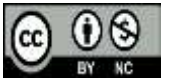
Effectiveness of Information and Communication Technology (ICT) Integrated Teaching and Learning in Primary Schools

Muhammad Roshan[1], Mushtaq Ahmed[2],
Sher Bano[3], Nasreen Hussain[4]



Abstract

The aim of this study was to explore the effectiveness of Information and Communication Technology (ICT) integrated teaching and learning at primary level in Public Private Partnership (PPP) schools. The study also investigated how ICT is integrated for teaching and learning at primary level in PPP schools. The study was qualitative in design and employed phenomenological approach. Data for the study were collected through semi structured interviews, lesson observations and Focus Group Discussions (FGDs). The study participants were 15 teachers and 5 head teachers. The study indicated that the schools used Smart LED TVs and Tablet PCs with interactive e-learning application and story-based animated content of Science, English and Mathematics for teaching and learning in classroom. The findings of the study showed that ICT integration improved students' academic achievements, increased their interest in learning and also increased students' attendance and enrolment. The findings of the study also presented that ICT integration shifted teachers' teaching practices from teacher centered to student centered, increased their interest in teaching and made teaching easier for them. The findings of the study may be helpful for different stakeholders working to improve the quality of education in the context of underprivileged areas especially PPP organizations, schools and teachers.

Keywords: *Teaching and Learning, ICT Integration, Primary Schools, Technology Effectiveness, Public Private Partnership*

1. Introduction

Information and Communication Technology (ICT) are the technological tools which are used for creating, storing, analyzing and sharing information (Alkamel, 2018). ICT integration is not a curriculum or computer skill, but a teaching method and process which are beyond provision of technological devices

[1] EMO Officer at Public Private Partnership Node, Email: roshanbozdar87@gmail.com
[2] Directorate of Curriculum, Assessment and Research, Jamshoro Sindh
Email: azmiansari@hotmail.com
[3] Assistant Professor, School Education and Literacy Department (SE&LD), Government of Sindh, Karachi Email: kakashehrbano1968@gmail.com
[4] Professor, Department of Education, Institute of Business Management, Karachi
Email: nasreen.hussain@iobm.edu.pk

and teaching of software packages (Fletcher, 2009). Instead, it is the use of technology to facilitate learning through different modes, offer opportunities for student-centered learning, involve learners, and allow them for distinction and learning preferences (Ertmer, 2012). Technology integration in education has been acknowledged as an important force to achieve the goal of educational transformation, improve instructional quality (Cetinkaya, 2017) and overcome various educational problems of 21st century (Seraji, 2017). A major shift in teaching and learning has been observed due to technology integration in education. According to Beauchamp (2010) effective use of technology can result into learner centered teaching and collaborative and interactive classrooms. ICTs have brought a considerable change in the teaching and learning processes by shifting traditional classroom, where student was a passive learner, to an interactive and collaborative classroom setting, where student is an active participant (Kapur, 2019).

The emergence of modern technological tools like laptops, smart phones, tablet PCs, animated videos and android based interactive e-learning applications have brought new opportunities to transform instructional practices and content delivery. Owing to the growing importance of ICT in education, Government of Pakistan (2017) recommends use of Information and Communication Technologies (ICTs) in education at all levels to improve quality of teaching and learning. To ensure provision of quality education which is the fourth goal of the Sustainable Development Goals (SDGs), it is imperative to use ICTs for teaching and learning. Various countries have spent billions of dollars to provide modern technologies to the schools (Asad, 2020). Research shows that, in certain cases, teachers are not completely aware of the enormous benefits that ICT integration can offer whereas some teachers might have positive perceptions of ICT integration in classroom.

A number of initiatives have been taken in Pakistan to increase access to education and improve the quality of education in the schools. One of the initiatives of the School Education and Literacy Department, Government of Sindh, was introducing smart teaching and learning in primary schools under Public Private Partnership mode. The project has been implemented in 600 Public Private Partnership schools in 29 districts of Sindh province. The schools have been implementing ICT based teaching and learning for 5 years now. However, the effectiveness of ICT integration has not been explored.

Most of the research studies conducted on ICT integration in Pakistan focus on college level or university level. Very few research studies are found at Secondary level schools, but their focus is either on private schools or public schools. In addition to this, most of the research studies on the use of computer for teaching and learning. However, no research was found focusing on the use of

ICT tools like e-learning applications, Tablet PCs and digitized content at primary level particularly in Public Private Partnership Schools located in underprivileged areas. Besides, there has not been any research on the effectiveness of ICT integration to teaching and learning. Therefore, this research study intended to explore the contribution of ICT integration to teaching and learning at primary level in PPP schools in Karachi, Sindh.

1.1 Objectives of the Study

The objectives of this study were to:

1. Explore how ICT is integrated in teaching and learning in classroom at primary level in Public Private Partnership (PPP) schools
2. Explore effectiveness of ICT integration for teaching and learning at primary level in PPP schools

1.2 Research Questions

The research questions that guided the study were:

1. How is ICT integrated for teaching and learning in classroom at primary level in Public Private Partnership (PPP) schools?
2. What is the effectiveness of ICT integration for teaching and learning at primary level in PPP schools?

1.3 Significance of the Study

The use of ICT in teaching is very significant. After the waves of recent pandemic, it has been established the teachers should learn about the integration of ICT in their lessons. However, the integration of ICT has its implications. This research explored the effectiveness of ICT integration for teaching and learning. The findings of the study may help educational organizations to review the plans and procedures which will enable teachers to use ICT more effectively. The study may also assist teachers to reflect on their practices regarding ICT integration and not only to think about the challenges but also try to find the solutions to challenges. The findings of the study may be beneficial for future researchers to explore effectiveness of integrating ICT to teaching and learning and fill the research gap. The findings of the study are also expected to be beneficial for policy makers in the ministry of education and other stakeholders like non-governmental organizations working for the betterment of education in the country.

2. Literature Review

The rapid growth of ICT in last two decades has brought significant shifts in school education. This is owing to the potential of ICT in ensuring an active and proactive teaching and learning atmosphere. Teachers are required to replace traditional methods by integrating ICT in teaching in accordance with the contemporary digital era (Ghavifekr & Rosdy, 2015).Though the influence of technology is far-reaching, its impact on teaching and learning has been

evolutionary rather than revolutionary (Klopfer, Osterweil, & Salen, 2009) especially in the developing countries like Pakistan (Zehra, 2016). Research findings suggest that technology is effective in improving teaching and learning (Negi, 2011). Nevertheless, successful integration of ICTs in teaching and learning is a complex and inclusive process that involves not only technology but also curriculum and pedagogy, institutional motivation, teacher proficiencies, and ongoing financing (Higgins, 2012).

Integrating ICT in education is an instructional strategy by the teacher. It involves collaboration and careful planning. Alongside integration, functionality, accessibility, flexibility and ease of use are the feature of ICT integration in teaching and learning. However, all these features revolve around the acceptance and readiness of teachers (Kler, 2014). According to Higgins (2012), the notion of ICT integration in developed countries may be traced way back in 1970s. In the US, the first computer terminals appeared in schools at that time was in shape of a mini-computer. By 1982, most primary schools had at least one computer for the purpose of educating children. In developed countries, use of ICT in classroom teaching is a common setting. Children use computers, laptops and tablets in their classroom. Moreover, using educational apps and software is also very common.

ICT use in the classroom setting is very beneficial to enhance students' skills and knowledge as Kisirkoi, (2015) claims that the use of ICT as teaching and learning resource is closely connected with a measurable increase in students' learning achievement. ICT is found very effective in several ways. It increases the motivation and engagement level of teachers and students. If ICT is integrated purposefully and in a planned way it promotes students' centeredness (Jogezai, Ismail & Baloch, 2020).

Sindh Education Foundation started Introducing Smart Teaching and Learning (INSTAL) project in its schools. The project has been implemented in 600 schools in 29 districts of Sindh province. The project incorporates designing, developing and implementing a customized e-learning application to aid the content delivery in an interactive manner to improve learning outcomes of KG to Grade V students. Teachers were provided training on e-learning application to ensure effective implementation of ICT based teaching and learning in classroom. The schools have been implementing ICT based teaching and learning for 5 years now. However, there has not been any research study on the intervention.

This research study was driven by the understanding that the area of effectiveness of ICT integration to teaching and learning at primary level particularly in Public Private Partnership schools in the context of Sindh province has not been explored yet. Therefore, this study attempted to explore the effectiveness of ICT integration to teaching and learning at primary level in Public Private Partnership schools.

Technology Acceptance Model (TAM) has been used as a theoretical framework to explore effectiveness of ICT integration to teaching and learning, investigate barriers to effective ICT integrated teaching. Technology Acceptance Model proposes a causal relationship between Perceived Usefulness (PU), Perceived Ease of Use (PEU), Attitude towards Computer Use (ATCU), and Behavioral Intention (BI) to use technology. Perceived Usefulness (PU) and Perceived Ease of Use (PEU) together lead to intention to use which results behavior usage. Davis (1989) first defined Technology Acceptance Model (TAM) as a theory that explains the factors which influence teachers' intentions to use information technology. The most crucial concepts are Perceived Ease of Use (PEU) and Perceived Usefulness of Technology (PUT) that influence the Intention to Use (IU) technology; therefore, outside factors that affect these two concepts should be considered. Using Technology Acceptance Model, teachers' technology acceptance level can be identified which determines the limit to which technology can be used in classrooms.

3. Research Methodology

3.1 Research Design

A phenomenological research approach was used to explore effectiveness of ICT integration for teaching and learning in the classroom. The best situation to apply a phenomenological approach is when a problem needs a profound understanding of human experiences commonly shared by a group of people (Creswell, 2014). Due to its nature and alignment with Interpretivism and Phenomenology, this research demands to be conducted as qualitative research.

3.2 Sample

Non-probability sampling technique was used to select the sample size for the study. Non-probability sampling technique is considered the most suitable technique for selecting small sample size (Battaglia et al, 2008) therefore it is typically used by the qualitative researchers (Blackstone, 2012). The sample size of this study consisted of 15 teachers and 5 head teachers from 5 different schools of Karachi managed under Public Private Partnership modality. The key characteristics of the sample were:

- Received training on ICT integrated teaching and learning
- Teaching with ICT tools in classroom for at least three years.

Furthermore, three teachers, who received ICT integration training and have been teaching through ICT tools, were selected from each school for lesson observations. After lesson observations, focus group discussions were held with the same teachers. Five focus group discussions were conducted and there were three teachers in each focus group discussion. In addition to this, semi-structured interviews of head teachers of the selected schools were also conducted.

3.3 Instrumentation

In order to elicit rich data, a variety of instruments were administered during this research. Data for this study were collected through lesson observations and focus group discussions with teachers and semi-structured interviews of the school head teachers. Observations allowed the researcher to devote a prolonged period of time in a situation and acquire a rich understanding of the phenomenon being studied. The observations of ICT integrated lessons enabled the researchers to understand how is ICT integrated in classroom, and what is the effectiveness of ICT integration for teaching and learning. It also helped researchers to evaluate the level of ICT integration and record the teaching practices. The semi structured interviews of head teachers were conducted. Semi-structured interviews are particularly useful for collecting people's opinion and experiences. The questions can be explained by the interviewer as per the need and the interviewee may also deliver a bulk of information that is important for the study (Brinkmann, 2013). Phenomenological studies aim to examine lived human experiences through the description provided by participants. Thus, a semi-structured interview tool was used to collect data from head teachers. Five focus group discussion were conducted with 15 teachers. Each focus group discussion was ranged from 25 to 35 minutes. The interviews with Head Teachers and FGDs with the teachers enabled researchers to explore the effectiveness of ICT integration for teaching and learning.

3.4 Data Collection

Data were collected after seeking data collection permission from the organization under which the schools were operating. The participants were contacted and briefly explained about the research and its objectives. In the first phase of the data collection, lesson observations were carried out. The researcher observed technology integrated teaching sessions in Audio-Visual (AV) rooms of five schools selected for the study. The participants' consent was sought in written. Subsequently, Focused Group Discussion was held with the teachers whose lessons were observed. Participants were asked about the effects of ICT integration on their teaching practices and students' learning.

4. Data Analysis and Interpretation

Data for the study were gathered through lesson observations, Focus Group Discussions and semi-structured interviews. Both focus group discussions and interviews were translated from Urdu to English and then transcribed. The transcribed data were shared with the participants to ensure validity of their responses. In order to interpret the participants responses Thematic Analysis technique was used. Thematic analysis is the procedure of finding patterns or themes within qualitative data (Braun, 2006). The data collected through Focus Group Discussions and semi-structured interviews were categorized into codes

and then themes were extracted.

This section of the study reports the findings of lesson observations and focus group discussions taken of teachers. It also includes the findings from semi-structured interviews of school head teachers. It was observed that a separate AV room was established in each school and the teachers of all schools used LED TVs and Tablet PCs with e-learning application consisting of digitized content of Science, Mathematics and English subjects. Smart LED TVs were used for playing videos of Science, Mathematics and English subjects and Tablets were used for interactive flipbooks and formative assessment exercises which were the part of e-learning application. The content in e-learning application was very much aligned with the National Curriculum of Pakistan (2006) and the syllabus of Oxford University Press (OUP) and Sindh Text Book Board (STBB) series books of primary level. The e-learning application contained videos, flipbooks and interactive exercises. Each school was supplied with one smart LED, thirty tablets with e-learning application, videos, Teacher Guides for each subject entailing lesson plans for teaching with digital tools. Schools were also provided with Solar systems to ensure un-interrupted power supply to AV rooms.

4.1 Findings from Lesson Observations

The researchers observed six lessons of Science, Mathematics and English subjects. During the lesson observations, it was observed that all teachers used the same technological tools- tablets and LED TVs and followed the same sequence of lesson plan. All teachers incepted the lesson by asking questions related to the topic to check students' prior knowledge. Five out of six teachers scaffolded the topics through open ended questions and unfolded the topics to students in a very interesting manner.

Soon after checking students' prior knowledge and introducing the topics, teachers played videos on LED TVs. Average timing of the videos was 5 to 8 minutes and included 3 to 4 pause signs where teachers paused video and asked questions from students. The questions were either reflective or predictive. Students actively responded to teachers' questions. Story-based animated videos were interesting enough to captivate students' attention. Interaction between students and teachers was very vigorous. Students did not hesitate to ask questions if they did not understand anything in the videos.

After showing the videos, teachers engaged students in class activities related to the topic under discussion. Students actively participated in the activities. In few cases teachers made pairs and groups of the students and engaged them in activities. Once the class activities were over, teachers distributed tablets among students. It was observed that in every school few of the tablets were dysfunctional. So, teachers made pairs of students and gave one tablet to a pair of students. Having distributed the tablets, teachers instructed students to

open the e-learning application on tablets. Students easily navigated to their concerned subject and topic in the application. Very few students faced difficulties in navigating and operating tablets, but they were guided by their teachers. Then teachers instructed them to open lesson exercises and attempt them. Tablets included MCQs based questions, matching statements, fill in the blanks and true false statements.

While attempting interactive exercises students were observed reading questions attentively and trying to attempt them. Students' interest and enjoyment were evident from their facial expressions; they were completely absorbed while watching videos and using tablets for interactive flipbooks and exercises. They attempted exercises on tablets with ease, submitted their responses and got results immediately. Most of the students' formative assessment results were quite impressive; they scored more than 70%. Teachers actively monitored students during exercise and checked their results. Few students were seen struggling to comprehend questions while attempting interactive exercises especially in English class. They approached their teachers for translation of exercise questions. Once teachers translated the questions, students attempted them correctly. At the end of the exercise, students showed their assessment score to teachers. On the whole formative assessment/interactive exercise results showed very good results.

At the end of the interactive exercises, most of the teachers collected tablets and took students back to the classroom from AV room. However, two teachers concluded the topic in a very interesting way after students completed their exercises. They asked students reflective questions and concluded the topic and then allowed them to move to their classroom. Benefits on the whole technology aided lessons showed positive effects on students' participation, engagement and learning outcomes. One of the important findings of the study were that the teachers used student-centered teaching methods. Students' excitement was visible from their eagerness to respond to teachers' questions.

Students' participation in Science and Mathematics classes was more as compared to English classes. It seemed like students didn't completely understand English voice over in the videos. Out of two English teacher, one (T 3) delivered her lessons in Urdu. She probably lacked English speaking skills. Two of six teachers were found bit shaky probably because of the presence of researchers in the Audio-Visual room during lesson demonstration. They did not share clear instructions, so students were found bit confused in performing activities. They also lacked skills to engage students in discussion. Rather they sought responses of questions from few students sitting on the front rows. Rest of the teachers exhibited very good communication skills, displayed good confidence and maintained smooth transitions between technology and non-technology tasks.

4.2 Effects of ICT Integration on Teachers

Effects of ICT integration on teaching was codified under the following sub-categories;

Table 2

Category and sub-categories for themes on effects of ICT integration on teachers

Effects of ICT integration on teachers' teaching	Shift in teaching practices
	Increased interest in teaching
	Made teaching easier
	Improved content knowledge
	Improved technological skills

4.2.1 Shift in Teaching Practices

During focus group discussions when teachers were asked about the contribution of ICT integration to teaching, all teachers agreed that their teaching practices have improved since they have started integrating ICT. They reported that their old teaching practice of merely delivering lecture has been replaced by discussion and cooperative methods of teaching. Most of the teachers reported that the use of videos and tablets has significantly contributed to their teaching and positively influenced their teaching methods. Talking about shift in teaching practices, one of the teachers reported that:

> In traditional classroom, most of the time I used to teach through lecture method. But here in AV room, I engage students in discussions, class activities and projects as well.

4.2.2 Increased Interest in Teaching

Another theme that emerged from focus group discussions was increased teachers' interest in teaching. All teachers reported that use of videos and tablets has increased their interest in teaching and made teaching easier for them. One of the teachers expressed that it has become easy for her to explain difficult topics in AV room with videos and tablets. Another teacher shared that it takes her less time to explain topics because videos are self-explanatory, so she doesn't have to spend much time on explaining topics. Another teacher shared that use of videos and tablets has increased her confidence and interest because students take more interest and she enjoys teaching with videos and tablets. Referring to her increased interest in teaching, one of the teachers maintained that:

> Students take a lot of interest when taught through videos and tablets in AV room. Students' expressions of interest in learning boost my interest to teach as well. So, yes, ICT integration has increased my interest and motivation to teach.

4.2.3 Made Teaching Easier

Most of the teachers also agreed that ICT integration has made their teaching easier. One of the teachers reported that students would not take interest in learning in traditional classroom. Science and Math used to be boring subjects for them. But now when you tell them that they are going to learn Math or Science in AV room, they become excited. They watch videos with a lot of interest and then assess their own learning on tablets. One of the teachers said:

> A topic that requires three to four classes to teach in a traditional classroom is easily covered in one class in AV room through story-based videos. It saves a lot of energy and time. Students understand things easily and quickly.

4.2.4 Improved Content Knowledge

Another important theme extracted from the focus group discussion was improvement in content knowledge of teachers. Most of the teachers agreed that the digitized content has improved their conceptual understanding of the subjects. One of the teachers told that:

> The digitized content has also improved my content knowledge. There were few topics which I was not very much clear about, but after watching video content and teaching students in AV room, my own understanding has improved.

4.2.5 Improved Technological Skills

ICT integration helps teachers improve their technological skills as well. Few of the teachers reported that her technological skills have also improved owing to ICT integration. She shared that: "ICT integration has not only improved my content knowledge and pedagogical skills, but also technological skills."

4.3 Effects of ICT Integration on Students

Talking about the contribution of ICT integration to students' learning, all teachers agreed that it has improved students' assessment results, increased their interest, participation, engagement and collaboration. They also reported that the integration of videos and tablets in lessons has also resulted into increased students' attendance and enrollment.

Table 2

Category and sub-categories for themes on effects of ICT integration on students

Effects of ICT integration on students	Better understanding of concepts
	Increased interest in learning
	Active learning
	Improved assessment results
	Increased attendance
	Increased enrollment

4.3.1 Better Understanding of Concepts

All teachers agreed that ICT integration has improved conceptual understanding of their students in Science, Mathematics and English subjects. One of the teachers reported that technology integration has positive effects on her teaching and students' learning. When she shows students videos and discuss the concepts, they understand the concepts very easily. Students consider videos as cartoons and pick every information provided in the videos. They like to share whatever they watch in videos.

> Students' understanding of the subjects has improved. Videos contain story-based content of the subjects which is very much relevant to their daily life. It is because of the videos and flipbooks that students have started loving Science.

4.3.2 Increased interest in learning

Another important finding of the study was increased interest of students due to ICT integration. One of the Science teachers maintained that in traditional classroom students do not take much interest nor do they understand the concepts especially in science subject, but they understand concepts very easily when they watch videos and read flipbooks. A teacher of Mathematics also endorsed the statement. Another teacher agreed and told that videos contain story based animated content and students like animations very much therefore students' interest in learning is very high. One of the teachers reported that:

> Students' interest has increased manifold due to ICT integration. In traditional classroom students get bored and even fall asleep during lecture, whereas they take interest and actively participate in ICT integrated lessons in AV room.

4.3.3 Promotes Active Learning

Most of the teachers shared that ICT integration has not only increased students' interest in learning, but has also improved their class participation and collaboration. One of the teachers shared that in traditional classroom students rarely participate in discussions and activities, but as a result of ICT integration, they participate more. One of the teachers testified that students participate actively when I ask them any questions related to the topic while watching video. They happily take part in lesson activities and discuss their learning with me when I teach them in AV room. Another teacher said that students participate a lot in group activities during lesson in AV room. One of the teachers shared:

> When in AV room, even weak students take more interest and actively respond to my questions whereas they never participate in any discussion in traditional classroom. So,

ICT integration has also improved students' participation.

4.3.4 Improved Assessment Results

Another important finding of the research study was improvement in students' assessment results due to ICT integration. All teachers agreed that ICT integration has improved students' assessment results. One of the teachers reported that students become regular due to ICT integration, when they are regular and learn through videos and tablets, they understand better. When they understand better, their assessment results improve. So, ICT integration has had very good impact on students' assessment results. Another teacher shared that at the end of the lesson when students attempt interactive exercises, most of their responses are correct. Another teacher testified the statement and said, students retain information very easily after watching video which helps them perform better in assessments. One of the teachers shared that:

> Tablets and videos have had a positive impact on students' formative and summative assessment results. Interestingly, improvement in results has only been seen in Science, Mathematics and English subjects. That clearly shows that the improvement in results of these subjects has happened only because of Audio-visual ads.

4.3.5 Increased Students' Attendance

Most of the teachers also agreed that ICT integration has also improved students' attendance and reduced drop-outs. One of the teachers said that those students who were irregular or were about to leave school became regular. Another teacher reported that:

> Most of the students who would stay absent frequently have become regular. Even the students who were on the verge of drop-out due to lack of interest in learning have also become regular now after ICT integration in our school.

4.3.6 Increased Students' Enrolment

The teachers also informed that ICT integration has not only improved students' attendance, but also increased enrollment. One of the teachers told that four hundred students were enrolled when she joined the school 4 years ago, but after AV room was established and LED and tablets were provided, enrolment jumped so high that they have 900 students in their school now and it's mainly due to technology integration project. One of the teachers reported that:

> ICT integration has tremendously impacted students' enrollment. In last 4 years, enrollment has rapidly increased and doubled due to ICT integration.

Generally, the findings of the study indicate that ICT integration has positively

contributed to teaching and learning. Teachers' attitude towards technology integration was positive and their ability to use digital resources for teaching in AV room was also encouraging.

5. Discussion and Conclusion

The findings of the study indicated that all teachers and head teachers consider ICT integration as an important step to improve the quality of education in Public Private Partnership schools. Most of the teachers upheld that ICT integration has positively contributed to their teaching and students' learning. When asked about the contribution of ICT to teaching and learning, few of the frequently cited quotes were "ICTs have increased students' interest", "Students' learning outcomes improved due to ICT integration" "My interest and motivation to teach have increased" and "Technology has made teaching easier for me". All these findings were validated during lesson observations. Such responses from teachers reflected their positive attitude towards ICT integration. According to Technology Acceptance Model (TAM) of Davis (1989) the most crucial concepts are for the use of technology are Perceived Ease of Use and Perceived Usefulness that influence the intention to use technology. Celik and Keskin (2009) maintained that effective technology integration in classroom depends on teachers' positive perceptions.

The findings of the study also gave evidence of student-centered teaching where teachers where actively engaged in supporting and facilitating students. All teachers used discussion and cooperative teaching methods. In two lessons of Science, Project Based Learning was observed in which teacher assigned students projects to be completed at home and present in the next class. Most of the teachers displayed good skills of involving students in discussion while watching videos and doing group works. Corroborating to these findings Tezci (2010) says technology is a substitute to teacher centered classrooms and admits that technology has not only changed the way learners learn but has also changed the way of teachers' teaching.

On the whole, the findings of the study showed that ICT integration was effective not only in improving students' interest, participation, engagement and learning outcomes, but also in improving teachers' teaching practices. Zehra and Bilwani (2016) substantiate the same finings and state that technology integration increases students' engagement, interest, excitement and collaboration. Students actively participate in learning activities and learn better when technology is integrated in teaching and learning. The use of technology is very effective for teaching as it doesn't only improve teaching and learning, but also makes teaching easier. Findings of another research study conducted by (Le Thi, 2020) authenticate the findings of this research, which state that ICT integration encourages students to communicate more with their classmates and also increases

their confidence to actively participate in the class. It also supports teachers to change their teaching from teacher centered to student-centered, providing students opportunity participate actively in the learning processes.

Students actively participated in the discussions and answered teachers' questions. Smeets, Gennip and Rens (2009) emphasized that when technology was not available emphasis was merely on information transmission, but due to technology integration emphasis has transferred to construction of knowledge. Students actively participated in activities and collaborated to finish the tasks in due time. Jung (2005) corroborates the same finding and states that teaching with technology promotes collaboration and develops thinking skills as well as results student-centered teaching. Tezci (2010) argues that the proper use of technology can increase students' participation and interactivity and shift the teaching and learning to students from teachers. Opara and Oguzor (2011) confirm this finding and opine that most of the students like using creative ways to learn; only few prefer traditional style of teaching.

The study concluded significant insights into teachers' attitude towards ICT integration in classroom, contribution of ICT to teaching and learning and the challenges in ICT integrated teaching and learning. Although ICT integration appeared to have positive impact on teachers' teaching, students' learning, enrollment and attendance. However, lack of training, administrative support, inadequate resources and technical issues in digital equipments interrupted the process of effective ICT integration in the schools.

6. Recommendations

On the basis of the findings, following recommendations are proposed to all stakeholders especially Public Private Partnership organizations, school administrations and teachers.

1. Adequate digital resources may be provided to the schools so that all students can benefit from them
2. The digital resources that have already been provided must be properly maintained and repaired when they have technical problems.
3. Follow-up visits should be planned quarterly and classroom-based support should be provided to teachers.
4. Digitized content should be updated in accordance with the changes in syllabus.
5. Head teachers should be provided training so that can play their part in ensuring effective implementation of ICT integrated projects.
6. School operators should be trained to play leadership role for effective ICT integration.
7. More schools should be supplied with digital equipments and digitized content.

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Citation of this Article:
Roshan, M., Ahmed, M., Bano, S., & Hussain, N. (2022). Effectiveness of Information and Communication Technology (ICT) Integrated Teaching and Learning in Primary Schools. *International Journal of Innovation in Teaching and Learning (IJITL)*, *8*(1), 53-69.