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Integration of Information and Communication Technology in School Curriculum

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Abstract

The diffusion of technology resources in education may widen the horizon of the learning domains. Information and Communication Technology (ICT) has been credited as a kind of building block which appears to be basic in laying foundations for a modern society in which the criteria of lifelong learning and adjustment are fulfilled. For developing nations, ICT has proved dynamic enough in increasing the access of education and also in improving the quality and relevance of education for the common mass. ICT resources help students in undergoing reasoning, creativity & problem solving and there exists a positive correlation between the ICT supported academics learning and critical thinking skills. ICT oriented curricula must be augmented by appropriate cognizance at ethical, legal and social level of technology use also as there may be unwanted attempts of plagiarism and software piracy. The formal education system is undergoing a radical change from lecture oriented & teacher centred trend to interactive learning and student centred pattern. ICT inclusion in school system boosts the effectiveness of teachers and improves learning on the part of students and the student achievement is also enhanced when ICT is used in some structured and planned way in formal teaching-learning. On ground level there are some obstacles, from both the teachers and learners perspectives, which stand as barriers in ICT inclusion in the school system.

Keywords: Information and Communication Technology, Lifelong learning, Plagiarism, Software piracy.

In this age of science and technology, the diffusion of technology resources in education may widen the horizon of the learning domains and it is the situational demand that requires somewhat a new kind of pedagogy that must be compatible enough with latest technology as, in such scenario, it may channelize the learning pathway of students to work to achieve the educational objectives. In the beginning, the word technology was construed as synonym to computer and related activity & the entire stress was on

computing only and in early 1990s, there was a kind of paradigm shift in which, instead computing, the processing and retrieval of information was primarily emphasized. The situation became more operational for users with the induction of internet and then the term information and communication technology (ICT) was floated (Pelgrum & Law, 2003). ICTs are defined as all techniques, tools, devices, content, sources, resources which through some digital medium can be used to deliver the information. ICTs comprise hardware and software devices of computers, internet, satellite communication technology, software applications, digital content (interactive in nature) etc. A classroom equipped with ICT resources comprises computers (desktop, lap top), printers, relevant softwares, online as well offline electronic resources, video recording devices, smart boards, television and projectors etc. The ICT resources like audio and video cassettes, e mail, radio and television broadcasts, tele conferencing, audio conferencing and interactive counselling sessions have been profoundly used for various purposes in education (Bhattacharya & Sharma, 2007). With the help of ICT, an information can be presented/ represented in multiple way(s) through different forms like text, table, picture, graph, image etc. as it considers the worth of an information in terms of its usability over the time in different situations. The formal education system with conventional mode of teaching exclusively considers content and for this reason the textbooks, curriculum also focus on the same. As a result of this, classroom learning scenario comprises only concept learning and retrieval thus rote memorization, rehearsal and belching out in examinations by the students dominate the situation. But the contemporary world requires a learner who is capable of undergoing lifelong learning and adjustment in the society so, the curriculum must focus on the performance and competency of the individual. In this regard, the ICT has been credited as a kind of building block which appears to be basic in laying foundations for a modern society (Mikre, 2011) in which the criteria of lifelong learning and adjustment are fulfilled. All over the world, the countries have realized that besides the skills of reading, writing and numeracy at concrete level, the concept and skills of ICT must be imbibed into the educational system so that needs, challenges and requirements of changing society can be met effectively (Noor-ul-Amin, 2013). For developing nations, ICT has proved dynamic enough in increasing the access of education and also in improving the quality and relevance of education for the common mass (Tinio, 2002). By the authorities, the inclusion of technology in the school curriculum catalysed the process to achieve these aspects. Over the years, the countries have been striving for the same and this incorporation of technology has been found useful in all academic subjects (Noor-ul-Amin, 2013). The integration of ICT, as an indispensable component of school curriculum, on the part of curriculum planners paves the ways for achieving the aims and objectives and facilitates the capacity building on the part of teachers by improving their class room teaching practices in the academic disciplines. Moreover, ICT resources help students in undergoing reasoning , creativity (Higgins, 2003) & problem solving (Brush *et al.* 2008) and there exists a positive correlation between the ICT supported academics learning and critical thinking skills (McMahon, 2009).ICT resources have significantly improved teaching, learning and evaluation as they facilitate the learning independent of space and time. The plausible reason behind such positive findings is the fact that technology facilitates the constructive approach of learning as learner centred settings and resource (ICT) based teaching work out in synchronization to enable the students to assimilate the text in context and practice it. Even in Indian context, National Curriculum Framework, 2005 addresses the issue of technology incorporation in teaching- learning situations in such a manner that both the teacher and

students should not be at the passive side of the process with technology as medium of instruction(s) but need to work with some active current with firm control of all kinds of feasible technological inputs that is technology does not dominate the situation but enriches the process as a means of interaction. For Indian school system, the Revised Draft of National Policy on Information and Communication (ICT) in School Education, 2012 focuses on preparing a youth population of technology users who are at ease, comfort with techno- resources and proficient enough to establish & sustain a knowledge based society which in the long run will cater to the socio-economic development of the country and will accelerate it for the competitiveness at global level. As an extension of this policy, the Curricula for ICT in Education (version # .01), 2013 requires the teachers to gauge the educational objectives of technology, views learning as a process comprising the usage of relevant softwares, hardwares and ICT interactions and perceives learner as critical user of ICT as he/she is expected/geared to execute higher order thinking skills and undergo abstraction through problem solving, creativity etc. and all such efforts, in the long run, will prepare him/her to pursue his/her career aspirations. For the integration of ICT in the school curriculum, there should be due consideration(s) of available diverse technological applications and such technology incorporation, in a broad sense, must cater to the educational purposes. The terminal objective(s) of such curricula for ICT in education should be to promote ICT literacy which stands for the tendency and knowledge, on the part of users, to apply devices and tools to probe the content. Also, there must be ample provision for hands on activities, open ended and delving deep tendencies and collaborative learning. Such ICT oriented curricula must be augmented by appropriate cognizance at ethical, legal and social level of technology use also as there may be unwanted attempts of plagiarism and software piracy and all such habits should be discouraged. Instead motivating original creation & presentation of content, feeling glad in doing so, ensuring safety and security parameters of ICT usage, dynamic approach in inclusion of those are technologically deprived and cherishing others' work should be worked out as an essential criteria to meet out the successful integration of ICT, at ground level, in school curriculum.

The Pedagogical Implications of ICT

The traditional model of learning process assumes it as a kind of hard act in which there is no fun, pleasure but seriousness on the part of students and the education programme is compensatory in nature from whom deficit model of learning emerges that is learning is viewed as the identification of lacunae on the part of students. On the basis of such identification students are taught, evaluated, categorized and remediated. Not only schooling but also researches are focused around the identification of weakness of the students rather than their strengths (Bruer, 1993) and these weaknesses are found to be conceptual in nature. The educational system, at broader level, stresses on the categorization and analysis of content rather than bringing coherence among the same (Postman, 1969 and Bruer, 1993). Possibly because of such tendencies on the part of practitioners, there has been no concern on changing or altering the surroundings, scenario that is schooling instead the students are subjected to undergo the change to meet the criteria. Moreover, learning was viewed as merely a process of information transfer from one end to another that is teacher, as dispenser of information, to student, as receiver of information, who are incapable of producing, reproducing from their own. All such practices, ultimately, promote lecture methodology, on the part of teachers, and text reading, memorization and retrieval, on the part of students,

hence reducing learning to just a kind of training for some cause. Also, learning has been analysed as a linear process in which there is a learning track with restricted content domain with pre-determined and validated instructional unit(s) emphasizing only one absolute solution of any problem. Over the decades, the continuous and refined research inputs brought change in the focal areas with respect to learning that it is a natural process as the natural state of human brain is to learn however individuals differ in their learning. Motivating teachers with concern for students and resourcefully rich and interesting environment promote learning among students. Learning as a process is active, contextualized, integrative and social in nature and when students are actively engaged in some meaningful way, they learn better the same if it is done in collaboration with teachers, peers, parents (Vygotsky, 1978). The formal education system is undergoing a radical change from lecture oriented & teacher centred trend to interactive learning and student centred pattern and it has been found that the continuous usage of ICT ultimately turns a learning environment from teacher to student centredness (Lu *et al*. 2010) and among students it promotes a spirit to share, communicate, learn and work together that is it promotes a collaborative learning environment in classrooms (Koc, 2005). Thus, while working with the ICT resources, like computer, trend has changed from learning about computer to learning computer and ultimately to learning with computer (Volman, 2005). So, ICT provides firm foundations to support this shift in the nature of learning process as a whole and the increased student centredness than before.

School is a place where a student gets a wider range of opportunities, as learning activities, in which at least computers, as a type of ICT resource, can be utilized and over the time, internet, as ICT resource, promotes the meaningful and wise usage of computers in schools (Castro Sánchez & Alemán, 2011) because as and when required students can judiciously access, save, present (Khan *et al*. 2011), retrieve, send the information or data. Computers facilitate the manipulation of information and students can make a change and even assess the effect of such change .The immediate feedback while working on computers creates joyful environment for learning and students work more and more so such practising sessions at home or leisure (Lissa, 2008), over the time, improve students' learning (Higgins, 2003) even at university level ICT resources, like computers, enrich students' learning experiences (Saunders & Pincas, 2004). ICT broadens the comprehension domain of students' learning and leads to the significant improvement in achievement in school subjects like science, social science and mathematics (Kulik, 1994). On the part of teachers, these are the technical skills and true perception towards technology which raise the worth of its integration in academic disciplines and in the long run such usage of ICT by the teachers in classrooms may enrich educational outcomes, improve the learning environment (Grabe & Grabe, 2007; Lowther *et al*. 2008 and Khan *et al*. 2011) and inspire the students for their future career and life (Wheeler, 2001). In fact, the ICT integration in the school system boosts the effectiveness of teachers and improves learning on the part of students and the student achievement is also enhanced when ICT is used in some structured and planned way in formal teaching-learning (Higgins, 2003). Though it takes time to develop necessary skills for the instrumental inclusion of ICT in teaching but the advantages can be harnessed exponentially if the teachers, as beginners, initiate the process of inclusion of ICT in teaching-learning scenario with zeal and confidence (Harris, 2002). So, the school as a culture must encompass vision and mission to set the goal, plan to work out the goal and values to cherish in achieving that goal that is ICT inclusion in school curriculum.

Barriers in using ICT in school scenario

Besides the discussed apparent worth, usefulness and relevance of ICT resources in education still on ground level there are some obstacles, from both the teachers and learners perspectives, which stand as barriers in the integration of ICT in the school system. Following section discusses some such barriers in using ICT resources in schools from different points of reference:

Barriers in ICT usage- Teachers' perspective

The attitude of users, that is teachers in some formal education scenario, towards the implementation of technological inputs in routine educational practices matters a lot and the positive attitude of teachers towards communication technologies may enhance the integration of technology, generally computers, in formal teaching and on the part of teachers it may also overcome their reluctance for using technology. In pre-service teacher training, little awareness, lack of experience with respect to the use of ICT devices and operational knowledge of the same in combining with pedagogical content (Honan, 2008 and Yildirim, 2007) in internship and as well as in service level (Yildirim, 2007) keeps teachers inclined towards conventional teaching methodologies, mostly lecture method, so teachers should be motivated to incorporate ICT components in their teaching by making them realize the effectiveness of such resources for their own professional growth (Lim, 2007). At Departmental level, teachers are responsible for their annual class results and their promotion is associated with it so they generally focus on examinations (Liu & Szabo, 2009) and moreover the class size and its managerial aspect may also make the situation more grave in using ICT (Tezci, 2011) but it has been found that the inclusion of ICT will not deviate or disturb teachers from their routine teaching work and above all they, as practioners, may have a direct control on ICT resources. Generally, the teachers acknowledge the worth of technological resources but they don't execute any tendency to incorporate such resources in actual practice as there may be lack of desired level of motivation and improper administrative supports in terms of financial and technical aspects (Liu & Szabo, 2009) so, at in service level, the administrators must ensure the adequate provisions of technical and financial supports in schools (Yildirim 2007; Liu & Szabo, 2009 and Tezci, 2011) and the Department should organize in service programmes for working teachers and special drives for teacher trainees, when they visit schools for internship, to orient them towards the positive impact of student centred and technology oriented teaching practices on learning and learners' achievement so that they may be motivated to perceive that they are using technology not to support their teaching but to promote students participation in learning and making them responsible for their own learning.

Barriers in ICT usage- Learners' perspective

In classrooms, learners are forced to study to score in examinations or prepare for entrance examinations for admission in universities or institution of higher education (Tezci, 2011) so they focus themselves for memorization of concepts only. Even in school timetable, for a class, there are generally two or three periods in the name of computer lab per week and in that computer lab or sometimes named as ICT lab also there may be technical instructors with causal approach towards students, insufficient

number of technical staff with respect to student strength and hence there may be low interaction between students and the professional staff or peers (Whelan, 2008) and such conditions may restrict students in using ICT facilities for their own learning. So, the technical staff in schools should be given salary at par with similar professionals in other sectors and as per student strength, requisite number of technical instructors should be posted in schools. Curriculum planners should emphasis on organizing an ICT inclusive pedagogy in which learning activities and their pace are determined by the learners, peer interaction and team learning take place and creative & integrative aspects of learning are met. At institutional level, the schools should be empowered to plan and frame the policies regarding the pedagogical practices with ICT integration. In an ICT integrated classroom, the framing of educational objectives with technological foundations keeping in view the learners' characteristics, like his/her working knowledge of technology etc., the availability of ICT resources and a clear cut division of labour between the teachers, students and technical staff are imperative in establishing an ICT oriented classroom (Lim, 2007) as ICT has the potentials for the students to facilitate them learn, enrich and sharpen the skills learnt.

Conclusion

In the world where change is the only constant there is a dire need to create an environment in which a community, which is knowledgeable and literate about technology, grows up and works to add on, by utilizing and deploying the available ICT resources, in nation building. In formal system of education, the Department should have provisions for research and related activities, evaluation and concerned experimentation with respect to ICT resources and ICT supported activities because only then the worth of ICTs for school education can be harnessed. School, as a system, should care for enabling the teachers and students to grow as critical user of surrounding digital resources. Within the class rooms, learning situations, with technology integration, should focus on sharing, co-operation and collaboration among students so that the human resources of a nation are optimally utilized. For the practice of technology oriented pedagogy, a comprehensive support and exclusive availability of technology are mandatory for ensuring the integration of ICT as only then the teachers' efforts, in this direction, may prove significant enough in achieving the goal.

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