RESEARCH PAPER

An Investigation of Utilization and Accessibility of Information and Communication Technology among Higher Secondary School Teachers and Students

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ABSTRACT

This paper primarily aims to investigate information and communication technology accessibility among teachers and students in higher secondary schools in Gilgit Baltistan GB. The study included 200 students and 100 teachers from various government, private, and non-governmental schools in Gilgit Baltistan. The LIKERT scale was used to design a questionnaire and was distributed to teachers and students the data was statistically analyzed, revealing the average percentage of both teacher and student has been accessibility level 53.47%, 42.61%, and non-accessibility level 46.53%, 57.34%. The analysis shows that the teacher's accessibility level has been moderate, while students have had a low one. Further, teachers educationally lack advanced level skills, and students have no such barrier to using educational tools. Based on these findings, it was recommended that institutions and authorities should provide advance level skill training to teachers and educational tools to both students and teachers to ensure ICT integration in the teaching and learning process.

| **KEYWORDS** | Higher Secondary School, Homes, ICT |

Introduction

Globally, Information and Communication Technology (ICT) is transitioning from analogue research-based educational technology development to digital knowledge-based technology development in education, so it became a pillar of modern society. Coining ICT in education has not only improved the ways of teaching but has also uplifted the standards of education by inculcating in them the skills of the modern era ((Abubakar & Chollom, 2017)). ICT has reshaped the way of communication between teacher and student and made it even better and its potential in transforming teaching cannot be ignored(Stephen, 2013).

Though the use of ICT in education was initiated in 1980s (Jude & Dankaro, 2012)but COVID-19 made its significance even more prominent ((Faisal & Kisman, 2020)). Whilst the modern world has integrated ICT in classrooms ((Lomos et al., 2023), the third world countries like Pakistan are still creeping where only few institutions in big cities have ICT facilities. There is very worst condition in small cities, towns and in far flung areas. Gilgit Baltistan, one of the far flung areas of the country besides having highest literacy rate in Pakistan lacking in the use of ICT tools in its educational institutions. The development of ICT in recent years has drastically altered educational procedures to improve the quality of education offered to students. In schools; the use of ICT resources will serve a dual purpose and improve the efficiency of classroom instruction (Ezekwe, 2019).

Gilgit Baltistan institutions prepare teachers who feed the higher secondary school level of education with manpower. During this level, they should be exposed to technology in the classroom, which they will use when eventually they leave school and become gainfully employed as teachers in higher secondary schools. It therefore, it is in this light that students and teachers, who are expected to drive the new ICT advanced education system, are addressed. Access to quality resource materials and instruction can demonstrate the advancements that ICT resources offer in higher education. In order to achieve this, teacher education must drastically integrate it into the instructional process. CT resources can enhance students- learners' creative and intellectual development through the use of multimedia images, graphics, audio, text and motion for high quality instruction and learning.

While educational expansion has occurred in Pakistan over the decades, the quality of education provided hasn't improved as much. This is the result of epileptic implementation of laudable educational programs in our higher educational institutions that led to stillbirth of laudable visions in the curriculum. In order to deal with this, teacher and student must be adequately prepared in terms of capacity building. As knowledge explorers, teachers and students must stay abreast of the latest ingestions, research networks, and innovations in education. It is only through proper use of ICT resources that this knowledge can be enhanced. Despite these noble intentions, most teachers and students lack laptops and other ICT ensembles, thus preventing them from accessing the internet services required to use ICT in the classroom. It is therefore likely that instructional delivery will be too challenging, as teacher educators who are adamant about change will always be against learners' knowledge. Therefore, this study aims to determine whether there is a correlation between teachers' and students' use of ICT in Gilgit region.

Literature Review

Globalization has transformed the world into a global village. The borders among the countries have become porous. For the past few decades, a variety of ICTs has become common throughout the world such as computers, lap tops, projectors, printers, e-blackboards and mobile phones have been available to teachers for use in integration of teaching and learning in schools (Akuegwu et al., 2011)conducted a similar research in Kenya. They found that the access to internet was limited in schools. They quote from the research of Kenya School Net (2003) that, "email was yet to be recognized as a tool for collaboration among students and teachers."(Seifu, 2020) stated that the two important factors to introduce the technology into schools are "availability and accessibility of ICT resources. "The effectiveness of ICT is beyond doubt in higher education and its efficiency has become an established fact.(Ahmad & Sheikh, 2022) assert that ICT improves the "educational opportunities of individuals" but the problem is that the teachers do not have access to the ICTs which impedes the process of learning. The researches by(Gombe et al., 2016), (Jude & Dankaro, 2012), revealed that "ICT availability often been one of the most important obstacles to technology adoption and integration in learning." This highlights the urgent need to enhance the integration of ICT in schools.(Broni, 2017)about the availability of ICT in schools of Onitsha revealed that 60% teacher's did not use ICT at all. So, it recommended improving the availability of ICT also suggested ensuring the availability of Media.

"According to (NANNIM, 2018), the global challenges of education in exploring and applying ICT through effective approaches have led the teachers and students to recognize and subsequently apply them to suit the desired field. "Different countries are attempting to enhance the accessibility of ICT for the education sector to bring

improvements in their whole setup. "Existence of ICT is improving the educational efficiency as well as obliging for making policies regarding education sector." (Muriithi et al., 2016)So, accessibility of ICT is necessary to ensure the "educational efficiency" of students.

Olufunke et al., (2010)research about the implementation of ICT reveals that the availability of ICT is important to increase the "educational efficiency of students" and their "learning skills". They also proved that, more availability of ICT would lead to better efficiency of students. "Students agreed that ICT provides vast knowledge to students through internet and digital libraries, so it can helpful to enhance the educational efficiency at local, regional and national level." So their research shows that ICT can have revolutionary reforms in education sector of country. The research of (Ifraimu et al., 2021)shows that the students belonging to rural areas have potential to adopt ICT but they are deprived of the facilities. So, if accessibility is ensured, they would give a positive response. As Gilgit Baltistan is a rural area, this research can have positive implications in the region.

Material and Methods

Nature

This research considers the quantitative methods approach in this study for which questionnaires were prepared and distributed.

Population

There are 1935 public sector institutions in Gilgit Baltistan (GB) out of which 312 high and 43 higher secondary institutions, whereas private sector carves up 612 institutions including 148 high and 30 higher secondary institutions (P.E Statistics, 2017). In district Gilgit and district Hunza (study area), there are 26 and 15 public sector higher secondary schools, 11 and 7 NGO schools and in the same order private sector shares 35 and 23 institutions in respective district. Only a few institutions in these districts have ICT facility.

Sample size

200 questioners were distributed to students with response rate 98% and 100 questioners were distributed to teachers with response rate 77%, from two districts Hunza and Gilgit to three main sectors(private, Government and NGO based higher secondary schools.

Sampling Technique

 On the basis of the nature of study, only those institutions are selected which have ICT facility as target institutions through purposive sampling. 10 students and 5 core subject teachers from pre-selected institutions were randomly selected. Random Stratified sampling technique used for students and cluster sampling technique were used for teachers.

Pilot testing

A pilot study was conducted before data collection to design the questionnaire. For this purpose, it was presented to a group of arbitrators and faculty members in the

Department of Education at the Karakoram International University, Gilgit. They were requested to state the objectives of the study.

The examination by the arbitrators added value to the validity of questionnaires and they were improved according to their feedback. The second method of piloting the teacher's questionnaire was that it was distributed as a pilot questionnaire to twenty teachers in higher secondary schools, (five of them were physics teachers, and five of them English teachers, five were Math's teachers, and five of them computer teachers). The researcher also distributed pilot student's questionnaire to one classroom in the higher secondary school. The teachers" and students" questionnaire was modified according to the notes received.

Validity reliability

The questionnaire was carefully prepared after the search of all the relevant literature and after the confirmation of a high level of internal validity. It was then presented to a group of arbitrators of faculty members in the Department of Educational at the Karakuram University and they were requested to state objectives of the study.

Table: 1
Description on the sections of the questionnaire instrument

Sections	Dimensions	No of items	Scale	Reliability values
Teachers questioner's	Availability of ICT Tools	27	(Access) =1, (No Access) =2	.728
Students questioner's	Availability of ICT Tools	27	(Access) =1, (No Access) =2	.732

Table 1 shows the reliability of the questioners the value of Cronbach's Alpha for teachers questioners is .728 >6 and the value of Cronbach's alpha for students is .732>6 hence questioners were reliable.

Data analysis technique

Descriptive statistics (frequency and percentages) were used to summarize data on teacher and student backgrounds, teacher qualifications, teacher-student educational tool accessibility, and barriers to ICT usage in the teaching and learning process.

Ethical consideration

The researcher obtained a permission letter from the director of Education to enter the educational institutes and conduct the research by distributing the questionnaires. The researcher must ensure that they are willingly participating and that their statements would be kept confidential. The researcher should not ask for the personal information of the participants to respect their privacy.

Results and Discussion

Table1
The Number of Participants Teachers' Data

Respondents		Frequencies	Percentage
Gender	Male	43	55.8%
	Female	34	44.2%
Age	20-30	58	75.3%

	31-40	16	20.8%
	41-50	3	3.9%
Qualifications	M.Sc.	50	64.9%
	MA	16	20.8%
	Bs(hnrs)	7	9.1%
	M Phil	4	5.2%
Sector	Private	58	75.3%
	Government	11	14.3%
	NGO based	8	10.4%

This table show that 34 (44.2%) of the teacher data were female and 43 (55.8%) were male. The majority of the respondents were between the ages 20-30 years (75.5%), 31-40 years age 16 teachers (20.8%), and 41-50 years age 3 teachers (3.9%). Teachers had an M.Sc. degree from 50 teachers (64.9%), an MA degree from 16 teachers (20.8%), Bs(hnrs) from 7 teachers (9.1%) as their highest educational qualification and an MPhil degree from 4 teachers (5.2%). The majority of teachers participated from private sector schools 58(75.3%), Government sector 11 teachers (14.5%), and NGO-based school teachers least participated: 8 teachers (10.4%).

Table2
The number of participant's student's Data

Respondents		Frequencies	Percentage
Gender	Male	78	39.8%
	Female	118	60.2%
Age	Less than15	2	1.0%
	16-17	55	28.1%
	17-18	69	35.2%
	19-20	54	27.6%
	Above 20	16	8.2%
Class	Ist year	89	45.4%
	2nd year	107	54.6%
Sector	Private	113	55.7%
	Government	34	18.9%
	NGO based	46	23.9%

The table2 show that 118 (60.2%) were female and 78 (39.8%) were male. The majority of the students were between 17-18 years of age 69 students (35.2%), 19-20 years of age 54 students (27.6%) above 20 age 16 students (8.2%), and less than 15 ages only 2 students (1.0%). Students participated from the 1st-year class 89 students (45.4%) and the 2ndyear class participated 107 students (54.6%). The majority of students participated from private sector school's 113 students (55.7%), Government sector 34 students (18.9%) and NGO-based school students participated 46 students (23.9%).

Table 3
Feedback of students regarding accessibility of Educational tools:

Technologies	Access	Accessibility	No Access	Non-Accessibility	Level
Computer	159	81.1%	37	18.9%	High
Tablet	20	10.2%	167	89.2%	Low
Note book	7	3.6%	189	96.4%	low
Computer labs at school	87.8	87.8%	12.2	12.2%	High
Computer in class room	7	3.6%	189	96.4%	Low
Digital dictionary	100	51%	96	49%	Moderate
Anti-virus software	129	65.8%	67	34.2%	High
Office automation	126	64.3%	70	35.7	High
Games	61	31.1%	135	68.9%	Low
Printer	64	32.7%	132	67.3%	Low
Multimedia	64	32.7%	132	67.3%	Low

Digital camera	84	42.9%	112	57.1%	Low
Scanner	4.1	4.1%	95.5	95.9%	Low
Internet (home)	66	33.7%	130	66.3%	Low
Internet(School)	162	82.7%	34	17.3%	High
Email	107	54.6%	89	45.4%	Moderate
AVERAGE %		**42.61%**		**57.34%**	

Table4
Criteria for access levels

Range	Access Level
Above 70%	High level
69%-50%	Moderate
Below 50%	low

Table 4 shows the students questionnaire regarding the accessibility of education tools for their learning which include computer (81.1%), Tablet(10.2%), personal computer at home(42.3%), notebook(3.6%)computer labs (87.8%), computer in classroom(3.6%), digital dictionary(51%), anti-virus(65.5%), office automation(64.3%), games(31.1%), printer(32.7%), Multimedia (32.7%), digital camera(42.9%), Scanner (4.1%), internet at home (33.7%), internet at school (82.7%), email (54.6%). This indicates that the majority of basic tools are not available for students for their learning purposes.

Table5
Feedback of students on the Barrier of ICT usage for learning:

Barriers	Agree F (%)	Disagree F (%)
Parents cannot offered	16(8.2%)	180(91.8%)
Lack of skills	11(5.6%)	185(94.4%)
Fear to miss use	10(5.1%)	186(94.9%)
Unawareness of parents	15(7.7%)	181(92.3%)

Table5 shows the feedback of students on the barrier of education tools not being available the respondents agree and disagree on the following: parents cannot be offered agree (8.2%), disagree (91.8%), lack of skill agree (5.6%), disagree (94.4%), fear to miss use agree (5.1%), disagree (94.9%), unawareness of parents agree (7.7%), disagree (92.3%). The overall result indicates there is no such barrier to use education tools for their learning purpose.

Table6
Students Use of computer lab at school level:

	Frequency	Percentage	level
Less than one hour	153	78.1%	High
1-3 hours	8	4.1%	Low
4-6 hours	1	.5%	Low
not use	34	17.3%	Low
Total	196	100.0%	

Table6 shows the use of computer lab at school the respondent percentage usage was less than one hour (78.1%), 1-3 hours (4.1%), 4-6 hours (0.5%), not use (17.3%), but the lowest usage percentage rate is 0.5%, which indicates students not used computer lab frequently.

Table7
Feedback of students internet use at school level

Some time F(%)	Rarely F(%)	Every day F(%)	At will F(%)	Not use F(%)
76(38.8%)	56(28.6%)	10(5.1%)	13(6.6%)	41(20.7%)

Table7 shows the feedback on the internet use of students at the school level The respondent has usage sometimes (38.8%), rarely (28.6%), every day (5.1%), at will (13%), not use (20.7%), which indicates majority student use the internet sometimes at school.

Table8
Feedback of students regarding accessibility of Educational tools

Educational Tools	Access	% Accessibility	No Access	% Non-Accessibility	Level
Computer	74	96.1%	3	3.9%	High
Tablet	20.8	20.8%	79.2	79.2%	Low
Personal computer at home	42.9	42.9%	57.1	57.1%	Low
Note book	11.7	11.7%	88.3%	88.3%	Low
Computer labs at school	69	89.6%	8	10.4%	High
Laptop	58	75.3%	19	24.7%	High
Computer in class room	69	89.6%	8	10.4%	High
Digital dictionary	57	74%	20	26%	High
Anti-virus software	67	87%	10	13%	High
Office automation	70	90.9%	7	9.1%	High
Games	58	75.3%	19	24.7%	High
Printer	14	18.2%	63	81.8%	Low
Multimedia	48	62.3%	29	37.7%	High
Typing tutor	39	50.6%	38	49.4%	High
Internet video camera	34	44.2%	43	55.8%	low
Digital camera	44	57.1%	33	42.9%	high
Scanner	8	10.4%	69	89.6%	low
Internet(School)	71	92.25%	6	7.8%	High
Email	71	92.25%	6	7.8%	High
AVERAGE%		**53.47%**		**46.53%**	

Table **8** shows the feedback on the teacher's educational tools at school and home, tools available include a computer(96.1%), tablet(20.8%), personal computer(42.9%), notebook (11.7%), the computer lab at school(89.6%), laptop(75.3%), computer in the classroom (89.6%), digital dictionary(74%), anti-virus software(87%), office automation (90.9%), games(75.3%), printer(18.2%), CDROM(62.3%), typing tutor (50.6%), internet video camera (42.2%), digital camera(57.1%), scanner(10.4%), internet(92.25%), internet(92.2%).the over result indicates mostly basic educational tools are available but advance level tools still lack for utilization

Table 9
Feedback of teachers internet use at school level:

Some time F(%)	Rarely F(%)	Every day F(%)	At will F(%)	Other F(%)
15(19.5%)	6(7.8%)	41(53.2%)	10(13.0%)	5(6.5%)

Table9 shows the feedback on teacher use of the internet at the school level the respondents have usage sometimes (19.5%), rarely(7.8%), every day(53.2%), at will(13%), other(6.5%),which indicates majority teachers use the internet every day at school.

Table 10
Feedback of Teachers on the barrier of ICT usage for teaching and learning

Barriers	Agree F (%)	Disagree F (%)
Lack of advance training	56(72.7%	21(27.2%)
Lack of advance skills	65(84.4%)	12(15.5%
Lack of access to new ICT device	45(58.44%)	32(41.5%)
Use of technology negative effect on learning	11(15.58%)	65(84.41%)

Table10 shows the frequencies and percentage responses of teachers on barrier of ICT not available at home from the table the respondent agree and disagree on the

following: Lack of advance skill agree(72.7%),disagree(27.2%),lack of advance skills agree (84.4%), disagree (15.5%),lack of access to new ICT devices agree(58.44%), disagree (41.5%),use of technology negative effect on learning agree(15.58%),disagree(84.41%).

Conclusions

The study looked into how higher secondary school students and teachers in the Gilgit region used and could access information and communication technology. In the study, a wide range of ICTs were available for students and teachers, including desktop computers, the internet, laptops, and smartphones. The high utilization of ICT facilities in Gilgit region also indicates that higher secondary school students and teachers have adequate access to, and are taking advantage of ICT devices for sharing information and knowledge. However, they face several barriers to the optimal use of ICT including the use of printer, scanner and internet data bundles, the lack of technological skills of teachers, the lack of training, and the lack of new access of new device. Computer labs can be provided to students /teachers and encouragement can be provided so they can share knowledge using ICTs for their teaching and learning.

Recommendations

Based on the conclusions, the scholar makes the following recommendations:

- The provincial governments and stack holders should provide schools with ICT tools and funds for maintaining them.
- Teachers should receive training, workshops, seminars and conferences on ICT skills in order to become more knowledgeable about ICT and its effective application in teaching and learning.
- Printer, internet, scanner and projectors should be available as information technology tools.
- A proper infrastructure can be provided for the accommodation of technological equipment.
- The provision of technology on a priority basis may be made in all schools lacking technology.

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