

# **Integrating Information and Communication Technology with Pedagogy: Perception and Application**

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## **ABSTRACT**

Information and communication technology (ICT) is a diverse set of technological tools and resources used to communicate and to create, disseminate, store and manage. Its integration with pedagogy may widen and intensify areas and scope of quality teaching-learning. With these presumptions in view the present researchers sought to ascertain if the serving teachers have been utilizing the ICT by integrating it with their ways of teaching. As we know a paradigm shift in the teaching process may be brought about mainly in two areas, viz; in the teacher's role of teaching and (2) in their role of helping the students learn. The technology is expectedly used for supporting new pedagogical methods by accessing remote resources, enabling collaboration, extending educational programs and developing skills for the workplace. In the overall scheme of things, teachers remain central to the learning process. So it is worth ascertaining if the school teachers have appropriate access to ICTs? Do the teachers make use of ICT for knowledge construction such as ICT based lesson planning? What is the discernable impact of the use of ICT on teaching style? What, if any, are the obstacles in utilizing ICTs in the process of teachers' and students self-learning? Are the teachers being given necessary motivation and incentives to participate in professional development activities?

Having adopted qualitative method, a survey was conducted among the students of Teacher Education of Maulana Azad National Urdu University who passed out during the last ten years and have been serving in different types of schools, mainly Government schools, in the states of Madhya Pradesh, U.P and Bihar. The results speaks that the in-service teachers have either no access to the ICTs or the required equipments/apparatuses which are not available as per need or not available at all. Secondly, use of ICT is rather discouraged on various pretexts and lame excuses. In the ultimate analysis, the teachers' knowledge of the ICT plus pedagogy has been eroding with the passage of time. The situation demands immediate and radical reworking of the whole scheme with ground realities as prime factor in focus.

**Keywords:** Information and Communication Technology, ICT access in Government Schools, technology integrated pedagogy

Education around the world is experiencing major paradigm shifts in practices of teaching and learning under the umbrella of ICT enabled learning environment. The move from teacher--centred to learner focussed paradigm is the marked feature of this learning transition.

Changes in the educational environment during the last decade have been phenomenal in that integrating ICT with teaching--learning implies putting pedagogy over technology. To getting mastery in ICT skills is not the only concern,

it involves using ICT to improve teaching and learning. Major emphasis of ICT infusion in pedagogy means to improve learning, motivate and engage learners, promote collaboration, foster enquiry and exploration, and create a new learner centred learning culture. In technology integrated pedagogy learners are expected to collect, select, analyze, organize, extend, transform and present knowledge using ICT in authentic and active learning paradigm. Teachers are expected to create a new flexible and open learning environment with

interactive, experiential and multimedia based delivery system. With the help of ICT teachers and learners communicate and collaborate without boundaries, make learners autonomous and allow teachers to bring the whole world into classroom activities.

For most European countries, the use of ICT in education and training has become a priority since the last decade. However, very few have achieved progress. Indeed, a small percentage of schools in some countries achieved high levels of effective use of ICT to support and change the teaching and learning process in many subject areas. Others are still in the early phase of Information and Communication Technologies adoption. In the United Kingdom (UK) alone, an estimated £567.8 million was spent on ICT in schools, excluding software (Twining and Henry, 2014). This particular investment takes into account special attention given to teachers in providing them with the necessary policy environment, digital curriculum, skills, infrastructure, and professional development to make effective use of ICT in the classroom. Given the substantial size of investment in many countries, other literature sets targets for spending on teacher training suggesting that 30 per cent of funding for ICT integration into schools should be devoted to professional development to ensure that ICT is used effectively (Twining and Henry, 2014). The target is based on the firmly held belief that teacher training and ongoing relevant professional development are essential if benefits from investment in ICT are to be maximized (Infodev, 2015). Meeting international goals [(e.g. Millennium Development Goals (MDGs), Education for All (EFA), World Summit on the Information Society (WSIS)) by 2015 and beyond requires substantial investment in teacher training institutions so that adequate pre-service and in-service training can be delivered (UNESCO-UIS, 2006). The Education for All: Global Monitoring Report (2013/ 2014) states that an education system is only as good as its teachers. While the introduction of ICT in education plays a role in shifting responsibility for learning from teacher to student, ICT does not however remove the need for classroom leadership, nor does it invalidate related traditional teacher skills and practices (Infodev, 2015). Developing teachers' capacity to enhance the quality of learning remains essential, and evidence

shows that education quality improves when teachers are supported and deteriorates if they are not (UNESCO, 2014). While ICT has been used in various ways to support teachers, some of the literature points to the fact that little evidence exists supporting the claim that digital technology has transformed education (Twining and Henry, 2014).

## LITERATURE REVIEW

Balanskat, Blamire, Kefala (2006) carried out a study in national, international, and European schools with the aim to draw evidences regarding the advantages and benefits of ICT in school achievements. It sought to measure the impact of ICT on students' outcomes. The study also tried to establish a link between the use of ICT and students' results in exams. The findings are interesting: ICT has positive impact on students' performances in primary schools, particularly in English language and less in science. Schools with higher level of e-maturity show a rapid increase in performances in scores compared to those with lower level.

In addition, schools with sufficient ICT resources achieved better results than those that are not well-equipped. The study noted significant improvement in learners' performances. Finally, teachers become more convinced that educational achievements of pupils are due to good ICT use. In fact, high percentage of teachers in Europe (86%) states that pupils are more motivated when computers and Internet are used in class.

Many pupils consider ICT tools very helpful in that they help them to do assignments. Teachers see that ICT enables students with special needs or difficulties. It also helps to reduce social disparities between pupils, since they work in teams in order to perform a given task. Students also assume responsibilities when they use ICT to organize their work through digital portfolios or projects. In addition, the study showed that ICT has significant impact on teachers and teaching processes.

Many teachers use ICT to support traditional learning methods, for example, information retrieval in which students are 'passive learners of knowledge' instead of 'active producers enable to take part in the learning processes. In a document entitled 'Teaching and Learning with ICT', Galea (2002) explains how ICT can promote teaching and learning. According to her, there are two

main reasons behind increasing the use of ICT in education in UK. First, ICT can change the lessons' pace: children in modern society need to develop sufficient potentials and skills that enable them to take full advantage from the new opportunities that ICT offers. Secondly, there are groundswells of interest of academic research in UK in how technological tools can enhance the quality of teaching and learning in schools, and so help learners to achieve better outcomes.

ICT enables a higher quality lessons through collaboration with teachers in planning and preparing resources (Ofsted, 2002). Students learn new skills: analytical, including improvements in reading comprehension (Lewin *et al.* 2000). ICT also develops some writing skills: spelling, grammar, punctuation, editing and re-drafting (Lewin *et al.* 2000). Still new technologies encourage independent and active learning, and students' responsibility for their own learning (Passey, 1999). ICT proves that students who used educational technology feel more successful in school, they are better motivated to learn more and have increased self-confidence and self-esteem. It is also confirmed that many students found learning in a technology-enhanced setting more stimulating and much better than in a traditional classroom environment (Pedretti and Mayer-Smith 1998).

The above mentioned studies were done mainly in Europe or in advanced countries in a scenario dissimilar from that of India. India's National Curriculum Framework 2005 states: "the significance of ICT has been widely recognized, but the detailed guidelines and strategies for their "educationally optimum uses have not yet been worked out" (NCERT, 2005, p. 92). NCERT (2005) further points out the irony of India's ICT prowess is the dismal lack of ICT resources in elementary schools. Only 13 per cent of India's government-run elementary schools have computers (Azim Premji Foundation, 2008; Thirumurthy & Sundaram, 2003). The Azim Premji Foundation (2004) found that educational technology in India's rural elementary schools continues to be almost non-existent and having access to even *one* computer would be considered lavish in most rural schools.

Mehta (2005) has found that Indian urban elementary schools are four times more likely to have ICT compared to rural schools. Bharadwaj's (2007) study

of 1,000 ICT equipped elementary schools revealed fewer than six computers per school or about one computer for every 72 students. Less than nine percent of the teachers in the schools surveyed had access to the Internet, whether at school or outside (Bharadwaj, 2007). Where computers are available in India's elementary schools, the emphasis is largely on acquiring computer literacy skills (Iyer & Baru, 2008). ICT is commonly taught as a separate class subject rather than being integrated into the subject matter (Iyer & Baru, 2008).

Thirumurthy and Sundaram (2003) compared how teachers used ICT in six different elementary schools. He discovered that there were no computers in the classrooms in any of the schools; instead children were taken to a computer lab, arranged in groups of three or four, and took turns playing drill and practice games on the computer. Umrani-Khan and Iyer (2009) reported that sharing computer hardware is a common occurrence in India's elementary school computer labs. Thus, at ICT-equipped elementary schools, there tends to be not enough resources for all the children. Whether it be cell phones (Kam *et al.* 2010), computer mice (Pawar *et al.* 2006), or software (Azim Premji Foundation, 2008; Banerjee *et al.* 2007; Linden & Banerjee, 2003; Pal, 2009; Patra *et al.* 2007), it is common for large groups of elementary students in India to share technology resources.

Thirumurthy and Sundaram (2003) found that "teachers often express a stream of concerns about ICT and curriculum integration, namely: misuse, overuse, and overstimulation" (p. 309). While some teachers believe that children will benefit the most only when curriculum is integrated with ICT, most teachers interviewed by Thirumurthy and Sundaram felt stifled by ICT and believed it was "additional work" (p. 309). Some teachers noted they did not feel competent to use ICT and were not satisfied with the minimal ICT training and preparation they received when in college. The Azim Premji Foundation (2008) study had similar findings. They found that the elementary teachers believed that ICT meant extra work and required additional training to be able to use ICT effectively.

In the overall scheme of things, teachers remain central to the learning process. In the process of becoming a teacher in teacher education institutions student teachers learn technological skills. While

making students to learn, any innovative teacher needs to draw diagrams, show pictures, animate some objects to explain critical concepts, even play some video clipping of real time operation. All these multimedia applications can assure very productive, interesting, motivating, interactive and quality delivery of classroom instruction. A number of teacher education institutions incorporate technological skills well in their curriculum. But the important question relates to productive use of their skills in teaching learning process in real classroom situation

### Research Problem and Questions

On November 8, 2015 speaking at 'edNEXT - National Conference on ICT' in School Education in New Delhi, the Union Human Resource Development Minister of India called to every citizen to come forward and contribute towards technology innovation for the benefit of school education. Prof. Ram Shankar Katheria, Minister of State for HRD, said the Prime Minister's new initiative of Digital India would go a long way in ameliorating the prevailing poor conditions of our villages. He stressed upon the need of digitalization in school education. In the process of teacher preparation Maulana Azad National Urdu University's Colleges of Teacher Education educate and train its student—teacher in technology integrated pedagogy and motivate them for its use. The question however remains: Is this know-how put to use in actual school classroom situation? The question that pertinently came into researcher's mind is that how far and how successfully the duly trained teachers have been utilizing their knowledge and learning experience in real classroom situation.

In sum, the researchers sought to explore answers related to the present problem are:

- Do the school teachers have appropriate access to ICTs?
- Do the teachers make use of ICT for knowledge construction such as ICT based lesson planning?
- What is the discernable impact of the use of ICT on teaching style?
- What are the obstacles in utilizing ICTs in the process of teachers and students self-learning?

- Are the teachers being given additional motivation and incentives to participate in professional development activities?

### Methodology

The intent of the present study was to seek a clear understanding of the use of ICT in teaching learning process in Government Schools of Uttar Pradesh, Bihar and Madhya Pradesh, mainly rural schools.

### Method and Sample

The present study was qualitative in nature and pursued through teachers' interviews which were done either telephonically or through mail. Most of the data was collected in literary form i.e. in words rather than in numbers. The sample of the study consisted of the 72 students who passed out of Maulana Azad National Urdu University during the last ten years before 2016 and were serving in different type of schools, mainly Government schools, in the states of Madhya Pradesh, U.P and Bihar.

### Tool and Data Collection

Semi-structured interviews schedule was used as tools for the present study. By keeping the research questions in mind interviews were conducted with the teachers. In the process of data collection teachers were motivated to speak their heart and share their experience, freely, fairly and frankly.

### RESULTS AND DISCUSSION

Having adopted qualitative method, a survey was conducted among the former student teachers (presently working teachers) of Maulana Azad National Urdu University. Those students were approached who had passed out during the last ten years (2007-17) and were serving in different types of schools, mainly Government schools, in the states of Madhya Pradesh, U.P and Bihar. Interpretations of the survey-based facts are given hereunder:

Teachers avowed that in their schools there is no access to ICT. One of the teacher who is on deputation on Block Resource Centre (BRC) in Block Manjha Gopalganj (Bihar) asserted that in the Block there are 130 primary schools but not even a single school has computer facility. Besides, only four of the 750 teachers had exposure to ICT during the pre-service training. But the knowledge even of

these four teachers was not being utilized at all. Of the 130 schools 37 schools have no electricity connection. Although radio is available in every school but the same are out of use. Strangely enough, the concerned department has not made any provision for broadcasting educational radio programs. The students are exposed to radios as and when President and Prime Minister of India address the nation.

One of the teachers posted in Deva Block, Barabanki stated that in her panchayat unit there are 24 primary schools but only a single school, Cheriya has one computer. That lonely computer too has been installed in school office and is likewise used only for office works. She stated all schools in the block are provided with radios, which are used for making the students listen to a single programme, called *Meena ki Duniya*. Teachers doubt educational worth of the same.

As reported in *Hindustan Times* (2013) a survey by NGO JOSH, found that only 57 per cent of government schools were equipped with functional toilets in schools. Only 63 per cent of students reported they had drinking water facilities. In the implementation of RTE norm the biggest defaulters are reported to have been the government schools; most of them lacking even proper classrooms and adequate teachers. Moreover, there was no water and, in a number of cases, no electricity during summer. The student-teacher ratio in many of these schools which being 100: 1, was shockingly low.

Teachers were of the view that ICTs are imperative tools to facilitate and ensure the shift from traditional 'teacher-centric' teaching styles to more 'learner-centric' methods. The teachers are of the firm view that with the help of ICT they may be able to use modern methods of teaching which they were exposed to during the course of training. They will be less likely to use traditional 'transmission-method' pedagogies and tend to practice more "constructivist" pedagogies provided the required facilities are available and they are provided essential exposure to the ICTs. One of social science teachers recounted that having done B. Ed he was very much motivated to use ICT in his class, and, moreover, he was not much disheartened with the unavailability of resources rather he himself brought his laptop to classrooms and showed slides and videos. He noted that it made easy to

make the students understand the concepts of geography. He volunteered another startling of his experiences: students were happy but senior teachers were annoyed and warned him that 'don't use such innovations here otherwise administration would expect all of us to do the same'. Resistance is generally observed while attempting to introduce ICTs into schools, by and large from the teachers themselves. They apprehended that they would lose their worth and turn out to be redundant once technology comes in, essentially due to their perception that it was too late for them to adapt to a new environment. Educators themselves may be sceptical about the effectiveness of using ICTs in school education.

One of the teachers who had been teaching in renowned private school in Bhopal (MP) narrated a different story. She said that whatever they were taught during their training period it was superficial and just like the iceberg. 'Here we are supposed to use smart boards. As and when we use technology, pre and post discussion is very important. All these things I learnt on job'.

Yet another teacher who was serving in a secondary school in U P, was annoyed with the system told with a bit screeching voice, that teacher educators educated them about the art and techniques of teaching but in reality teaching was the last priority in school essentially because the teachers had become there data collector and holder of such and similar information. He lamented by adding that if the administration might have provided computer only for such administrative work the burden of additional (extra/non-teaching) work would have lessened. Language obstacle was another point that the teachers raised: English is the predominant language of Internet and the teachers-learners are hardly efficient to understand most of the content. For developing countries like ours where proficiency in English is not up to the mark, especially in rural and semi-rural areas, language poses a serious barrier to maximizing the educational benefits of the World Wide Web.

Teachers stated that they are able to develop lesson plans with technology integrated pedagogy. But such endeavour is aborted by the non-availability of required resources and absence of attitudinal positivity. Whilst ICTs may be instrumental in promoting class' understanding of and discussion

about difficult concepts, its use can reinforce traditional pedagogical practices and divert focus from the content of what is being discussed or displayed through the tools being utilized. By providing access to updated and additional learning resources, ICTs can enhance teachers' self-learning in his/her subject area.

In response to the query if the use of ICT would bring about any change in their teaching style, the teachers' responded rather assertively in affirmative. The teachers of the panchayat unit under reference recollected their training days and most of them claimed that they were taught with the help of technology and that they still have the content and knowledge in their active memory.

As the introduction of ICTs to aid education is part of a larger change or reform process, promoting and disseminating use of ICTs is vital for its success. Teachers asserted that mere technical mastery of ICT skills is not a sufficient precondition for successful integration of ICTs in teaching. They should rather have proper and positive attitude towards ICT integration.

Most research on ICT use in elementary schools comes from developed nations (UNDP, 2003, 2010; World Bank, 2003). Generally, there is a lack of research on educational institutions in developing nations (Light, 2009; Pal, 2003, 2008; Patra *et al.* 2007; Walsham, 2010). While Indian policymakers expect ICT to usher in promising education changes, they have a limited understanding of how that technology is negotiated in elementary school classrooms. Patra *et al.* (2007) identify this as an outcome of attempting to squeeze macro-level policy expectations into micro-level contexts. At the local school level, there is also a lack of research about the meanings Indian teachers and students assign to computer technology (Light, 2009; Pal, 2008; Patra *et al.* 2007; Walsham, 2010). Researchers have yet to analyze the differences in Indian teachers' and students' interpretations of ICT's educational purposes (Pal, 2008, 2009). Consequently, it remains unclear how and why computer technology is negotiated in India's most basic schooling unit: the elementary school classroom. Identifying and analyzing this discourse addresses the need to develop frames of reference (Pal, 2008) towards a deeper and more collaborative understanding for elementary school computer use (MHRD, 2009).

## CONCLUSION

Teacher responses and overall findings are startling to the extent of being disheartening. In a nutshell, the in-service teachers have neither access nor exposure to the ICTs nor even the required equipments/apparatuses are available as per need; and at most of the places not available at all. Secondly, use of ICT is rather discouraged on various pretexts and lame excuses. As a consequence, there is hardly any use of the ICT and, in the ultimate analysis the teachers' knowledge of the ICT plus pedagogy has been eroding with the passage of time.

The present sample not being too large however presents a dismal view of the overall scenario as prevailing in the samples schools. Such and similar studies deserve to be undertaken at macro level so as to have a comprehensive view of the prevailing situation in totality. On the basis of present study it is however worth asserting that the situation demands immediate and radical reworking of the whole scheme with ground realities as prime factor in focus.

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