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# A Literature Review and Classification of Researches in ICT

**Mrs. Jyotsna Bisht Patwal**

Research Scholar, Department of Education, Banasthali Vidyapith, Banasthali, Rajasthan

**Dr. Ajay Surana**

Head of Department, Department of Education, Banasthali Vidyapith, Banasthali, Rajasthan

**Mr. Anand Singh**

Dean (U.G Courses), S.C. Guria Institute of Management & Technology, Kashipur, Uttarakhand, India

## ABSTRACT

*This paper presents a literature review and classification scheme of ICT research. The literature review consists of many papers or articles published in journals/magazines/news/websites that are appropriate outlets for researches in ICT in education. The results show that an increasing volume of ICT research has been conducted in education area. The papers or articles are classified and results of these are presented, based on a scheme that consists of three main categories: school level, teacher education and higher education. A comprehensive list of references is presented. This review will provide a rich literature source for anyone interested in research in ICT in education and help simulate further research.*

## I. INTRODUCTION

21<sup>st</sup> century is characterized with the emergence of knowledge based society wherein ICT plays a pivotal role. In the modern era, Information and Communication Technologies (ICT) play a crucial role in the way that society functions. Today we see that there is hardly any aspect of our life which is untouched by the effect and use of ICT. ICT is also widely utilizing in the field of education. Today we are using ICT in our classroom teaching, distance and online education and also in all types of formal and non- formal education and providing knowledge and competency to the new generation for proper use of ICT in their work. The future of the economy and the citizens' prosperity are strongly correlated with ICT integration in every aspect of life.

ICTs stand for information and communication technologies and are defined, for the purposes of this primer, as a "diverse set of technological tools and resources used to communicate, and to create, disseminate, store, and manage information." These technologies include computers, the Internet, broadcasting technologies (radio and television), and telephony.

## 2. RESEARCH METHODOLOGY

In this paper, Information and communication technology literature has been classified into three categories. First researches done in school level are reviewed which include the researches done in the field of education related to ICT. In second part researches related to teacher education are review and discussed which include researches done related to ICT in teacher education. In third part review related to higher education was discussed which include all the researches done in higher education (U.G. and P.G.) related to ICT. Finally issues in the literature review are identified and discussed.

## 3. CLASSIFICATION

The classification framework is based on the literature review and the nature of researches in ICT, which mean to give an understanding how the subject has evolved and progressing. The articles were classified into three categories.

(i) School level (ii) Teacher education (iii) Higher education

The detail discussion of the reviews are as follows-

### 3.1 School level

In this part, we will discuss the researches related to ICT done in school level.

S.No.	Researcher	Year	Findings
1	Uma, V.	2000	In the teaching of chemistry, for the information analysis related to chemical calculation, for report writing, for the data collection in the laboratory and for various works related to research, the computers are proving to be more useful. The students who are disabled and use wheel chair can acquire knowledge more easily by using computer. The students who can not turn pages of books with their hands due to physical inefficiency can acquire knowledge by computer screen. The students who have less capability to listen can acquire knowledge through telecommunication electronic mail and online service.
2	Mridula, D. Ranade	2001	The study found that the response of students to CAI has been overwhelmingly positive. It led to greater inter student interactions.
3	Salvy, P.	2002	The study found that Computer Assisted Instruction is effective than traditional method.
4	Subramanian and subramani	2004	The study found that digitalized environment approach established the positive results on the attainment of the concept formation among the primary school section.
5	Singh, Meenakshi and Asha Pandey	2004	The study found that the teachers has positive views regarding computer introduction in schools. Also, no significant difference was found in the opinion of teachers in terms of gender and age but there was significant difference in terms of subject and teaching medium.
6	Tahilyani, Dheera	2006	The computer based mindtools produced positive effect on achievement of students at upper primary level.
7	Narendra Imaandar, Radhika	2007	The study found that mostly teachers use traditional methods to teach geography. The use of computer in teaching was found negligible but most of the teachers accepted that the use of the computer in classroom teaching will be effective. It was also found that CAI is effective in geography teaching. The geography teaching through CAI is effective for the students having high intelligence and middle intelligence but it was not found effective for students having low intelligence.
8	Vandana, Mehra and dilli, rajneva	2009	The study found that the teachers has positive attitude towards ICT. So, ICT should be given priority in teacher education. So that the teachers could face various challenges in the future.
9	Bisht, Jaya	2010	A web resources module was made by the help of search engines and key words. 98.51% teachers have the positive opinion towards the module.
10	Bisht, Jyotsna	2010	The study found that the teaching through CAI in Mathematics subject has positive effect in the student's achievement. Also, the students and teachers has positive attitude towards CAI in Mathematics subject.
11	Sharma, Pramod Kumar	2014	The study found that leaving almost 10% of schools, mostly schools has satisfactory number of computers. But

			the availability of softwares was very less in most of the schools. The teachers have freedom to work on computer in most of the schools and mostly the teacher's use ICT in their teaching. The electricity was available for computer work in most of the schools but the computer repairer are very few in schools.
12	Bisht, Champa	2015	The study found that in Uttarakhand state, the availability of ICT resources in the schools of Pauri district is less in rural area than in urban area as compared to Nainital district. According to the principals of the school ICT was used in class weekly and sometimes the teacher faces the problem of less knowledge, time and distance to use ICT in their teaching. Also teachers accept the necessity of computer knowledge for the effective use of computer in schools.
13	Parmar, Ashok	2015	The study was conducted to the teachers of Secondary school which are running according to Gandhiji's educational view in Gujarat. It was found that there was no difference in the attitude of teachers in terms of gender and educational qualification but there exist difference in terms of age. The attitude of teachers whose age is greater than 40 years is found more than the teachers of less than 40 years of age.
14	G. Rameshwari and R. Ramar	2016	The study found that to teach science subject with e-learning technique to the student having less intelligence is more effective than traditional method.

**b) Researches related to Teacher Education**

S.No	Researcher	Year	Findings
1	Narayan Swami, M. and Thanga Swami, S.	2001	35% of the teachers related to DIET uses the computer. 20% of the teachers of teacher education institutes uses computers. Near about 65% and 85% of the teachers of both institutes accepted that they are not competent in doing various types of work in computer. Teachers accepted that pre – service training on the use of computer should be given. In present in-service teachers also need technical training to use computer. There is need of including computer and technical training in various educational opportunities and training practices.
2	S. Rajshekhar	2003	It was found from the study that the female pupil teacher has more positive view towards the use of computer than the male pupil teacher. Also, Urban and under graduate female pupil teachers has more favourable view towards the use of computer.
3	Varanasi, Lalini, Sudhakar and V.	2004	Today, the education is changing. We can do our work on the basis of technology and can use it in teaching learning. In present, there is need of technology training to the pre- service as well as in- service teachers. The teachers are not able to accept it at the initial and wide level.

4	Pareek, Rekha	2005	The study found that the studying pupil teachers, teacher educators and principals of teacher education institutes in Rajasthan have positive attitude towards the curriculum of computer. All accepted that computer education is need of today.
5	G, Sheela	2006	The study found that there is no difference in the attitudes of teacher educator towards teaching ICT in terms of gender and locality. The attitude towards teaching ICT was found more in the teacher educator of private college. The attitude towards ICT of teacher educator having less experience of ICT was found to be more positive as compared to the pupil teacher who has more experience of ICT.
6	Saini, Charu	2006	Pupil teachers must learn to integrate pedagogy with technology.
7	Sibichain, K.K. and Annaraja, P.	2010	The study found that the ability of pupil teacher in the use of computer help to improve their techno- pedagogical ability in classroom.
8	Abraham, Jessy and Sharma, Babita	2010	To provide education in this new technological age, the teachers of India need to prepare to deal with new challenges of 21 <sup>st</sup> Century. So, in India there is a need to integrate the components of ICT in teacher education program in such a way so that the teacher can become capable for facing the demands of this noble profession.
9	Roy, Ajit Kumar and Ajay Kumar	2012	The study found that the ICTs is not according to the norms in the B.Ed. colleges. Apart from the arrangement of projector, the status of all other ICTs according to norms in B.Ed. colleges is not satisfactory. None of the college has the arrangement of computer.
10	Akila, S. and Sindhuja, B. (2013)	2013	The teacher education system is an important vehicle to improve the quality of education and teachers. A technological technique for professional development of teachers is to provide courses in basic knowledge about technologies. Thus, it can be said that technologies are the bedrock for national survival and development in a rapidly changing global environment.
11	Kaur, Gurvinder	2013	A sample comprised of 159 B.Ed. trainees of Panipat district. It was found that there was no significant difference for students on attitude and practice of use of ICT based on gender and location of school. The teacher attitude and practice of ICT in teaching do not vary irrespective of their gender and location of school.
12	Maya	2014	The view of pupil teachers towards ICT was found above average. There was no significant difference in the view towards ICT of pupil teachers of government and non government colleges. Lack of English knowledge, nature of college administration, cost of ICT tools, burden of syllabus etc are the factors which effects the use of ICT.
13	Rajpurohit, P.S. And Saxena,	2016	Information and Communication Technology is the main factor for new world economy and for the rapid change in

	A.K.		society. The new ICT tools has made change in communication process and buiseness in society. To provide basic ICT knowledge and ability to teachers is now main technique for the vocational development of teacher. Now it become necessary for teachers to be competent in the use of these new technologies.
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### C. Researches related to Higher Education

S.No.	Researcher	Year	Findings
1	Goswami, Sapan	2005	Female students of technical field do excessive use of internet for e-mail, search engine, for educational work and for job placement. After educational activities internet is used for news, chat room, downloading software and audio-vedio music. Students of non technical field also use internet excessively for e-mail and job placement. But they did less use of e-mail and more use of search engine as compared to the students of technical stream.
2	Vandana, Mehra and Amandeep	2005	The study found that 54% of the post graduate students uses internet for time pass. 53% of the students uses internet for educational objectives and 59% of the student uses internet for chating.
3	Dhamija, Neelam and S.K. panda	2007	The study found that the attitude of Post Graduate students towards the internet is positive. There is no significance difference in the attitude of P.G. students towards internet in terms of gender and locality.
4	Bhowmik, Debashish	2014	ICT have tremendous capability for revolutionary change in the educational process. Its integration in teaching learning process can develop new capabilities and knowledge in the students. The highest benefits of ICT in education can be obtained only if the government provide adequate and proper educational facilities to educational institutions, integrate ICT based activities in school education system, make proper opportunities and planning to develop teachers efficiency, should appoint ICT competent persons to supervise and evaluate the implementation of ICTplannings and should plan to support the proper maintenance of ICT resources.
5	Sony, Chaya; Singh, Beermati and Chaubey, Akhilesh	2015	There is no difference in the technology used by the teachers in terms of gender, age and vocational status but there found significant difference in terms of teaching experience. There found significant difference in the technology used by average and less experienced teachers but there found no difference in the high and less, high and average experienced teachers.
6	Mehra, Vandana and Omidian, Feranak	2015	The study found that the university student of India and Iran shows comparable perception towards e-learning. Male student shows more positive perception towards e-learning as compare to female student. Also, students of Art/education and Science shows comparable perception towards e-learning.

7	Jeevamani, V. And Shivkumar,D.	2017	The study found that there is no significant relation between the use of mobile phone and academic achievement.
8	Patel, Jignese .B.	2017	In the mobile learning context, the 4G technology is the best in our education system. Its full implementation should be on every person of various educational institutions especially of distance education. It will remove every difference made by the time and location in learning process at every stage of education. Students will be motivate to study morewhich will boost educational achievements.Suitable and more educational material is requiredfor this special 4G environment of learning .

#### 4. DISCUSSION:

From the above discussion we see that so many researches are done in the field of ICT and education in school level, in teacher education and in higher education. It is seen from the above literature review that the effectiveness of teaching increases by integrating ICT in education. Also, a positive attitude was found towards ICT in school teachers. Teachers reported some major practical difficulties on implemtation of CAI such as overcrowded classroom, lack of sufficient software, rigid time table, unsuitable resources and lack of training. Also, it is found from the researches that pupil teacher's ability in application of computer helps in improving their techno – pedagogical ability in the classroom.

Above review of literature also conclude that most of the teacher educator has the facility of basic media but a group of educator does not know that how these media or ICT can be used as a part of the education process and some teacher educator do not know that from where they can get media and ICT based material in their subject. It is also seen that the ICT tools are not present according to the norms in the teacher education colleges.

#### 5. CONCLUSION:

The above literature review show that an increasing volume of Information and Technology research in education has been conducted for a diverse range of areas and few areas are identified where more research is required likehow toinclude ICT in teaching learning process, ICT competency of teachers and pupil teachers etc. Research is required on implementation of Ict in education, what are the reasons of non acceptanceof ICT in teacher education etc. More research is required on initiatives taken by government and individualsfor the implementation of ICT in our present education system.

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