deviation for each statement based on the responses of the participants (teachers). The participants were asked to rate their level of agreement for each statement on a scale from 1 to 5, where 1 represents strong disagreement and 5 represents strong agreement. Statement number 1 (Use of Zoom for online Teaching) reports mean score 2.70 which suggests that the participants find the use of Zoom/Meet for online teaching to be useful. The standard deviation of 1.490 indicates that there was some variation in the participant's responses. Similarly, in response to "Creation of WhatsApp group", mean value of 3.60 suggests that participants found the creation of WhatsApp group useful for communication. The standard deviation of 1.188 indicates that there was some variation in the participant's responses. Moreover, effectiveness of online teaching rated at 3.95 mean score which suggests that the participants found online teaching to be effective. The standard deviation of .224 indicates that there was relatively low variation in the participant's responses. In response to effectiveness of GCR, the mean score for the statement is 4.10, which suggests that the participants found GCR (presumably a tool or platform for online teaching) effective. The standard deviation of .240 indicates that there was some variation in the participant's responses. Statement number 5 (disconnection during online classes) reports mean score to be 1.85, which suggests that the participants did not experience great level of disconnection during online classes. The standard deviation of .870 indicates that there was significant variation in the participant's responses. In response to statement number 6 (Cooperation of students), mean score of 3.35 suggests that teachers found students to be cooperative in the online learning environment. The standard deviation of 1.089 indicates that there was some variation in the participant's responses. Statement number 7 (Students answer the questions) reported mean score to be 2.80, which suggests that the participants were good to some extent while answering the questions during online classes. The standard deviation of 1.322 indicates that there was significant variation in the participant's responses. Facility for asking questions during online classes got mean score 3.00 which suggests that the participants found the facility for asking questions during online classes to be helpful to some extent and the standard deviation of .973 indicates that there was some variation in the participant's responses. In response to "students ask questions during online classes", mean value is 3.70 which suggests that the participants felt students to be proactive in asking questions during online classes. The standard deviation of .801 indicates that there was relatively low variation in the participant's responses. In

response to statement number 10 mean score 3.30 suggests that teachers were proactive in asking questions during online classes and the standard deviation of 1.129 indicates that there was relatively low variation in the participant's responses. Mean score value of 3.15 for statement number 11 (means of communication) suggests that the participants found the means of communication used in online teaching to be effective. The standard deviation of 1.348 indicates that there was some variation in the participant's responses. Similarly, mean value of 3.30 for use of gadgets (statement 12) suggests that the participants find the use of gadgets in online teaching effective. The standard deviation of 1.129 indicates that there was relatively low variation in the participant's responses. In response to statement 13 (number of classes during a week) mean score of 3.60 suggests that the participants found number of classes during a week in online teaching were not affected. The standard deviation of 1.188 indicates that there was some variation in the participant's responses. In response to the last statement, mean score value of 3.69 suggests that the participants found the ICT tools useful for purpose of communication and standard deviation of .804 indicates that there was some variation in the participant's responses.

Table 3: Responses of Teachers and Students

S.No	Statements	Respondents	N	Mean	SD	t-value	Df	p-value (sig. 2-tailed)
1	Use of zoom/meet for online classes	Teacher Student	40 100	2.70 1.90	1.490 1.096	2.794	118	.006
2	Creation of what's app group	Teacher Student	40 100	2.60 3.40	1.188 1.119	-2.889	118	.005
3	Effectiveness of online teaching	Teacher Student	40 100	3.95 3.89	.224 .447	.584	118	.560
4	Effectiveness of GCR	Teacher Student	40 100	2.95 3.49	1.050 .990	-2.205	118	.029
5	Disconnection during online classes	Teacher Student	40 100	1.85 2.76	.870 1.248	-3.106	118	.002
6	Cooperation of students	Teacher Student	40 100	3.35 3.35	1.089 1.095	.000	118	1.000
7	Students answer the question	Teacher Student	40 100	2.80 2.54	1.322 1.352	.788	118	.423
8	Facility for asking questions during online classes	Teacher Student	40 100	3.00 3.39	.973 1.171	-1.395	118	.166
9	Students ask questions during online classes	Teacher Student	40 100	3.70 3.78	.801 .760	-.426	118	.671
10	Teachers ask questions during online classes	Teacher Student	40 100	3.30 3.49	1.129 .904	-.822	118	.413
11	Means of communication	Teacher Student	40 100	3.15 3.60	1.348 .943	-1.803	118	.074
12	Use of gadgets	Teacher Student	40 100	2.20 3.03	1.399 .332	-5.307	118	.000
13	Number of classes during week	Teacher Student	40 100	2.70 3.58	1.302 .831	-3.892	118	.000
14	Purpose of communication	Teacher Student	40 100	1.30 2.60	.733 1.303	-4.319	118	.000

It shows the values of t-test and p (sig. 2 tailed) in response to teachers and students' feedback for questionnaire. Table 3 carries 14 statements where each row represents a statement, and the columns indicate the type of respondent (teacher or student), number of respondents (N), mean rating (Mean), standard deviation (SD), t-value, degrees of freedom (df), and p-value. P-value shows the probability that a null hypothesis is correct. Test of significance (T –Test) shows that there was statistical significant difference between opinion of two sets of data (teachers and students). Smaller t-value shows more similarity between the sample sets whereas larger t-values indicates the differences between the two sample sets. In response to statement number 1, mean rating is 2.70 for teachers and 1.90 for students, with a smaller p-value (p-value = 0.006) and larger t value (t= 2.794) showing a significant differences between the two sample sets.

Similarly, t-value for statement 2, 4,5,12,13, and 14 are 0.005, 0.029, 0.002, 0.000, 0.000, and 0.000 respectively which also indicates significant differences between responses of the students and teachers. On contrary, statement number 3,6,7,8,9,10 and 11 reported values of t higher than 0.05 which indicates that there was no significant difference between the responses of teachers and students. Both respondents show similarity in their responses related to the use of ICT tool for teacher-student communication.

Table 4: Gender based responses by teachers regarding use ICT during COVID-19

Sr. No	Statements	Respondents (teachers)	N 40	Mean	SD	t-value	p-value (sig. 2-tailed)
1	Use of zoom/meet for online classes	Male Female	24 16	2.67 4.00	1.155 .0000	-3.236	.005
2	Creation of what's app group	Male Female	24 16	3.29 3.13	.289 .835	3.058	.007
3	Effectiveness of online teaching	Male Female	24 16	3.08 2.63	1.379 1.506	.702	.491
4	Effectiveness of GCR	Male Female	24 16	1.92 2.00	1.084 .926	-.178	.861
5	Disconnection during online classes	Male Female	24 16	2.42 2.88	2.42 2.88	-839	.413
6	Cooperation of students	Male Female	24 16	2.33 3.43	1.303 1.134	-1.849	.082
7	Students answer the question	Male Female	24 16	3.17 2.63	.937 1.188	1.139	.270
8	Facility for asking questions during online classes	Male Female	24 16	2.83 3.25	1.267 1.165	-743	.467
9	Students ask questions during online classes	Male Female	24 16	3.08 2.88	.996 .991	.459	.652
10	Teachers ask questions during online classes	Male Female	24 16	3.50 4.00	1.000 .000	-1.401	.178
11	Means of communication	Male Female	24 16	3.25 3.50	1.215 .926	-.493	.628
12	Use of gadgets	Male Female	24 16	3.00 3.75	1.279 .707	-1.503	.150
13	Number of classes during week	Male Female	24 16	3.17 2.75	1.115 .886	.885	.388
14	Purpose of communication	Male Female	24 16	3.25 3.13	.622 1.246	.299	.002

Each row represents a statement to be responded, and the columns indicate the type of respondent (male or female teachers), number of respondents (N), mean rating (mean), standard deviation (SD), t-value, and p-value. In response to statement number 1, the mean values and standard deviation for male teachers are M=2.67, SD=1.155 respectively whereas for female teachers M=4.00 and SD=.0000 regarding use of zoom/meet for online classes. Value of t is 3.236 and P = .005 which indicates that female teachers are more satisfied with the use of zoom/meet for the online class. The trend of sharing recorded lecture has been observed in male teachers. Test of significance (T –Test) shows that there was statistical significance difference between opinion of male teacher (M=3.29, SD=.289) and female teacher (M=3.13, SD=.835) regarding in response to statement number 2, value of t (3.058) and p (.007) indicates that both respondents agreed about the usefulness of the creation of Whatsapp group as a mean of communication and a source sharing information. Test of significance (T –Test) shows that there was statistical significant difference between opinion of male teachers (M=3.08, SD=1.379) and female teachers (M=2.63, SD=1.506) regarding effectiveness of online teaching (T = .702, P = .491). Male teachers were more satisfied with the effectiveness of online teaching. Similarly, male teachers were more satisfied (M=1.92, SD=1.084) as compared to female teachers (M=2.00, SD=.926) when they were asked for effectiveness of GCR (T= -.178, P = .861). T –test also shows that there was statistical significance difference between opinion of male (M=2.42, SD=2.42) and female teachers (M=2.88, SD=2.88) regarding disconnection during online classes (T= -839, P = .413). Both respondents have reported the little disruption

and disconnection during online class. Female teachers have shown positive concern regarding the cooperation of students during the online class (T = -1.849, P = .802). Moreover, mean value and standard deviation of male teachers (M=3.17, SD=.937) and female teachers (M=2.63, SD=1.188) regarding students' answering the question also depicts significant variation from mean but t value (1.139) and p value (.270) shows similarity in both sample sets. Test of significance (T –Test) shows that there was statistical significance difference between opinion of Male teacher (M=2.83, SD=1.267) and female teacher (M=3.25, SD=1.165) regarding Facility for asking questions during online classes (T = -743, P = .467). The facility for asking questions during the class was not well developed said by male teachers. Test of significance (T –Test) shows that there was statistical significance difference between opinion of male teachers (M=3.08, SD=.996) and female teachers (M=2.88, SD=.991) when they were asked if students ask questions during online classes (T = .459, P = .652). Female opined that some students asked questions during the online class. Standard deviation and means values of male teachers (M=3.50, SD=1.000) and female teacher (M=4.00, SD=.000) depicts that there was a significant difference between the reponses by both gender when they were asked if teachers ask questions during online classes (T = -1.401, P = .178). In response to statement number 11(means of communication) both respondents did not face difficulty as analysed by statistical values (male teacher M=3.25, SD=1.215 and Female teacher M=3.50, SD=.926, T = -.493, P = .628). Similar results were found when they were asked for use of gadgets where t= -1.503 and p = .150). In response to the last statement, mean and standard deviations male teachers (M=3.25, SD=.622) and female teachers (M=3.13, SD=1.246) show significant difference and t-value and p-value (T = .299, P =.002) shows that the purpose of communication was fully conveyed as opined by both respondents.

Table:5 Gender based responses by student regarding use ICT during COVID-19

S.No	Statements	Respondents	N	Mean	SD	t-value	p-value (sig. 2-tailed)
1	Use of zoom/meet for online classes	Male Female	38 62	2.37 2.26	1.076 1.070	.499	.619
2	Creation of what's app group	Male Female	38 62	3.18 3.48	1.159 .971	-1.391	.167
3	Effectiveness of online teaching	Male Female	38 62	3.74 3.98	.685 .127	-2.771	.007
4	Effectiveness of GCR	Male Female	38 62	3.45 3.58	.950 .915	-.697	.488
5	Disconnection during online classes	Male Female	38 62	2.76 2.79	1.283 1.217	-.106	.916
6	Cooperation of students	Male Female	38 62	3.26 3.44	1.155 1.018	-.780	.437
7	Students answer the question	Male Female	38 62	2.58 2.61	1.328 1.233	-.130	.897
8	Facility for asking questions during online classes	Male Female	38 62	3.37 3.74	1.025 .599	-2.303	.023
9	Students ask questions during online classes	Male Female	38 62	3.24 3.68	1.051 .696	-2.523	0.13
10	Teachers ask questions during online classes	Male Female	38 62	3.53 3.68	1.033 .825	-.807	.422
11	Means of communication	Male Female	38 62	3.26 3.53	.978 .740	-1.559	.122
12	Use of gadgets	Male Female	38 62	2.79 2.47	1.277 1.238	1.247	.215
13	Number of classes during week no	Male Female	38 62	2.95 2.81	.985 1.114	.641	.523
14	Purpose of communication	Male student Female student	38 62	2.55 2.69	1.179 1.338	-.534	.594

Mean values, and standard deviation for all statements depicts values which are somewhat near to each other for both genders which indicates that there was not much variation among the responses by both genders. Greater than 0.05 p-value for all the statements shows that null hypothesis is incorrect and there is no significant difference regarding the use of ICT-

tools in teacher-students communication during COVID-19 among the responses by students based on gender. Analysis found a significant difference in the opinions of male and female students about effectiveness of online teaching (sig=0.007). female students found online teaching more effective and it was also found that female students found it easier to ask questions during online teaching (sig= 0.02) as compared to mal students

5. Conclusion

In today's world access to ICT is a major requirement for participation in technological society. There is no iota of doubt that the contribution of ICTs to education and society plays important role in communication. Online learning has a positive impact on communication between teachers and students and it boosts students' success. ICT tools provided a great substitute to the education system which lead the education process on working mode inspite of being it seize due to the sudden shift from formal classroom teaching-learning to online teaching-learning during COVID-19. ICT tools minimized the gap between teacher and student communication during COVID. The learning process kept on going due to proper and timely adoption of ICT tools. WhatsApp groups were created. The online teaching and learning process was effective. The adoption of Google Classroom was very effective for communication. Students cooperated with their teachers due to the availability of the facility to ask questions during online classes. Means of communication were effective. Students were able to answer questions by using their gadgets positively. Zoom/meet was also used to some extent. In brief, the purpose of the communication was achieved at large scale. It was also found that there were no significant differences between male and female students regarding the use of ICT tools for communication but teachers opined it differently based on gender. Hernandez (2017) also opined that classroom learning using ICT necessitated the development of a set of skills by the teachers in order to begin the process of making the most of technological tools. To conclude, it was found that all participants (teachers and students) find ICT tools to be useful in teacher-student communication whereas there were some differences based on gender among responses of teachers regarding the uses of different applications of ICT.

5.1. Limitations and Delimitations

Current research has following limitations and delimitations.

- Only eight public schools were selected from Lahore, Punjab
- Private schools were not selected
- Learners of grade 9 and 10 (secondary level) were selected
- Both genders were not given equal participation.
- Only quantitative inquiry was used.
- Use of triangulation could support and validate results.

5.2. Recommendations

Information & Communication Technology (ICT) has brought a positive change in education process. It plays a very important role in the teaching-learning world. Zoom/ meet is less used at the school level because teachers send weekly work in pdf form in Google classroom and send voice notes on WhatsApp. Training programs must be initialized for teachers regarding the use of ICT tools in an extended context. Hernandez (2017) also recommended that teacher training should be given the first option prior to facing new educational challenges. Some contents related to the usage of ICT tools must be included in courses for students. Awareness programs regarding the use of Information & Communication Technology (ICT) must be organized. IT-trained staff could be recruited to train teachers and prepare them to cope up new needs of the Information & Communication Technology tools.

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