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"ENHANCING TEACHING AND LEARNING THROUGH TECHNOLOGY INTEGRATION IN EDUCATION"

NISHANT GUNJAN

Assistant Professor, Department of Education, M.L.T. College, Saharsa (Bihar), India

ABSTRACT

It is a widely accepted fact that technology is getting well trenched into every sphere of our life, be it agriculture, health, communication, defence, industry and so on. So no wonder, the field of education has not remained insulated from it. There has been a significant and positive impact of technology on education, especially on the teaching-learning process. It has been realized that recent technological digital devices, software applications and social medias of the modern world can revolutionize education. However, most of the educational processes are still dominated by the teacher, textbook, and the chalkboard. Hence, in order to reap the benefits of modern technology, we have to familiarize ourselves with the new phenomenon of integration of technology. This is because even when the technology is accessible, we at times tend to be apprehensive to integrate it despite the fact that modern technologies are penetrating into remote and rural areas. The pedagogical approach to integrate technology as required by Rogers(2000) is that the teacher should select the content and accordingly choose the tools. The teachers have to be reflective and evolve suitable instructional strategies to integrate technology. This paper focuses on various modern technologies and their applications in the field of education.

KEYWORDS: Educational Technology, Blended Learning, ICT in Education, Web Based Learning

INTRODUCTION

Since we have moved to the 21st century the whole approach to teaching and learning has increasingly been aided by the constantly evolving technologies. In the last three decades, there has been a major shift in the concept of training and development. As a consequence, the traditional way of first learning in a classroom and then applying such information for the rest of one's professional life is no longer ideal. Today, there is need for a continuous process of up-dating one's knowledge while making use of the existing knowledge. This is the prime requirement of professional development and it has become indispensable due to on-going creation of new information, and the easy flow of this information at a global level. In the current Information & Communication Technological age, the methods and techniques used by the learners and teachers in grasping education are dissimilar with those used in the past to a great extent. Thus an understandable shift can be viewed easily from schooling to electronic de-schooling, from cognition to construction, from man to machine, from local perspective to global, from real to virtual and from close to open world of learning. It means that today the learner can not only think internally but is also capable to create his own knowledge. He is good at machines, his thinking and ideas are not limited to local conditions but have crossed their limits and started to extend it globally. Hence the learner is not bound today in the closed classrooms for learning instead he can utilize the different ways of alternative education along with the integration of ICT in his endeavours. Advances in the field of information and communication technology have opened new doors for teachers and learners to enhance as well as to improve their skills and competencies.

Why Technology in Education and Training

Today, it is not difficult to think about various technologies, which can contribute to effective education and training. Some of the technologies, which are commonly used are print, audio, audio-video, and Internet. Among these, Internet is the latest technology which provides a cumulative environment and exposure to all the technologies from print to audio-video. The web technology is presently dominating the arena of education and training. There are a number of uses of technology in education, and especially of information technology. Let us discuss why do we use technology in education!

- Technology allows learning anytime, anywhere and at one's own pace.

- Technology allows independent learning and facilitates access to data and helps in processing it and sharing results. It thus helps in constructive learning. Storing and retrieving information are also easy.

- Some technologies like CD ROM and the Internet allow learners to utilize more than one sense organ as instructions are provided as multimedia. The content may also be interactive and while shyness or crowded classrooms may inhibit interactions, technology facilitates it in distance learning.

- Collaborative learning: Technology like the Internet provides learners with an access to rich educational resources, their teachers and other experts and even their peers and thus learning becomes collaborative.

- Motivating learners: Motivation of the learner is the most important factor in learning. Technology helps and facilitates the process of providing motivation during the process of learning. Through technology it is possible to provide immediate feedback to learners. For instance in a multimedia CD, quizzes and other assessment exercises may be included. On attempting these questions learners are provided with immediate feedback.

- Technology facilitates and assists in the authentication, search, identification, storing and processing of the digital material available online.

- It can serve as a tool for the differently challenged population. Technology can serve as an extension and enhancer for their missing capabilities, which could be perceptual, physical or cognitive so that they can also receive the delivered information. for example, for the visually impaired, one can have Braille lettered terminals and input/output devices. For paraplegic learners there are several robotic customized devices for interacting with teaching material. For the slow learners, the teaching material can be adapted for ensuring drill practice, exercise, feedback, etc.

- Technology can help in learning subjects like history, and/or future trends because it can reconstruct situations and thus facilitate visualization of going back and forth in time. A few examples might be: journey through ancient India, a trip to future India, or a devastated or polluted environment, etc.

- Technology can be of great help to the multilingual population, with automated translators available both to teachers and students.

- Simulations possible through technology enable learners to interact in real time with the situations created. Simulation has its own advantages and provides learners with real life experiences. The ideal situation would be for each student to have access to laboratories and scope for field work. However, in many cases this is not

possible for a variety of reasons, like cost involved and risks associated with certain tasks. Technology helps in such cases. In order to have access to such situations one can deploy simulation, micro world, tele-robotic technologies. With these technologies students can interact with the virtual environment created and engage in the physical experiment. We should also know about an emerging trend in simulations. It is tele-immersive environment for teaching and learning. With a three dimensional virtual space, which mimics the real space visually, aurally, and tactually, both the student/apprentice and teacher can meet and interact. This technology is not available yet but it is an emerging one. There would be many advantages of such an environment such as:

o   The students and teachers do not have to be physically present at the same place as technology can connect them.

o   The teacher can teach several students through technology and yet the student would feel that he/she is the only one getting the teacher's full attention.

o   This technology would facilitate demonstration/coaching of physical and/or mechanical skills (such as surgery, operating complex machinery, etc.), which requires true spatio-temporal observations of the demonstrator. In turn the tutor can make the same spatio-temporal observations of the students and provide not only verbal but also mechanical feedback. This feedback is critical for the apprentice since it will give him/her a sense of being in direct touch with reality.

o   Another emerging technology is the multi-site tele-immersive environments which may be needed for the teaching and training of cooperative activities by simulation, such as playing in an orchestra, dancing in a troupe, working in coordinated manufacturing process, etc. from one teacher-student scenario we can have multi-students and one teacher scenario by deploying the distributed tele-immersive environments.

Based on Constructivism

This is a philosophy of learning founded on the premise that, by reflecting on our experiences, we construct our own understanding of the world in which we live in. Each of us generates our own "rules" and "mental models," which we use to make sense of our experiences. According to this theory, learning is simply the process of adjusting our mental models to accommodate new experiences. Constructivism views learning as a process in which the learner actively constructs or builds new ideas or concepts based upon current and past knowledge. In other words, "learning involves constructing one's own knowledge from one's own experiences." Constructivist pedagogy is the link between theory and practice.   For the modern educationist, education is much beyond memorizing facts and performing fixed operations. It is 'metacognition' which refers to the ability to understand and manipulate cognitive process through questioning, planning, regulating thought and thus perform critical thinking(Parsons, Hinson and Broom, 2001). Metacognition is considered as an essential aspect of learning and consists of (i) knowledge of cognition, and (ii) regulation of cognition. In the new paradigm of education wherein technology is getting integrated, **construction** of knowledge gets promoted. The learner constructs knowledge through his/her own efforts rather than being fed with fixed information from an outside agency. Intimately related to constructivist approach is the 'Humanistic approach' which places the learner at the centre stage and allows learning at one's own pace and style. There is faith in the learner's potential and allows the learner to fully exercise and use the potential. These approaches are adopted when technology is integrated as the learner occupies the centre stage.

Moreover, not all learners will try to construct knowledge in the same way as would have happened if a teacher would have spoon fed them with the same information. thus educational technology nurtures creativity and helps in overcoming a straitjacketed approach.

Learning from the Technology

When technology is used to convey specific information or skills, Zucchermaglia(1991) describes it as "full" technology- full of information to be conveyed to the student the acquisition of facts through repeated practice and rote memory, or learning from the technology is the goal of instruction. Full technologies include computer assisted instruction, integrated learning systems, computer-based tutoring systems, assessment software, and administrative software, such as electronic grade books or attendance record-keeping software. McClintock(1992) points out that technology has often been used as a replacement for existing tools, such as books, rather than as an alternative medium through which different tasks might be performed and different objectives might be achieved.

Learning about the Technology

Another use of technology in schools that exemplifies traditional learning environments includes learning about the technology itself(Jonassen, 1996). Classes in computer programming and computer literacy are designed to teach students how computers work. Students learn specific skills related to using the computer, such as keyboarding skills, ethical uses of computers, or a particular programming language, but these skills are not tied to other content.

Learning with the Technology

Learning with technology drives much of the current thinking about the use of technology to support learning. Bonk, Hay, and Fischler (1996) note, "Currently popular ideas about students using electronic tools to be designers of knowledge are akin to Dewey's arguments that children must actively construct and interrelate knowledge by learning in more authentic ways." According to this perspective, when technology becomes an integral part of the classroom learning environment it provides a tool for both teachers and students that can facilitate new roles and new instructional strategies. Technology used as a tool can serve as a means to seek and process information, and to reflect on one's understandings, beliefs, and thinking processes. Ordinary application software such as word-processing, spreadsheet, graphics, presentation, and database software; problem-solving software; simulations; electronic mail; and the Internet are technology tools that fit into this category. Using commonly available software (databases, spreadsheets, electronic mail, multimedia, hypermedia, and others), learners employ technology to both construct and represent knowledge.

Internet Technology in Education

Internet technology has made a substantial contribution to education. The emphasis now continues to shift from Computer Based Learning and its related methods such as Computer Assisted Instruction to Internet Based Learning. There appear to be two main options. One is a form of distance learning in which a teacher places course-materials on a web server, which can be accessed by remote students. This approach follows a prescriptive pattern. It allows all the teaching materials to be validated at source and integrated into the course. However, it may be an expensive way to provide enough software to meet the demands of complete syllabus. The alternative is a type of independent study in which learners search the internet for material that are relevant to their interests. This is a more constructive process that can provide access to a media range of courseware and multiple views of a subject area but the suitability of the material for a taught course cannot

be guaranteed. These two modes can be combined to form a more general approach that may be described as Internet Based Learning(IBL). It includes any process in which a learner is provided with access to course- materials stored in the Internet. It requires a model of teaching that combines the advantages of both prescriptive and constructive learning by selecting appropriate materials and admitting a wide range of views of a subject. It should facilitate a learning style that has been described as guided discovery.

This new approach allows the learners to have more control over their own learning to think analytically and critically, and to work collaboratively. This constructivist approach is an effort at educational reform made easier by technology. In this process the learner has access to global rather than local software and maintains a direct link to the teacher. This interactivity may take the form of a direct e-mail link, electronic conferencing or an automated connection to a server programme. Internet information is usually accessed through the hypertext protocols of World Wide Web. Some authors are of the opinion that an unstructured presentation is more conducive to learning by forcing the learner to construct a personal knowledge map. Other prefers to offer more direction in the form of a navigable interface that relates to the structure of the subject. Both views have their merits, but for an open learning system such as the Internet a structured interface appears to be more appropriate.

Multimedia in Education

Multimedia is the term for different media like text, graphics, animation, sound, and video all wrapped in one interactive package. The basic idea is to manage and co-ordinate the various devices of communication and entertainment electronics with the computer. Multimedia tools can help us in creating presentations, games, animations, which further promote the interactive ways of learning. Multimedia has emerged as an effective way for students to develop projects that incorporate text, graphics, sound, and video. We have Microsoft PowerPoint as a multimedia tool to create presentations, multimedia projects, etc. Some multimedia tools for primary class students are also available like Kid Pix Studio and JumpStart, which provide tools for students to paint pictures as well as add text, animation, video, sound effects, and music to create an exciting multimedia project. Some tools are available for trainees interested in creating, manipulating, and editing visuals such as photographs as for e.g. Adobe's Photoshop. Some tools are also available for audio and video production such as imovie, practicaMusica, songworks, and kidMusic.

Modern Digital Gadgets for Learning

Numerous computer add-on devices are being designed to help learning more enjoyable and realistic, even if we are studying on the comfort of our own home. For instance, kids who wish to learn how to play the piano can take advantage of USB pianos, which works similarly like a real piano, but are plugged into the computer while we are taught using a CD or downloaded piano lesson. There are also gadgets available for those who wish to play the guitar which is connected to the PC via USB and offers an interactive guitar learning system, regardless of whatever level of guitar player you are. These computer-based gadgets are useful for lessons that require an instrument, drawing board, white smart board, smart phones, kindle, e-textbook, web cams and other devices needed in hands- on learning.

Advantages

- Technology provides access to a vast source of the latest knowledge and information from all over the world that can be stored, retrieved, updated and reused.

- Human beings cannot cope up with the knowledge explosion. Hence teachers cannot always provide authentic and current information. Technology helps us in getting authentic and current information.

- Technology carries learning material to individuals irrespective of their geographical location. It thus makes the society egalitarian and democratizes education.

- It engages learners throughout the learning process and motivates through assessment of learning progress and feedback. It also allows interactions. Instructions through many technologies can be used and reused and stopped and started at will. Thus learning is learner centered.

- Higher cognitive processes are encouraged when information is processed through analysis, synthesis, etc. It encourages critical thinking and problem solving abilities.

- Education is individualized as every learner learns at his/her own pace and in his/her own style. It thus addresses various styles and paces of learning.

- The learners learn to explore and discover sources of information. Accessing a global pool of knowledge imparts a global outlook to the students.

LIMITATIONS

- Technology can never substitute the humane elements of a teacher like the ability to inspire and guide with a human touch, provide warmth, affection and leadership, and inculcate values.

- Integration of technology requires great capital investment. Apart from physical resources, recruiting trained manpower to operate them also requires financial inputs.

- Long exposure to TV and computer screens from childhood affects health. Continued exposure to the glare of the computer screen may affect the eyesight, Sedentary habits rob individuals of physical exercise.

- It may make learners, especially children averse to socializing in a face to face manner.

- Internet /TV have hypnotic effects that can hook people and make them addicted to it.

- Modern schools in a bid to offer progressive education, allot more time for computers and Internet. It is taking a toll on lessons in art, music and games. Aesthetic, social and physical developments may thus get neglected.

- Access to too much information can confuse a young learner and lead him/her astray from the focus.

CONCLUSIONS

The concept of using technology occasionally to supplement a lecture and integrating it in the teaching-learning process are different. The latter ensures the integration of judiciously selected technology usually to the print or some other medium. Even in the classroom, technology may be integrated with orally delivered lessons. Learning thus can be through multimedia. The teacher's role is to facilitate learning. They formulate instructional strategies, integrating technology in the perspective of issues like the nature of the content, readiness of the learner, access to technology, etc. Convergence of technologies further facilitates learning by making available a single device in which many individual technologies are synergistically combined. Miniaturization of technology is making the devices portable and handy.

Technology on one hand is individualizing education and on the other hand it is globalizing it. It thus has a tremendous impact on the society and education. Gradually technology is becoming a surrogate teacher. While this has several advantages there are pitfalls too associated with it. Hence integration of technology should be done judiciously.

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APPENDICES

ABOUT AUTHOR

Mr. Nishant Gunjan embarked upon his educational journey from the reputed institution like Banaras Hindu University. He has completed his M.Ed. from Panjab University, Chandigarh. He has studied Geography too at Master's Level. He is UGC NET qualified in Education. Presently he is working in capacity of Asst. Professor at Dept. of Education, M.L.T College, Saharsa (Bihar).

He has life membership of Indian Association of Teacher Educators (IATE).His interesting areas are in Educational technology and Special Education.