



ADVANCES AND BEST PRACTICES IN E-EDUCATION

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Abstract:

The historic Education imparts knowledge and as human beings, the relevance of knowledge is for life long. Various case studies have been performed across worldwide to innovate in computer supported learning and implementation of best practices to spread education. Various case studies have stressed on the importance of technological innovations and its significant implications in academic research along with classroom learning. Globalisation has increased the demand of staying up-to-date with technology in every perspective. This article focuses on the understanding of various strategies or theories of learning as a base for effective learning/teaching experience which needs to fulfil various criteria to pertain knowledge; and the take home message is to utilise the benefits of combinations of strategies in educational system without prioritizing on one strategy; as catering to the needs of indifferent learners requires multifaceted approach of classroom and e-learning. Computer supported learning has dwelled into various fields influencing everyday relevance on this digital trend and there is a need to make this learning beneficial to the rural masses to overcome digital divide. Integrating Information and Communication Technology (ICT) enables interactive sessions in the teaching pedagogy, driving students' attention and critical thinking with constructive learning when compared to the student-centric, classroom teaching. ICT gives an opportunity for arriving at new conclusions or discovery of new facts other than being as means of communication and for delivery of facts. When specific modern ICT tools are collaborated with constructive teaching, the quality of education could be improved in terms of gaining and implementing the acquired knowledge with creative skills based on changing and fast growing needs in this era.

Index Terms: E-education, E-learning, Technological Innovations, Theories and Designs of Learning & Information and Communication Technology (ICT)

1. Introduction:

According to Gail Grimes and Claude Whitmyer(2009); E-education is the application of Internet based approach for the deliverance of learning experiences through primary tools such as e-mails, e-meetings, e-expeditions and the methodologies of teaching and learning; therefore referred as E-learning. E-education takes place multiplicity in formal electronic lecture rooms, on corporate intranets for on-time coaching, audio and video group discussion and in various alternative technologies mediated learning areas. And the delivery of information occurs through internet, intranet/extranet, interactive TV, CD-ROM, satellite broadcast, audio- and videotape (Paulsen, 2002). E-education is also referred to as virtual education; web-based education, internet based education, and education via computer-mediated communication.

E-learning is the most easily accessible source to espouse and to perceive information with ease and flexibility, to innovate and moreover a value-added cost effective service that reaches explicitly in right time from virtually anywhere. These reasons are responsible for the preferences of global learning system over to traditional learning which is more evident in the digital era. In spite of the up-gradation of terminology of E-learning from Internet based Training, Web-based Training, online learning; the transformation brought about by the E-learning is tremendous in this competitive world and immediate needs for life (Moore et al, 2011).

2. Challenges of Innovation for Higher Education:

There are certain challenges in higher education for innovation which would need to be focused globally and in turn, could make a positive impact if carefully managed. These challenges include funding for higher education; pressure due to globalisation; changing needs of higher education. With autonomous institutions, the changes according to the demands of higher education could be better worked; however these changes and its benefits would be limited to individual institutions. And with less autonomous institutions, benefits are more spread across higher education institutions but time consuming for the initial changes to be driven.

3. Potentials of E-Education:

Various case studies were performed across worldwide viz., US, Europe, Asia-Pacific and others to innovate in computer supported learning and implementation of best practices to spread education. And these case studies have highlighted the importance of technological innovations and its significant implications in academic research. Globalisation has increased the demand of staying update with technology in every perspective. Some of the innovative internet technologies used include: websites, asynchronous text conferences, instant messaging, blogging, audio/video conferencing, synchronous tools like shared whiteboards. Computer supported learning has dwelled into various fields influencing everyday relevance on this digital trend. Be it in the field of higher education; science education and the effects of learning using computer

simulations (Rutten,2012); learning languages (Motteram, 2013), Information-Communication Technology (ICT) and teaching students with specific learning disabilities(Obradović, 2015), interactive music education (Dervan, 2006) etc. are of valuable and appreciative contributions of E-education. Some of the examples and the instructional uses of technology tools include uses of Video data projectors such as Visualizer, whiteboard, smart board lessons, computer links for games and interactive sessions, model journal pages, student PowerPoint presentations, blogging, research wiki, word processing, playing music, photographs, demonstrations of websites and searching tools; podcasting or recording of audio files etc. The innovations in computer supported learning and the best practices have been adopted in various fields. There are many learning management application for the educational institutions designed to improvise on communication, resource and information sharing. A few of them are Moodle, Canvas, Blackboard Learn, Edmodo, Brain Cert (Loughlin, 2014), MOOC.

An open source course management system, Moodle offers to free download and a platform for distance learning, Moodle used by all small to large organizations as it allows for creating personalised online learning environment with tools like chat, surveys, and feedback. Moodle is available in 95 languages and has been used by instructors, students and administrators

Blackboard Inc, could be used for higher education, K-12 education, business, administrators globally for sharing of resources and consulting to specific organization's needs. Blackboard Learn allows connectivity between instructors and students through digital content accessed through mobile devices.

Canvas can personalise the education experience with individual student profiles, audio and video chats between instructors and students and assess student learning through task automation

Edmodo allows learner-teacher interaction and measure progress through assignments, quizzes and polls. It integrates with certain useful apps to make learning personalised and also allows connecting between parents, administrators and publishers.

Brain Cert operates more like traditional classroom that allows users to create assessments, short tests and quizzes in a virtual classroom hosting live conferences.

Schoology provides tools to create unique instructional content for individual student through personalized student profiles and unique course webpage. It also improves connectivity with email and SMS notifications (Loughlin, 2014).

Massive open online course (MOOC) is the online platform that enables learners globally to access educational content and forums on different areas wherein learner-teacher can interact and gain benefits through lessons, videos and self-assessment materials using connectivist learning approach. However, the enormous resources available needs to be carefully managed as the course content would be reshaped and reinterpreted by the massive student body which could create chaos unless carefully monitored and digital literacy is necessary (Conole, 2015).

4. Pros and Cons of Individual Education Systems: Traditional vs. ICT Based Learning

While Classroom/traditional learning, enables interactive environment that promotes exchange of ideas and queries openly without any communication barriers; on the other side, this system could encourage passive learning in students hesitant for open discussions due to their learning differences and the teacher might fail to identify these individual differences on time and quieter personalities might get less recognized in the process. Whereas, online learning has the advantage of learning from distant places and also could cater to learners from disadvantaged locations with easy transfer of information through internet and mails which provides a convenient means for the learners who cannot afford to classroom learning, to communicate and interact with the teachers. However, online learning cannot be a complete replacement to traditional learning. Users/learners would just lean on these easily available tools and the rewiring of brain for critical analysis might get effected in a long run and influence further generations genetically. If in case learners totally rely on the modern educational tools, then the classroom teaching may not exist. As a result there will be unemployment to the good qualified and potential teachers. Additionally, there might be the pressure to change the whole educational system, as the students/ learners get information or their education through the modern tools/online systems/webs. There may not be scope for most of the postgraduate courses and might not be selected as a course by many learners. Students might be more fascinated to see new updates using electronic gadgets rather than to understand new educational concepts, have reduced capacity to remember and to critically analyse. Learners would get more acclimatized and lethargic using the modern tools without much of the brain activity. Education systems might not exist as it is in present and might not be followed; due to which the quality of education would be drastically hampered. To enrich and fill the gaps of traditional learning, E-learning has made a remarkable trend. The efficiency of e-learning benefits in various fields of education is due to the various requisites. Especially, it requires motivation at the individual level and self-discipline, good understanding and interpretation skills, co-operation, critical analysis of information received, right perception, open mindedness and practical applications in effective manner (Nagarajan & Jiji, 2010). However, the constructive base of e-education systems on time with efficacy relies on effective implementations of right designs and it's assessment for accomplishment at the student and the instructor levels to overcome the gaps and to improvise it further

(Nagarajan & Jiji, 2010). This has led to the development of various formulations/ models in the field of e-education, to improvise and obtain effective results of online learning and teaching. Most interestingly, inspite of various challenges, the benefits of e-learning in education have proven to be of more advantage over the disadvantages. This plethora of outcomes in digital era is appreciable only if there is no space for digital divide.

5. Theories of Learning and best Practices to Overcome Obstacles to Innovations in Education:

Various theories of learning such as theories of cognitivism, behaviourism, and constructivism were put forth after practical research in labs, to understand the involvement of networking of brain, psychological and psychotherapy respectively (Lawrence, 1993; Jung, 2014; Bates, 2014). These theories were inculcated in learning and education by the educators since past times and if continued as a foundation for the digital era in various combinations of these theories could make positive impact. These criteria to be based on theories of learning (Bates, 2014) would help learners to meet to their various requirements.

Theories of Learning	Principle of Theory	Relevance in Education
Behaviourism	Based on the physiological reflex action for a certain stimulus which evokes a particular response	Sequences of thought processes in learners can be evoked with the emphasis on rewards and punishment to gain knowledge while setting standards to education
Cognitivism	Based on the learner's ability of mind to re-organize his inner world of concepts, memories with his experience. Emphasises of cognitive approaches to learning is with the focus on comprehension, abstraction, analysis, synthesis, generalization, evaluation, decision-making and creative thinking	Helps to link learning to the development and rewiring of neural circuitry in the brain due to which several technology-based developments in teaching have taken place such as i) intelligent tutoring systems, artificial intelligence representing the development of computer software that has the potential to even replace human activities say, teaching if at all learning is the main objective; ii) pre-determined learning outcomes which is based on analysis, synthesis and evaluation; certain instructional design approaches to design teaching for specific learning outcomes. This favors processing new information and updating the former which is prerequisite in present day world and would be more effective if criteria of computer supported learning/software is reflective on the way human learning operates making education easier
Constructivism	Social process of learning and teaching experience	Value based constructive knowledge by the society for liberal education that develops critical awareness of the values and ideologies shaping the existing knowledge with critics of already received information. Due to their varied learning experiences and past knowledge, the benefits of further learning cannot be merely accomplished by the technology as the importance is focused/centred at individual level and has been applied in most qualitative subjects
Computer-assisted learning	Computer-centric approach of teaching	Aims at computing to replace at least certain activities done by human teachers traditionally
Online collaborative learning theory (OCL)	Use of technology primarily to enhance communication between teacher and learners	Computer assisted learning was further developed to OCL as referred by Harasim (2012). It uses computing to replace traditional teaching only to certain extent aiming at improving and enhancing teacher-learner communication for knowledge construction through social dialogues guided specifically by the instructors with norms of discipline and the teachers act as the link to knowledge community and not as a fellow learner. It encourages students to work together, innovate, explore, to be actively engaged in creating knowledge

Connectivism	Based on initial exposure to the flow of information by the teacher and the individual's autonomous reflection to construct personal learning with availability of participants on social media	New theory under refinement and critics developed by Siemens, Downes and Cormier based on the following characteristics i) Freedom in choice of content and the way they choose to learn by the learners ii) Openness, to access course, content and assessing methods iii) Diversity with individual perspectives, varied contents, use of multiple tools for networking learners and creating opportunities for dialogue and discussions iv) interactivity: Vast communication opportunities between learners and co-operative learning, resulting in emergent knowledge
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Table 2: List of various theories of learning and their relevance in education (Bates, 2014)

However, each approach of theories of learning has its own pros and cons. The cognitivists approach could help us understand the activities of human brain in processing and seeking new information, its interpretation, and organisation and to manage knowledge skilfully. Both behavioural and cognitive approaches are rigid; as the learners cannot benefit with self determination in a pressurised learning environment. Instead, the constructive approach makes each individual centric and their previous knowledge varies and is on social grounds, but increases the complexities to meet to individual's learning experience. In constructivism, instead of the standardised curriculum, emphasis is given to customized curricula to the learner's prior knowledge and hands-on problem solving. And instructors focus on making connections between facts of prior knowledge and provide new understanding by encouraging learners analyse, interpret the acquired information; assessing their own achievements and involves learner's active participation. Constructivism enables learners to reflect on their own experiences on the pre-existing knowledge and further explore to understand the concepts with the constructivist teachers guidance. Teachers could provide problem-solving tools for reconstructing knowledge, analyse, and to allow students to transform themselves to be active participants in the collaborative learning environment by reciprocating with their new ideas on testing their hypothesis and finding solutions themselves in groups. However, the passive students might lag in the process if not considered carefully. In constructivism, learners are active participants and enrich on their thinking, creative and understanding abilities, the skill that can be further applied to other learning and real life situations by designing their hypothesis/ projects and exploring to prove them. This enables in creating social environment for collaborative working and sharing or exchange of ideas. And the connectivist approach though allows independent choice for the learners and their contributions to knowledge, enormous critics exists because of the lack of control on the quality of content and their contributions; poor assessment schemes; and the learning might not cater to the needs of academic knowledge, making learning experience cumbersome due to enhanced contents generated by the learners and in case of lack of traditional education; and teacher's expertisation to streamline the focus would be required (Bates2014). And it's more applicable in non-formal learning than formal education. illustrates the challenges for teachers and course developers in developing learning centered, content centered, community centered, and assessment centered learning environment catering to the needs based on how people learn and how these emerging technologies can be best used with creativeness, motivation and open mindedness to act according to the demands. Hence, to understand every individual with different abilities and cater to their needs of learning; necessitates proper design and implementation of tools by the instructors and skills of teaching which requires both traditional and digital coverage. This is because of the various reasons mentioned until now and additionally, the memory system of human being has 2 interconnected compartments of memory that process present information (referred as working memory) and another (long term memory) for the storage of acquired knowledge previously and to recall for the future needs. So while comparing human brain to the computer with respect to functioning and processing information; the abilities of the human brain at the individual level needs to be focused to make the learning process an efficient and self-motivated, encouraging, fun filled experience inspite of the complexities of the subject of study.

6. Best Practices of Education:

Integrating Information and Communication Technology (ICT) enables interactive sessions in the teaching pedagogy driving students' attention and critical thinking with constructive learning when compared to the student-centric, classroom teaching (Knowlton, 2000). The benefits of using ICT in classroom are increased commitment, independent and self-directed learning, enhanced feeling of achievements and self-esteem to attain to the goals (Cox, 1997). ICT gives an opportunity for arriving at new conclusions or discovery of new facts other than being as means of communication and for delivery of facts. When specific modern IT tools are collaborated with constructive teaching, the quality of education could be improved in terms of gaining

information. For which teachers are to be trained with these specific IT tools for their ease and effective applications in the curriculum and favour constructive learning. Identifying the best or suitable ICT tools for delivering information and the study area that requires more use of ICT needs to be decided. Proper goals should to be set while using ICT tools and also the learning outcome to be obtained when selecting the ICT tools. The students may concentrate on areas of his interest outside class or spend more time on it rather than focusing on the subject wherein he needs to concentrate more on. We should think on whether students need to use computers during the class hour or restrict its use only to the labs when they need to practice theory. The appropriate age to be considered for the students or in which level of schooling, students should be given access to computers for learning has to be determined. Effectiveness of ICT tools in improving the student performance or student attendance or student concentration or in motivating the students towards a difficult subject or an area wherein the students lacks self motivation could be explored. Identifying best suitable ICT tools for specific subjects and specifications of the ICT tool required for a subject needs to be done. Training teachers first about the ICT tool which is to be implemented in the class. Students should be trained on that specified ICT tool to understand subject better. Demonstrating the steps of using the ICT tool for implementing to the students is a necessary step. Making the students work more at home giving assignments or group work at class and to improve their critical thinking. Evaluating the students to check the subject knowledge can provide better results. Thus, the teacher has the key role of planning, designing and supporting students learning using ICT tools for its success. Teachers should be trained to be competitive in using the ICT tools and planning, design their lessons thoughtfully as done in traditional learning and monitor the focus, learning abilities using advanced techniques and evaluate progress of the learners keenly ensuring they are in right direction and reached to the desired outcomes of learning-teaching (Witfelt, 2000; Moore, 2005; Bates,2010). According to Becker (2000); teachers need to adapt their teaching styles for implementation of ICT in lessons as a constructive strategy. And learners become more responsible in performing their assignments and find their ease in understanding difficult subject using these ICT tools. Classroom learning is made interesting through PowerPoint slides, videos, discussion groups, and quizzes by creative teachers teach various analytical skills and for better learner interactions (Knowlton, 2000). In spite of the advancements in technology the teacher has a key role in the student learning process as learners need to be disciplined, motivated, lead in right path when the demand is more to learn and equip themselves with advanced technologies to keep in pace with the competing world and the learning needs to be curriculum based to be focused, and allow the learners to expose themselves new concepts and skills while updating their pre-existing knowledge; which ICT alone cannot accomplish (Moore, 2005). Constructive approach is achievable using ICT in lessons for successful outcomes (Becker, 2000). Therefore, combinations of classroom learning and ICT are a necessity to fill in the gaps of individual education systems.

Links are also available that provides the learners and teachers to help them upgrade their knowledge with examples and instructional uses of technology tools. To mention a few

Purpose	Available Tools
Social Learning	Edmodo, Grockit, Edu Blogs, Wikispaces, Pinterest, Schoology, Quora, Ning, Open Study, ePals
Learning tools to make lessons fun and interesting	Funbrain, Educreations, Manga High, Khan Academy, Animoto, Socrative, Knewton, Kerpoof, Study Sync, Carrot Sticks
Planning lessons and tools to develop amazing projects	Teachers Pay Teachers, Planboard, Timetoast, Capzles, Prezi, Wordle, QR codes, Quizlet, MasteryConnect, Google Drive, YouTube, TED-Ed, Glogster, Creaza, Mentor Mob
Useful tools for better organization to stay connected for ease in building multimedia lessons	Evernote, Twitter, Google Education, Dropbox, Diigo, Apple iPad, Aviary, Jing, Popplet, Google Earth, Donors Choose, Slide Share, Live Binders, Audio Bog

Table 1: List of useful technological tools (Retrieved from education technology tools by GDC team)

7. Conclusion:

The regulatory measures taken and financial investments made by the government and the autonomous institutions towards web based education have been effective to certain extent. The customized content, adoption and implementation of web based benefits along with traditional modes of education could work in multifaceted way to meet to the effective teaching and learning experience which includes the objectives of personal learning and formal academics. In conclusion, it would be genuine to not to overlook at the benefits of traditional learning and there is need to enhance constructive learning along with the computer supported learning at all ages worldwide. Preferably, having updated classroom teaching strategies with modern education web based tools has an upper hand than just one of the systems. The balance between new technologies and updated academic content is a prerequisite. To Design and implement learning materials; focus on effective learning strategies should be ground rooted on combination of theories of learning and updated for the best benefits of motivating learning, for in-depth critical analysis with individual interactions in spite of their

differences. Learner-teacher interactions should aid in understanding the concepts efficiently, effectively on time in a better way, deliver and implement gained knowledge technically with ease while being able to develop critical analysis, thought process and come up with innovations for the benefit of each individual of the present and future generations of the society worldwide.

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