USES OF DIGITAL TECHNOLOGY BY TEACHERS AND STUDENTS AT SENIOR SECONDARY LEVEL

Ms. Mitarani Barik[1] & Ramakanta Mohalik[2], Ph. D.

[1]*Research Scholar, Regional Institute of Education, Bhubaneswar*

[2]*Associate Professor, Regional Institute of Education, Bhubaneswar*

Abstract

The main purpose of this study was to investigate the uses of digital technology by teachers and students for teaching, professional development and learning at senior secondary level. The survey was conducted on 20 teachers and 155 students of senior secondary CBSE affiliated schools located in Bhubaneswar, Odisha, India. Self-developed questionnaire consisting of 51 items for teachers and 36 items for students based on different aspects of digital technology was used as tool. The study found that (i) 95% of teachers are aware of internet and are using effectively in their teaching as well as professional development, (ii) all teachers have knowledge on software like MS Word, MS Power Point, MS Excel etc. and they agreed that digital technologies are helping them in teaching effectively,(iii) all students have Smartphone at their residence, (iv)96.12% of students are familiar with software like MS Word, MS Power Point, MS Excel etc and know how to use it for learning, and (v) 72.25% of students admitted that lack of time due to heavy homework are the barriers for not using digital technology for leaning. The study has suggested implications for teachers, students, schools and also for Government.

Keywords: Digital Technology, Professional Development, ICT, Educational Applications, Digital Devices

Introduction

Digital technology plays an important role in facilitating student's learning. It encompasses digital devices, tools, systems, techniques and resources that generate, process and store data and information including gaming application, social media, learning application, productivity application and mobile devices. It not only enhances the teaching, but also exposes the learners to new and different kinds of learning. Digital technology includes all types of electronic equipments and applications that communicate with the human being by taking raw data and transferring it in the form of information. It is now considered as a basic need in 21st century and it is spreading like a spider wave. Most important advantage is that now days some digital technologies are affordable and can be used by many people for their advancement in any field, because digital technology can help a person in any aspect of life. Digital technology becoming a part of classroom transaction in 21st century classroom. Now

all the stakeholders are interested to use digital technology in the field education for variety of purpose. It seems essential for the teacher and students of digital age to develop digital literacy and competency for succeeding in educational endeavour. This study investigated the uses of digital technology by teachers for their teaching and professional development and students for their learning purpose at senior secondary level.

Rationale of the Study

Digital technology is becoming a most demanding necessity of the world. Using digital technology in educational field is a complementary thing and if teachers and students are using digital technology in their teaching-learning process, the education will get a progressive direction. Digital technology can be integrated in teaching-learning process. Teachers and students can use digital technology for teaching learning as well as teacher's professional development. Relating to this issue the investigator has gone through various researches which are discussed in following paragraphs.

Mohalik et.al. (2018) reported that majority of teacher trainees possesses digital devices and interested to use for learning and teaching. Bulfin and Scott (2016) revealed that students like to use technology but they can use if schools provide a good resource support. Rebecca and Sanna (2015) reported that the difficulty of not using technology isdue to lack of resources. Charles and Yidan (2014) revealed that use of ICT is more in other work in compare to pedagogical work**.** Public school students use ICT in pedagogical work more than that of private schools. Urban school students use ICT in pedagogical work in compare to rural students.Nowell and Shanedra (2014) found that students are finding difficulties in connecting the use of technology with studies. Chan and Sigh (2014) concluded that most of the teachers have positive attitude towards ICT use and more knowledge create more positive attitude towards ICT. Hatlevik and Ove (2013) has conducted a study on digital competence at the beginning of upper secondary school: identifying factors explaining digital inclusion and this study on senior secondary level gives positive and students are using technology in a good way. Gurung. (2013) found that the participant personal digital engagement overlapped with their digital use inside the classroom. Mwalongo (2011) found that the frequency of use of ICT is influenced by access, the competency of ICT use is influenced by training and teachers use ICT in a wide range in teaching, professional development, administration and personal use.

All these studies are conducted distinctly and less study are conducted at senior secondary level for examining the uses of technology by teachers and students. Few studies have been conducted to examine the uses of technology by teachers for their professional development. After going through all these researches the investigator conclude that few studies are conducted particularly for examining the uses of digital technology by both teachers and students for their teaching-learning process and their professional development, especially at senior secondary level. Hence it is relevant to study uses of digital technology by teachers and students at senior secondary level.

Statement of the Problem

The present problem would be stated as "Uses of Digital Technology by Teachers and Students at Senior Secondary Level"

Objectives

1. To examine the uses of digital technology by the teachers of senior secondary level for teaching and professional development.
2. To examine the uses of digital technology by the students of senior secondary level for learning.

Methodology

The survey method was adopted for studying the uses of digital technology by teachers and students at senior secondary level. The data were collected by using self-developed questionnaire which contains check list, open ended questions and close ended questions. Total 51 questions for teachers and 36 questions for students were prepared containing availability of digital technology, familiar technologies, ways of using digital technologies and barriers of using digital technologies. 20 teachers and 155 students at senior secondary level were selected purposefully from Government CBSE schools from Bhubaneswar, Odisha. The content validity of the tool was ensured by expert teachers at senior secondary level of DM school. The collected data are analyzed by using frequency and percentage and accordingly interpretations are made.

Analysis and Interpretation

The investigators analyzed the data using frequency, percentage and qualitatively, which are presented in two sections as follows.

A. Uses of Digital Technology by Teachers

Table-1: Availability of Digital Devices for Teachers

Sl. No.	Digital Devices	Residence Frequency (%)	School Frequency (%)
1.	Desktop	14 (70)	20(100)
2.	Laptop	15(75)	0(0)
3.	Tablet	5(25)	0(0)
4.	I-Pad	2(10)	0(0)
5.	Smartphone	16(80)	0(0)
6.	Whiteboard	0(0)	15(75)
7.	Camera	6(30)	12(60)
8.	Internet	19(95)	20(100)
9.	Scanner	1(5)	20(100)
10.	Printer	2(10)	20(100)
11.	Computer Lab	0(0)	20(100)
12.	Digital school calendar	0(0)	20(100)

Table-1indicates the availability of digital devices of senior secondary teachers at their residence as well as at school. The above table has two parts such as availability of digital devices at residence and availability of digital devices at school. The first part of the table reveals that 95% of teachers have internet connection at their residence and 80% of teachers have Smartphone. Further, 75% of teachers have laptop and 70% of teachers have desktop at their residence. The table also reflects that 30% of teachers have digital camera and 25% of teachers have tablet at their home. Only 10% of teachers have i-Pad and 10% of teachers have printer at their residence. The table also indicates that all the schools have desktop, scanner, printer and internet connection in computer lab. Further, 75% of schools have interactive whiteboard and 60% of schools have digital camera, but no schools have laptop, tablet, i-Pad and Smartphone.

Table-2: Teachers Familiarity with Applications/Softwares

Sl. No	Software	Frequency (%)
1.	Google+	16(80)
2.	Google Chrome	20(100)
3.	Slide share	10(50)
4.	WhatsApp	17(85)
5.	Facebook	12(60)
6.	Khan academy	5(25)
7.	e-Pathshala	8(40)
8.	S planner	2(10)
9.	MS Word	20(100)
10.	MS Excel	20(100)
11.	MS PowerPoint	20(100)
12.	MS Access	9(45)

Table-2indicates various software that the senior secondary teachers familiar with. All teachers use Google Chrome, 80% of teachers use Google+ application, 85% of teachers use WhatsApp and 60% of teachers use facebook. 50% of teachers are familiar with Slideshare application, 40% of teachers are familiar with e-Pathshala and 25% of teachers use Khan Academy application.Further, all teachers are familiar with MS Word, MS Excel and MS PowerPoint but 45% of teachers have knowledge in MS Access.

Table-3: Activities Done by Teachers with Digital Technology for Teaching

Sl. No.	Activities	Frequency (%)
1.	Collecting information	20(100)
2.	Collecting resource materials	19(95)
3.	Preparation of presentation	17(85)
4.	Prepare tasks for students	18(90)
5.	Collect reference	19(95)
6.	Getting new strategy	19(95)
7.	Preparation of TLM	12(60)
8.	Giving feed back	12(60)
9.	Provide assignment	12(60)
10.	Collect teaching videos	13(65)

Table-3 reflects the various kinds of activities done with the help of digital technology by senior secondary teachers. All teachers use digital technology for collecting information,95% of teachers use digital technology to collect various resource materials,85% of teachers use digital technology to prepare presentation and 90% of teachers prepare students for exam digitally. Further, 95% of teachers use digital technology to collect reference and also same percentage of teachers use technology for getting new strategies of teaching. 60% of teachers use digital technology to prepare TLM, 60% of teachers use technology to provide assignment and also same percentage of teachers use technology to give feed back to students and rest 65% of teachers use technology to collect teaching videos.

Table-4:Digital Technology for Professional Development (PD)

Sl. No.	Activities	Frequency (%)
1.	Action Research	17(85)
2.	Assessing learners	17(85)
3.	Admission work	12(60)
4.	Administrative work	12(60)
5.	Searching new job	9(45)
6.	Getting higher degree	8(40)
7.	Different online courses	9(45)
8.	Getting information about PD activity	15(75)
9.	Self study	17(85)

Table-4 indicates the activities done with the help of digital technology for the professional development of senior secondary teachers. 85% of teachers do action research by technology, 85% of teachers use digital technology for assessing the learners. 60% of teachers do both admission and administration work with the help of digital technology. 45% of teachers use technology for searching a new job, 40% of teachers use technology to get a new degree. 45% of teachers do online courses, 75% of teachers get information about professional developmental activity through digital technology. 85% of teachers use digital technology for self study.

Table-5: Barriers for Teacher in Using Digital Technology

Sl. No.	Barriers	Frequency (%)
1.	Insufficient time	7(35)
2.	Lack of skill	4(20)
3.	Lack of interest	0(0)
4.	Problem in internet access	7(35)
5.	Lack of pedagogical support	6(30)
6.	Lack of infrastructural facility	10(50)
7.	Pressure to complete syllabus	9(45)
8.	Pressure from administrative work	6(30)

Table-5indicates all the various kinds of barriers that the senior secondary teachers face while using digital technology. The barriers are lack of facilities in school (50%), pressure to complete syllabus (45%), lack time and internet access (35%) and lack of pedagogical support and pressure for administrative work (30%).

B.Uses of Digital Technology by Students

Table-6: Availability of Digital Devices for Students

Sl. No.	Digital Devices	At Residence Frequency(%)	At School Frequency (%)
1.	Desktop	105(67.75)	155(100)
2.	Laptop	98(63.22)	0(0)
3.	Tablet	56(36.12)	0(0)
4.	I-Pad	6(3.88)	0(0)
5.	Smartphone	155(100)	0(0)
6.	Whiteboard	0(0)	106(67.38)
7.	Internet	136(87.75)	155(100)
8.	Scanner	14(9.03)	155(100)
9.	Printer	34(21.94)	21.94%
10.	Computer Lab	0(0)	0%

Table-6has two aspects such as availability ofdigital devices at residence and availability of digital devices at school. All the students have Smartphone at their residence and 87.75% of students have availability of internet at their home. But 67.75% of students can use desktop and 63.22% of students use laptop at their home. Further, 36.12% of students have tablet at

residence but only 3.88% of students have availability of i-Pad at residence. All the schools have desktop, scanner, printer, computer laboratory and internet connection as reported by students.

Table-7: Students Familiarity with Applications/Softwares

Sl. No.	Software	Frequency (%)
1.	Google+	88(56.78)
2.	Google chrome	153(98.71)
3.	Slide Share	29(18.71)
4.	Edmodo	0(0)
5.	LinkedIn	10(6.45)
6.	WhatsApp	117(75.48)
7.	Facebook	96(61.94)
8.	e-Pathshala	29(18.71)
9.	MS Word	149(96.12)
10.	MS PowerPoint	145(93.55)
11.	Photoshop	71(45.81)

Table-7 indicates that 98.71% of students are using Google chrome software on a regular basis. Among all social networking sites 75.48% of students use WhatsApp and 61.94% of students use facebook for their learning purpose but 56.78% of students use the application Google+ for getting back up data. Further, only 6.45% of students use the application LinkedIn for getting update with some current news as well as to connect with some intellectual people according to their interest area. Some students (18.71%) use slide share application to get presentation according to their need. But only 18.71% of students use e-Pathshala for online learning purpose. No students use the application Edmodo for their learning purpose. 96.12% of students know the use of MS Word and 93.55% of students know how to use MS PowerPoint but 45.81% of students are familiar with the use of Photoshop (Graphic software).

Table-8: **Various Activities done by Students with Digital Technology**

Sl. No.	Activities	Frequency (%)
1.	Collecting information	150(96.78)
2.	Collecting resource material	133(85.81)
3.	Preparation of PPT	119(76.78)
4.	Preparation for examination	122(78.71)
5.	Using subject related apps	97()62.59
6.	Online learning course	39(25.16)
7.	Scanning image	55(35.48)

Table-8 reflects the various activities done by senior secondary students using digital technology. 96.78% of students use digital technology for collecting learning information and 85.81% of students use digital technology for collecting resource materials on school subject.

78.71% of students use digital technology for preparation of examination and 76.78% of students use it for preparation of PPT and other project work. 62.59% of students use digital technology to use various subject related application for better understanding. Only 25.16% of students use digital technology to do online courses and 35.48% of students scan different images using digital technology.

Tabl-9: Barriers for Students in Using Digital Technology

Sl. No.	Barriers	Frequency (%)
1.	Insufficient time	112(72.25)
2.	Lack of skill	98(63.22)
3.	Lack of resource at school	37(23.88)
4.	Lack of interest	35(22.59)
5.	Problem in internet access	62(40)
6.	Lack of pedagogical support	38(24.52)
7.	Lack of infrastructural facility	45(29.03)

Table-9 indicates different types of barrier faced by students of senior secondary level in using digital technology. The barriers are insufficient time (72.25%), lack skills (63%), problem in internet connection (40%), lack of infrastructure facility (29%) and lack of pedagogical support from school etc.

Major Findings

Uses of Digital Technology by Teachers

- 95% of teachers have internet connection, 75% of teachers have laptop and 70% of teachers have desktop at their home. On the other hand only10% of teachers have printer, i-Pad like digital technologies at their residence.

- Only 5% of teachers have done online course. All teachers use digital technology for collecting information. 95% of teachers use digital technology for collecting reference, new strategies and resource materials. 90% of teachers use digital technology for student's assessment. 85% of teachers use digital technology for preparing presentation. On the other hand 70% of teachers use digital technology for scanning image, 65% teachers collect teaching videos with the help of technology and 60% of teachers prepare TLM and give feedback to students through digital technology.

- 85% of teachers use digital technology in their professional development for action research, for assessing the learner and for self study. On the other hand 45% of teachers use digital technology for online courses, getting new job and 40% of teachers use digital technology for getting higher degree.

- The barriers are lack of infrastructural facility, lack of technical support, pressure for preparing students for examination and insufficient time to use digital technology.

Uses of Digital Technology by Students

- All students have Smartphone at their home. 67.75% of students have desktop, 65.81% students have digital camera and 63.22% of students have laptop at their residence. Only3% of students have i-Pad and 21.94% of students have scanner and 9.03% students have scanner at their residence.

- 81.94% of students prepare documents through technology. 83.22% of students are using WhatsApp group for sharing learning information. 94.84% students agreed that uses of digital technology increase their learning skill as well as their interest. 96.78% of students use digital technology for collecting information and 76.78% of students use digital technology for preparing PPT. Only 25.16% of students use digital technology for doing online course.

- The barriers for students to use digital technology are insufficient time for using digital technology and lack of technical support at school.

Result and Discussion

The study found that teachers are using digital technology often in teaching. Teachers are making proper use of desktop, laptop, smartphone, internet, software like MS Word, MS PowerPoint and applications like WhatsApp, Facebook, Twitter, Khan Academy and e-Pathshala etc. Teachers have positive perception toward teaching with interactive whiteboard. So in overall view teachers have positive opinion towards using digital technology. But there are many barriers for not using digital technology that is insufficient time, lack of resources and also pressure from school administration. It also indicates that teachers are getting many helps from digital technology in their professional development such as they are doing action research, assessment, doing online course, finding new job and also getting higher degree etc. So digital technology is not only useful in teaching but also becoming an integral part of professional development. This result is supported by Li, Lan (2015), who found that most of the teachers have competency in technology and they are using significantly in classroom, but this study also oppose that some teachers are not aware of the regular development in technology, Chan and Sigh (2014) who reported that most of the teachers have positive attitude towards using ICT in teaching-learning process. Mwalongo (2011) who found that teachers are using ICT more in professional development and are getting various kinds of

benefit in their profession when digital technology is integrated.But result of this study is contradicting the findings of Mohalik and et.al. (2018) who reflected that though majority trainees are familiar with digital technology, but they don't know how to use it in teaching learning process. Mndzebele (2013) who found that though teachers have interest to use technology in teaching-learning process, but school doesn't have enough resource to support it.

The second important findings of the study indicates that students of senior secondary school are using digital technology with interest and passionately in learning and are getting positive result with it. Students are using digital technologies starting from desktop, laptop, smartphone, internet, different software and application etc. Students are more likely to use WhatsApp as a social networking application in learning purpose. Students are also using applications like Khan Academy and e-Pathshala for online learning. But students are facing difficulties while using digital technology, like lack of resources at school, lack of technical support and also for sufficient time.The result of the study is supported by Armistead(2016) who indicated that digital technology has a positive impact on student's learning. Bulfin and Scott(2016) who reported that students have interest to use digital technology, but there should be technical support from school.But result of some of the study is contradicting the findings of the present study like Gurung (2013)who reported that students using digital technology inside and outside the classroom are overlapped and they cannot able to differentiate it.

Educational Implications

- In 21st century every work is possible through smartphone even teaching-learning process. The present study indicates that only 20% of teachers use smartphone for sharing information and only 15% of teachers are using to download important information. Hence teachers should be oriented and encouraged to use digital technology specially Smartphone for teaching learning purpose.

- When talking about integration of technology in teaching-learning processes first of all preparing documents and PPT for presentation are come to mind, so every teacher should be aware of this. This study reflects that all teachers are familiar with MS Word, MS Excel and MS PowerPoint, 3.88% and 45% of students are not familiar with MS Word and MS PowerPoint respectively. So the computer teacher and subject teachers can take extra class to teach students about the use of MS Word and MS

PowerPoint. Teacher can provide some online assignments and projects to students for developing digital skills.

- This is digital era and as a teacher of senior secondary level every teachers are supposed to have the minimum availability of digital devices like desktop, laptop etc. From the study it is clear that 25% of teachers don't have desktop, so they must be encouraged to obtain these digital devices. The government can provide financial help to teachers for purchasing digital devices on nominal interest. Schools also don't have laptop or i-pad like digital devices, so educational administration should provide these digital technologies for the improvement in teaching-learning process.

- In digital age everyone is possessing digital technologies including students who are digital native obtaining technical knowledge by birth. This study indicates 67.75% of students have desktop and 63.22% of students have laptop who are using it in learning process, but every school have desktop, so school should provide enough facility to those students to use desktop in their learning and fostering them to improve their knowledge.

- The school authority must provide facilities to both teachers and students for using digital technology for the purpose of teaching and learning. Students must be given periods in computer laboratory for exploring materials and videos on different subjects, which can enlarge students understanding. Similarly, teachers must be allowed to prepare PPTs and create short videos on school subject, which can be utilized for teaching.

Conclusion

The study uncovers that teachers and students of senor secondary level are aware of using digital technology in teaching-learning process, but all teachers are not familiar with digital technology and all students know about digital technology but are getting confused to use it in learning purpose. Hence teachers need orientation programme to get updated with various emerging uses of digital technology in teaching as well as professional development and students need some more guidance from teachers and parents.The study has been conducted in a short period so the investigator cannot cover all possible dimensions, but if further study is done on this issue then many changes can bring in the area of digital technology in teaching-learning process. Every classroom can be converted to digital classroom and every subject will include digital strategies to make the learning more practical an effective.

References

Armistead. S. (2016). *Digital Technology-From Vision to Action. Journal of Teachers andCurriculum, 16(1), pp.7-15.*

Bulfin & Scott, (2016). *Nagging, Noobs and New Tricks - Student's Perceptions of School as a Context for Digital Technology Use. 42(3), pp.239-259, http://dx.dol.org/10.1080/03055698.2016.1160824.*

Chan. S & Singh.T. K. R. (2014). *Teacher's Readiness on ICT Integration in Teaching-Learning: a Malaysian Case Study. International Journal of Asian Social Science 2014, 4(7), pp.874-885.*

Charles. B.A. & Yidan. I. (2014). *Implementation of ICT Learning: a Study of Schools in Ghanaian Secondary Schools. Procedia-Social and Behavioural Sciences, 191, pp.1282-1287.*

Gurung. B. (2013). *Digital Engagement: Learning Experiences Alternative High School Students within a Technology Integrated Triad Model. Unpublished PhD Thesis. New Maxico State University.*

Hatlevik & Ove (2013). *Digital Competency at Beginning of Upper Secondary School: Identifying Factors Explaining Digital Inclusion. Computer and Education, 63,pp.240-247, http://dx.doi.org/10.1016/j.compedu.2012.11.015.*

Li, lan (2015). *How and Why Digital Generation Teachers Use Technology in The Classroom: An Explanatory Sequential Mixed Methods Study. International Journal for the Scholarship of Teaching and Learning, 9(2), http://doi.org/10.20429/ijsotl.2015.090209. .*

Mndzebele. N. (2013). *Teachers Readiness in Uses of ICT in Classroom-The Case of a Developing Country. International Journal of Educational and Technology, 3(8).*

Mohalik, R., Panda, B.N., Agarwal, P.C. & Sethy, R. (2018). *Digital Literacy among Teacher Trainees at Secondary Level. NCERT Sponsored Research Study of RIE Bhubaneswar.*

Mwalongo. A. (2011). *Teachers Perception about ICT for Teaching, Professional Development, Administration and Personal Use. Internal of Education and Development using ICT,7(3), pp.36-49.*

Nowell&Shanedra. D. (2014). *Using Disruptive Technologies to Make Digital Connection :Stories of Media Use and Digital Literacy in Secondary Classroom. Journal of Educational Media International,51(2), pp.109-123,*

Rebecca. S &Sanaa. A. (2015). *Investigation to Undergraduate International Students, Use of Digital Technology and their Application in Formal and Informal Settings. 12th International Conference on Cognition and Exploratory Learning in Digital Age.*