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Digitalising education: Teacher's perceptions towards integration of ICT in education

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Abstract

“Information and Communication Technology” (ICT) has transformed the education by providing tools and technologies that enhance teaching, learning, and administrative processes. It has the capability to upgrade the quality and reach of education, and prepare learners for the challenges of the digital age especially in a country like India with limited resources and mass population.

The present study has been carried out to examine the teacher's perception regarding using ICT for teaching, its effectiveness and to identify important elements in its effective utilisation. It further examined the challenges in its application in education.

The survey revealed that teachers find teaching resources and materials available online more updated and useful. They can refer to it for designing more interesting and engaging lesson for students. It further revealed that the application of ICT promotes active and engaging lesson for students' best learning experience.

The findings reinforce the need to give proper training to both teachers and students in order to promote use of technology in education effectively. Institutional support for making latest hardware and software available, reliable network, power backup and free Wi-Fi facility are other important element for integrating the technology with traditional teaching successfully.

Keywords: Barriers to incorporation of technology with traditional education, digitalising education, effective elements of integrating ICT in teaching, modes of ICT application in teaching, online teaching

Introduction

“Information and Communication Technology” (ICT) has a critical role in transforming education by providing access to information, facilitating interactive learning experiences, promoting collaboration and communication, enabling personalized learning, improving administrative efficiency, supporting teacher professional development, promoting access and inclusion, and facilitating flexible and scalable educational models. ICT has the potential to enhance the quality and reach of education, preparing learners for the challenges of the digital age. It has transformed the education by providing tools and technologies that enhance teaching, learning, and administrative processes.

Educators and learners have started appreciating the advantages of utilising ICT (Information and Communication Technology) tools in education like flexibility, availability of a lot of information, ease of taking classes in online mode, and so on. It has upgraded teaching learning process. Therefore, governments have also started thinking of keeping the connection of online teaching along with offline mode alive to improve the teaching learning process. In fact, the University Grants Commission (UGC) has asked Universities to adopt India's “Massive Open Online Courses (MOOCs)” program through the SWAYAM^[1] platform to help students in their academic and professional growth. According to its notification in the Gazette of India^[2], institutes can offer up to 40% of the overall courses of the program for each semester through online mode on SWAYAM portal. Adu, & Olatundun, (2013)^[1], has rightly remarked that in this era of rapid change, one can teach students to be participants in this journey of growth only through incorporation of ICT in education. ICT has revolutionized the way people work today and are now transforming education systems.

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¹ SWAYAM- “Study Webs of Active-Learning for **Young** Aspiring Minds”

² http://www.ugc.ac.in/pdfnews/2682897_SWAYAM-Regulations-20-40percent.pdf

If schools train children in yesterday's skills and technologies they can not be effective and fit in tomorrow's world. This is a sufficient reason for ICTs to win global recognition and attention.

Before moving further, it is imperative to understand meaning of ICT in an educational set up.

ICT: ICT means Information and Communication Technology

It has three components:

Information: Information is the summarised data, facts and figures presented in such a way that one can derive meaningful inferences therefrom.

Communication: Communication is the process of dissemination of knowledge and information.

Technology: Technology refers to the mode of disseminating information.

Thus, ICT denotes the medium through which knowledge is passed on to students/learners by teachers. ICT comprises communication tools and applications such as computer, softwares, hardwares, networks, satellite communication, mobile technology, video conferencing, RFID Technology, WI-FI zone, Internet, www, Web2.0 and social media among others.

Application of ICT in education brings flexibility, makes the system more powerful, effective, interactive, and interesting, broadens the knowledge paradigm, increases opportunities of learning, and creates rich learning environment. It has power to extend the teaching learning activity beyond the class room. (Asongue and Roux, 2017)^[4].

ICT can improve the quality of higher education by promoting experimentations, researches, and innovations, adopting the new approaches in the teaching –learning process and integrating the new information with the best practices. In 1998, “UNESCO world Education Report” emphasised the significance of ICT in higher education to generate quality education. Recently ICT has become significant tool in education set up. ICT has also played a vital role in providing distance education very effectively. ICT provides online delivery of courses, online assessment, and online design courses to large number of students at a time. The ICT based system like digital libraries, online courses, audio, and video conferencing contribute significantly to the area of E- Learning

Usage of ICT in Education in India: In India, usage of ICT in education was started few decades back. In 1975-76, India introduced the ‘Satellite Instructional Television Experiment’, a satellite-based educational program. This initiative broadcasted health and hygiene-related content to over 2000 villages across six states in India. The implementation of “INSAT” (Indian National Satellite System) marked a significant milestone in the history of Indian educational technology. The Educational television broadcasts started through INSAT satellite in 1982 in Orissa and Andhra Pradesh and after that they were extended to some other states like Maharashtra and Uttar Pradesh.

Now INSAT cover whole country and various educational programs are being broadcast by it, as the vital aim of the INSAT is to bring the rural people into national mainstream.

In 2004, another satellite called EDUSAT3 was launched for educational purposes. The National Policy on Education 1986, modified in 1992, emphasized the use of Educational Technology to enhance the quality of education. The Curriculum Framework (2005) also recognized the crucial role of ICT in education at school level. The “Sarva Shiksha Abhiyan” (SSA), an initiative by the Indian Government aiming for Universalization of Elementary Education (UEE), underscores the significance of ICT in the education sector. The Central Advisory Board of Education (CABE) highlighted the extensive utilization of ICT as a vital aspect of schooling in its 2005 report on Universal Secondary Education. The Indian government has been implementing diverse measures to incorporate ICT in the education sector, enabling the seamless dissemination of information and communication across all educational domains.

ICT has greater potentialities and a promising future in India due to two reasons. Primarily, India possesses one of the most significant ICT workforce globally and there is a growing awareness among the educationists, students, and other stakeholders on the emerging role of ICT in enhancing the education process and its outcome. Secondly, India being the country with second highest population with almost 60% of the population living under impoverished conditions, it is of utmost importance to make educational systems affordable and flexible to suit the needs of different people. This can be made possible by integrating ICT with traditional methods of teaching and learning system. Information technology can be seen as the growth engine that has the potential to shape India into a Knowledge Economy and Society.

In this backdrop, the current study has been conducted with the following objectives:

1. To examine teacher's perception regarding use and effectiveness of integrating ICT in education.
2. To identify effective elements in use of ICT effectively in education from the viewpoint of teachers.
3. To identify major challenges restricting application of ICT in education from the viewpoint of teachers.

Literature Review

The literature review, which explores the existing research on the utilization and efficacy of ICT in education, has been organized based on the objectives of the current study.

Use and Effectiveness of ICT

Very few studies have been conducted to analyse the perceptions of teachers regarding the use ICT in education such as Mbatha (2016)^[21], Kayisire and Wei (2016)^[15], Delport *et al* (2016)^[6], Helm (2015)^[11], Albugami and Ahmed (2015)^[3], and Kumpel *et al*, (2015)^[8] An examination of existing literature indicates that teachers generally hold favourable opinions regarding ICT, and there is a direct link between their attitudes towards ICT and their willingness to incorporate it into education. Sylvestre, Zhao, Haiyan & Hitimana (2017)^[9] conducted a study to identify how teachers view the integration of ICT into the teaching and learning processes in Rwanda's primary schools.

³ GSAT-3, also recognized as EDUSAT, is designed for remote classroom education, spanning from school level to higher education. It represents the country's inaugural "Educational Satellite," offering satellite-based two-way communication to classrooms for the delivery of educational content.

It revealed that the essential factors for integrating ICT into TLP included having access to technological tools, appropriate infrastructure, and the necessary skills. The results of this research were reinforced by the studies of Koehler, Mathew, Mishra, Kereluik, Shin & Graham (2014)^[34]; Schmidt, Thomson, Koehler & Shin (2009)^[35]; Mishra & Koehler, (2006)^[36]; and Fullan (1993)^[37].

Ghavifekr, *et al.* (2016)^[8] revealed that reduced time in delivering the content, enhanced job performance, increased productivity, effectiveness in teaching are key elements to teachers' perceived usefulness of tools of ICT. Lau & Sim, (2008)^[19] in their study investigated the degree of ICT implementation among secondary school educators in Malaysia. The study concluded that utilisation of ICT in the field of education promotes better learning experience among learners as it enables teachers to effectively address the diverse requirements of students.

Cox, Preston & Cox (1999)^[38] discovered that numerous educators consider ICT as a tool to enhance material presentation, create enjoyable learning experiences for students, and streamline administrative processes. Studies by Shamim and Raihan (2016)^[39]; Ringstaff & Kelley, (2002)^[40]; Pelgrum (2001)^[22]; and Reeves (1998)^[42] indicated that employing ICT tools enhances fundamental skills and knowledge, fosters higher-order thinking, creativity, and research abilities among students.

Factors influencing Integration of ICT in Education

In a study by Jagadesh M (2017)^[13] in relation to the factors impacting the efficient utilization of ICT in "teaching and learning process" (TLP), it has been noted that time, location, context, content selection, and the method of delivering instructions while employing ICT tools are pivotal elements that enhance the teaching and learning experience.

Venkatesh, *et al.* (2016)^[31] in their study revealed that acceptability by learner is a major factor influencing the usage of ICT tools in education. On-site technical assistance is also found to be an essential factor for developing ICT skills amongst educators. The findings of the study are supported by other research studies such Lau & Sim, (2008)^[19]; Schiller (2003)^[27]; Cox, Preston & Cox (1999a)^[38]. Thus the literature review suggests that use of ICT and its integration into education is dependent on teachers' readiness, confidence, knowledge, and ability to use ICT in educational set up.

Challenges to the Usage of ICT

Studies by Igbo & Imo (2017)^[12]; Kayisire & Wei (2016)^[15]; and Lloyd, Byrne & McCoy, (2012)^[20] showed that four primary obstacles hindering the integration of ICT in education are: (1) Insufficient skills necessary for incorporating ICT into teaching and learning methods; (2) Insufficient availability of technological tools; (3) Inadequate infrastructures; and (4) Lack of motivation among teachers resulting from their financial compensation. In addition to the above, studies by Asongu & Roux (2017)^[4], Tabira & Otieno (2017)^[29] and Bornman (2015)^[7] identified that lack of technical support, inadequacy of online contents, organizational culture, administrative initiatives and views of

teachers about education and willingness to change are also important factors restricting the usage of ICT in education.

A study by Ghavifekr, *et al.* (2016)^[8] revealed that limited accessibility and network connection, insufficient technical support, lack of effective training, and teachers' incompetency to use ICT were the major challenges in incorporating ICT with traditional teaching.

Tedla (2012)^[43] in his research about integrating ICT in education in many African Countries, found that ICT integration is not dependent on one factor, but several interrelated factors directly or indirectly affect the usage of ICT into classroom instructions. He classified the factors restricting utilisation of ICT in education into manipulative, non-manipulative factors. Studies by Lloyd, Byrne, & McCoy, (2012)^[20]; Grainger & Tolhurst, (2005)^[44] and Cox, *et al.* (1999)^[38] too have identified many factors restricting the utilization of ICT for teaching. These elements encompass accessibility to electronic resources, software and hardware quality, user-friendliness, incentives for adaptation, school policies that offer support, dedication to continuous professional development, and formal training in ICT background.

Research Design and Methodology

Research Design: A self-structured questionnaire is framed to collect data through primary survey and convenience sampling method is followed to collect data. The questionnaire was sent to about 800 faculty members of University of Delhi. It was followed by telephone calls, reminders, and e-mail reminders to the respondents. Total responses received were 107 suggesting a response rate of 13.4 per cent.

The questionnaire consists of three sections. The first section collects the profile of the respondents. The second section seeks responses about use and effectiveness of ICT tools in education. The third section tries to capture the viewpoint of the teachers on elements significant for effective utilisation of ICT for education and challenges to its usage.

According to the theme devised in Literature review, following hypotheses have been considered to carry out analysis

H1: Teachers of University of Delhi perceive ICT to be useful in Education

H2: Teachers of University of Delhi perceive ICT to be effective in imparting knowledge in Education

H3: Teachers of University of Delhi perceive the listed elements to be highly important for integration of ICT with traditional methods of teaching

H4: Teachers of University of Delhi perceive the listed factors restricting the usage of ICT in Education

Research Method: The study has used the mean, standard deviation, ANOVA analysis for examining perceptions regarding use and effectiveness of ICT in education.

Result Analysis and Discussion

Demographic Details of Respondents

The information relating to socio-demographic variables is presented in Table 1.

Table 1: Respondent Analysis

Socio-Demographic Variables	Frequency	Percent
Gender		
Male	26	24.3
Female	81	75.7
Age		
Less than 30 Years	25	23.4
30 Years -50 Years	59	55.2
more than 50 Years	23	21.5
Educational Qualification		
PG	16	15.0
M.Phil.	35	32.7
Ph. D	56	52.3
Teaching Experience (Years)		
Less than 10 Years	37	34.6
10 Years -20 Years	27	25.2
More than 20 Years	43	40.2
Location of College		
North campus	39	36.4
South campus	29	27.2
Off campus	39	36.4
Job Status		
Ad-hoc	39	36.4
Temporary	8	7.5
Permanent	60	56.1
Position		
Assistant Professor	72	67.3
Associate Professor	33	30.8
Professor	2	1.9
Education Stream		
Science	19	17.8
Commerce	69	64.5
Humanities	19	17.8
Teaching style		
Traditional (Chalk and Talk)	9	8.4
Modern (using ICT tools)	19	17.8
Mixed	79	73.8
Pre-hand Knowledge of ICT Tools		
Low	9	8.4
Medium	67	62.6
High	31	29.0
Total	107	100.0

It shows that majority of participants are females (75.7%). It seems to be gravitating towards one gender i.e. females however, it is not true. In reality, the proportion of female teachers in colleges of “University of Delhi” is greater than male teachers. So, the sample is a true representative of population. Maximum number of participants (67.3%) are assistant professors whereas 30.8% are associate professors and rest 1.9% are professors. Most of the respondents (73.8%) are using a combination of traditional and modern methods of teaching. Most of them (62.6%) have medium level of knowledge of ICT tools. Further, 43.9% of the respondents use ICT tools very often and 35.5% of the respondents use the technology sometimes.

Regularity of Use of ICT Tools for Teaching

The analysis of the survey findings indicated that only 14% of the teachers surveyed always use ICT tools in education. A major section of the respondents (43.9%) use ICT tools

very frequently though nearly 3.7% of the respondents rarely or never uses ICT tools in education. It affirms that most of the teachers have accepted ICT tools as a new norm in education and they do try to use these while teaching.

Table 2: Regularity of Use of ICT Tools in Teaching

How frequently You use ICT tools	Frequency	Percent
Always	18	14.0
Very Often	47	43.9
Sometimes	38	35.5
Rarely	2	1.9
Never	2	1.8

ICT Tools used in Teaching

The analysis of survey results (Table 3) further revealed that MS office and video conferencing are the most popular tools used by teachers while teaching. Use of you tube links, Google doc/sheets and websites is also satisfactory.

Table 3: ICT tools used in Teaching

ICT Tools	Always	Very Often	Sometimes	Rarely	Never
MS-Office	37 (34.58)	39 (36.45)	24 (22.43)	3 (2.8)	4 (3.74)
Google Doc/Sheets/Forms	12 (11.21)	45 (42.06)	26 (24.3)	12 (11.21)	12 (11.21)
Video Conferencing	24 (22.43)	34 (31.78)	30 (28.04)	9 (8.41)	10 (9.35)
You-Tube Links	4 (3.74)	29 (27.1)	42 (39.25)	16 (14.95)	16 (14.95)
Pod- Casts	0 (0)	7 (6.54)	12 (11.21)	28 (26.17)	60 (56.07)
Blogs	1 (0.93)	8 (7.48)	22 (20.56)	31 (28.97)	45 (42.06)
Websites	5 (4.67)	37 (34.58)	36 (33.64)	9 (8.41)	20 (18.69)

Communication Tools used in Teaching

E-mails and What's App are identified as the most

frequently used tools used by teachers to provide the content (Table4).

Table 4: Communication Tools used in Teaching

Communication Tools Used	Always	Very Often	Sometimes	Rarely	Never
E-mail	27(25.23)	28(26.17)	38(35.51)	10(9.35)	4(3.74)
What's App	49(45.79)	39(36.45)	19(17.76)	0(0)	0(0)
Telegram	1(0.93)	9(8.41)	14(13.08)	28(26.17)	55(51.4)
Messenger	1(0.93)	5(4.67)	17(15.89)	25(23.36)	59(55.14)
Skype	0(0)	2(1.87)	8(7.48)	27(25.23)	70(65.42)
Chat Room	7(6.54)	18(16.82)	18(16.82)	12(11.21)	52(48.6)
Google Talk	11(10.28)	17(15.89)	18(16.82)	13(12.15)	48(44.86)

Technology used to deliver the Content

The survey result showed that 89.7% of respondents prefers to use Google meet and Google classrooms is used

by 69.2 of the respondent teachers. More than half of the respondents use Zoom platform too.

Table 5: Technology used in Teaching

Technology used to deliver the Content	Frequency	Percent
Google Meet	96	89.7
MS Teams	16	15.0
Zoom	58	54.2
Google Classroom	74	69.2

Need of Integrating ICT with Traditional Teaching Methods

The 93.5% of the teachers were of the opinion that it is high

that they need to integrate online teaching into our education system.

Table 6: Need of integrating ICT with Traditional Teaching Methods

Response	Frequency	Percent
Yes	100	93.5
No	0	0
Can't Say	7	6.5
Total	107	100

Reliability Test of the Questionnaire

The reliability of the questionnaire was tested through Cronbach's coefficient. The value of Cronbach's coefficient alpha for each factor is more than 0.7, hence the survey results are reliable.

results) as given in Table 9 showed that teachers, in general, find ICT tools highly useful in delivering the content to students. Respondents perceive that use of ICT assist them in preparing teaching material by providing them with diverse teaching resources to use. They feel that integrating ICT into teaching allows students to learn at their individual pace. Therefore, H1 is accepted.

Teachers' Perception towards Usage of ICT in Education:

The survey results (mean values and t-test

Table 7: Teachers Perception towards Use of ICT Tools in Education

Statements	Mean	Rank	S.D.	Test Value = 3	
				t	Sig. (2-tailed)
ICT tools help in adopting /upgrading T-L process in the changing face of time	4.48	1	0.805	18.974	0.000
ICT helps in preparing teaching material	4.17	2	0.863	14.000	0.000
ICT minimize the time of delivering the content	3.60	7	1.089	5.681	0.000
ICT tools provide diverse teaching resources to use	4.15	3	0.711	16.721	0.000
Introvert students become more responsive through online teaching	2.09	9	1.062	0.546	0.586
Class management is bit difficult in on line teaching mode	2.94	8	1.054	-0.551	0.583
It's difficult to have full attention of the students in on line mode of teaching	3.89	4	1.031	8.909	0.000
ICT tools helps in learning at student pace, in a student centric environment	3.68	6	1.024	6.890	0.000
Online assessment lacks integrity	3.78	5	1.040	7.716	0.000
Total of Use	3.84		0.523	16.676	0.000

Teachers Perception regarding Effectiveness of ICT Tools in Education

Survey results as shown in Table 10 reveal that teachers find ICT highly effective in imparting knowledge. They perceive that ICT provides greater opportunities to increase the efficiency in teaching and it also helps in broadening the horizon of contents to be delivered. The survey also

revealed that teachers find usage of ICT enhances teaching learning process and provide new skill set to teachers. As mean values of the statements are more than 3 and t-test value is significant, therefore, H2 is accepted. The findings are in confirmation with the findings of other studies such as Ghavifekr & Mohammed (2015)^[9], Cox *et al* (1999)^[38]; and Davis (1989)^[45].

Table 8: Teachers Perception regarding Effectiveness of ICT Tools in Education

Statements	Mean	Rank	S.D.	Test Value = 3	
				t	Sig. (2-tailed)
Teaching is easier and much fun with ICT tools	3.80	5	1.085	7.660	0.000
ICT provides greater opportunities to increase the efficiency in teaching	4.08	1	1.011	11.097	0.000
ICT enable students to study effectively	3.83	4	1.068	8.054	0.000
ICT enhance T-L experience and provide new skill set to teachers	4.07	2	0.859	13.053	0.000
ICT helps in broadening the horizon of contents to be delivered	4.04	3	0.921	11.655	0.000
Students can be more engaging with ICT tools	3.52	8	1.160	4.666	0.000
Students can absorb well even without the using ICT tools	2.87	8	0.995	1.749	0.183
Students put less efforts in case ICT tools are involved in teaching	3.56	9	0.903	6.426	0.000
Assessment and assessment of students is much easier with ICT tools	3.60	6	1.027	6.027	0.000
Total Effectiveness	3.74		0.638	12.038	0.000

Teachers' Perception regarding Important Elements for Integration of ICT in Education:

The survey (Table 9) has revealed that factors like readiness amongst teachers and acceptability by learner are very important elements influencing the utilisation of ICT tools in education. Reliable network, power back up, and

institutional support for making latest hardware and software available are other important factors which will enhance the involvement of ICT for teaching. Besides this, there is also need to provide for teachers' training to enhance their skills in ICT. As mean values of the statements are more than 3 and t-test values are significant, H3 is also accepted

Table 9: Teachers Perception regarding Important Elements for Integrating ICT for Education

Statements	Mean	Rank	S.D.	Test Value = 3	
				t	Sig. (2-tailed)
Readiness amongst teachers	4.19	7	0.870	14.109	0.000
Provision of teachers training to usage of ICT tools	4.08	8	0.779	14.405	0.000
Reliable network and power back up	4.21	6	0.991	12.684	0.000
Institutional support for making latest hardware and software available	4.21	6	0.959	13.005	0.000
Assistance with technical matters and Periodic maintenance	4.28	3	0.960	13.803	0.000
Availability of software that are easy to learn	4.36	2	0.840	16.804	0.000
Administrative initiation for using ICT	4.25	4	0.837	15.485	0.000
Administrative provision to provide hardware and software to students	4.22	5	0.904	14.010	0.000
Free Wi-Fi to students	4.06	9	1.045	10.458	0.000
Acceptability by learner	4.39	1	0.898	16.037	0.000
Total Factors	4.23		0.737	17.211	0.000

Teachers' Perception regarding Challenges faced in Using ICT for Education and Road Ahead:

To examine various factors restricting the incorporation of ICT for teaching, questions were framed regarding challenges to the utilization of ICT for teaching. The survey results (Table 10) reveal that lack of ICT skills among teachers and

students and insufficient availability of appropriate computer rooms, software are two important barriers restricting its utilisation in education. There is also need to give incentives to teachers to incorporate ICT tools with traditional teaching. The mean values and significant t-test values indicate that H4 is accepted.

Table 10: Teachers Perception regarding Challenges to Usage of ICT in Education

Statements	Mean	Rank	S.D.	Test Value = 3	
				t	Sig. (2-tailed)
Lack of suitable teaching content	3.17	7	1.094	1.590	0.115
Lack of ICT skills among teachers	3.89	4	0.816	11.249	0.000
More time consuming	3.71	5	0.952	7.720	0.000
Lack of incentives to integrate ICT tools with traditional teaching	3.94	3	0.856	11.407	0.000
Lack of adequate computer rooms, software	4.20	2	0.829	14.924	0.000
Lack of ICT skills among students	3.55	6	0.983	5.801	0.000
Lack of personal touch between students and teachers in online teaching	4.50	1	0.692	22.495	0.000
Challenges and Road Ahead	3.85		0.584	15.095	0.000

Summary and Implications

Results and Implications

The study investigated the perceptions of teachers of “University of Delhi” regarding use and effectiveness of ICT in education. The main finding and their implications are listed below:

1. The survey has revealed most of the teachers are prepared to use ICT tools in education. Nearly 57.9% of them use ICT tools in teaching. MS-office and video conferencing are most popular tools used by teachers while teaching. Majority of the respondents use google meet, google class room, and zoom platform while teaching.
2. The study has revealed that respondents find ICT tools highly useful in teaching. ICT tools provide them with diverse teaching resources and helps in preparing teaching material. Usage of ICT in teaching minimizes the time taken for delivering the content. It also helps students to study at their individual pace as content is available online. It creates student centric environment. So, it benefits both teachers and students. In all, it leads to enrichment of teaching learning process. The survey results reiterate the findings of King, Jorgensen, Lussier, Fichten, Havel, Amsel and Podma (2017); Igbo & Imo (2017) ^[12]; Kayisire & Wei (2016) ^[15]; Tarus (2015) ^[30]; Ghavifekr, Zabidi, Muhammad, NgY, Yao & Zang (2014) ^[10].
3. The study has revealed that teachers find ICT highly effective in imparting knowledge. It broadens the horizon of content to be delivered and provides greater opportunities to increase efficiency in teaching. It makes the process of assessment and evaluation much easier. This is in accordance with the findings of Becta, (2003); Lau & Sim, (2008) ^[19]; Barrette (2009) ^[5]; Ghavifekr and Rosdy (2015) ^[9]; and Helm (2015) ^[11].
4. The study investigated important elements in successful implementation and effective utilization of ICT in education. The study results reveal that institutional support and provision for making latest hardware and software available, is very important element in successful integration of ICT with traditional teaching. The findings of the study reiterate the results of other researchers such as Asongu & Roux (2017) ^[4]; Kayisire & Wei (2016) ^[15]; Agbo (2015) ^[2]; Albugami & Ahmed (2015) ^[3].
5. As far as challenges in integration of ICT in education are concerned, lack of adequate computer rooms, software, and lack of personal touch between teachers and students are two important issues to be tackled. Lack of ICT skills among teachers and students is another very important issue that needs to be resolved. The finding of the study reiterates the results of other researchers such as Beggs Kebede & Getenet (2018) ^[16]; Ghavifekr *et al* (2016) ^[8]; Bingimlas, (2009) ^[16]; Khalid Abdullah (2009) ^[17]; Sharma (2003) ^[46]; Pelgrum (2002) ^[42]; and (2000) ^[47].

Suggestion for Education Policy

The findings of the study contribute to a better understanding of the teachers' perception regarding use and effectiveness of ICT in education and main factors limiting its implementation. From the results and discussion, one can

safely conclude that for successful and effective integration of ICT tools with offline teaching, the efforts should be aimed at:

1. Arranging basic institutional set up i.e. computer labs with sufficient number of computers and software to cater to the load of students in colleges.
2. Educating basic computer literacy to students in the initial years. This way they will be equipped to the field of digital education with the help of ICT.
3. Providing sufficient funds to institutes for infrastructure set up.
4. Organizing workshops/seminars to upgrade skill set of teachers so that they can integrate ICT with traditional teaching.
5. Providing assistive technology to differently enabled teachers/students to equip them to use ICT in education to promote inclusive education.

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