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ICT Augmented Elementary Teaching and Learning

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"Computer-based instruction has raised student achievement in numerous studies. It has given students a new appreciation for technology and has had positive effects on student's attitudes toward schools and teaching. And computers have helped teachers save instructional time."

J. A. Kulik and C. C. Kulik (1987)

1. Technology and Teaching-learning

1.1. Conceptual Overview and Recent Trends

Technology, to a layman, means some strategy, apparatus, instrument or practice, which can make a work easier, efficient, requiring lesser efforts, lesser time, lesser labour, and lesser money. In other words, technology is the one, which saves time and energy while pursuing a particular task.

Being so useful, technology has encrypted in almost every sphere of human life, including the education. In the sphere of education, transforming from effective strategies for teaching-learning, as earlier concept of 'technology of education', technology has, now, taken a different shape as of using effective apparatus, instruments, platforms and resources for effective teaching-learning, which can be said as 'technology in education'. Technology, now, means not only the content creation, but also to communicate it effectively to the prospective learners and opening up a new door for enhancing creativity among them, believing in the principles of constructivism.

Evolved through the era of audio-visual aids, educational technology (ET) and information technology, the technology in education has now manifested into the concept of Information and Communication Technology, popularly known as

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ICT in education. Its origin lies into the philosophy that the creation of information is not just sufficient, but the information created must be communicated, too, to the learner for better facilitating learning and learning. And, the learner should be the active creator of this information. Hence, the development occurred in trends of ICT in education, too. A few of recent trends are Open Educational Resources (OER), Web 2.0 tools, Learning labs, e-learning (learning through digital format), m-learning (mobile learning), u-learning (ubiquitous learning), etc.

While ministries of Human Resource Development (MHRD) of the nation and various states are emphasizing on the use and applications of ICT in teaching-learning through various efforts, viz. ICT@Schools Scheme, providing tablets to school learners, etc., it becomes the need of the hour that facilitators, especially at elementary level, must be very well acquainted with the technology augmented teaching-learning, and should have maximum possible knowledge of teaching- learning through the technology.

Observing indispensability of the technology, in the current and coming era, in the field of education, the current article endeavours to discuss the technology for learner and learning, facilitator and teaching (facilitating learning), professional development of facilitators and educational technology repositories.

1.2. Why Technology in Education?

Technology in education is endeavouring to provide a temporal free, spatial free, unbiased, full of equal opportunity, and non-threatening learning environment to learners. Through technology, facilitator and learners can be in touch for better interaction irrespective of annual calendar, school timings and period timings; irrespective of school building and classroom space, irrespective of gender, caste and location, irrespective of chances available to each person for expressing his/her ideas, and providing less-threatening virtual learning environment, ubiquitously. This is helping in not only reaching a large quantity, but also enhancing the quality of education with more flexibility and multi-tasking opportunity. These are a few, and also might be several other, reasons which are making facilitators, learners, stakeholders, policy makers and administrators for supporting and applying the technology in the field of teaching-learning at elementary level, with a greater enthusiasm.

2. Technology for Learner and Learning

2.1. Technology for Content

Learning-content is the backbone of all sorts of formal learning. The richer the content, in terms of quality, the richer the quality of learning. Learning-content can be full courses, course materials, content modules, learning

objects, collections and journals, etc. Earlier, the content was generated and developed by the experts only, and learners were having no say in this process, but now the scenario is changing. The development of content material is also thought to be as an opportunity for learning. The learners are also involved to collaborate in content creation, sharing, editing, enriching, review and feedback. Their maximum active participation in this process facilitates their learning. Technology, here, is playing a prominent role. There are online tools and software to support content creation, where learners can be efficiently involved giving rise to better learning on their part.

2.1.1. Document creation, sharing and collaborative editing

For document creation, sharing and collaborative editing, there are platforms viz. Google docs/ drive, which provide ample freedom, control and security of document development process.

For an instance, at elementary level, a story can be written on how clouds are formed following a classroom brainstorming discussion (DEP-SSA, 2007) session. During discussion various students may share various views. They can be asked to discuss and create a shared document on this topic. The collaborative editing of the created document on how clouds are formed can enhance the learning on the part of elementary learners.

2.1.2. Content creation in Hindi and regional languages

Using technology, it has become, now, very easy to create and edit content in Hindi, Bangla, Gujarati, Kannada, Malayalam, Marathi, Oriya, Punjabi and Telugu, just by typing in English. One can download and install Microsoft Indic Language Tool on a computer. Then, any language, as mentioned above, can be easily typed by transliteration process. For an instance, typing 'prathmik' using English keyboard will result into प्राथमिक in Hindi, પ્રાથમિક in Gujarati, প্রাথমিক in Bangla and ପ୍ରାଥମିକ in Oriya, etc. This can be used in creating document, presentations, data files, etc. Not only this, it can be used offline as well as online with almost equal efficiency. To clarify more, it can be used to write online emails, blogs, Facebook comments, twitter comments, etc. with the same efficiency as that of the offline documents. Moreover, editing process is the same as that of the application platform, it is being used.

For an instance, narration of an event (DEP-SSA, 2009a) by looking at a given picture showing two people sitting in a train can be a good activity at elementary level. The significant aspect of a narration is the learner would prefer to narrate in his/her own specific language and would be most comfortable in narrating his/her preferred language. The ICT tool discussed above can help a lot in

expressing thoughts in their own local/regional language.

2.1.3. Subject specific content tools

There are subject specific content tools available, viz. Celestia, Google Earth, and Geogebra, etc., which have not only in-built specific content, but also have prospects for subject related further activities.

For instance, stars in the sky or patterns (NCERT, 2010) formed in the sky can be a good topic to discuss at elementary level. Celestia can help a lot in such learning at elementary level. Geogebra can help in recognising various elementary shapes like circle, square, etc.

2.2. Technology for Creativity

Creativity is inherited in all the learners, though its degree may vary. This creativity can be used for better facilitating learning and learning. Creativity, here, can be understood as creating something new, with respect to one's own earlier experiences and capabilities. Learning through creativity not only involves divergent thinking, but convergent thinking, too. Facilitators can use creative learning through concept mapping, crosswords, puzzles, quizzes, gap-filling exercises and jumbled-sentences, etc. Technology can help learners and facilitators, both, for enhancing expression of creativity and cognitive abilities among learners.

2.2.1. Concept Mapping and Crosswords

Cmap and Hot Potatoes are exemplary software, which can be used for creating concept maps, quiz for multiple choice questions, short answer type questions, hybrid questions, gap-fill or close exercises, crosswords, jumbled-sentence exercises, matching or ordering exercises.

For an instance, learners at elementary level can create their own crosswords for names of vegetables. They further can try to develop a concept map what are names assigned to the relations in a family and how are they related to each other. This activity can create interest among learners and can result into expression of creativity.

2.3. Technology for Evaluation

A good evaluation is an inherent and integral part of learning process and benefits the learners (NCF, 2005). Technology can be efficiently used for evaluation purpose, too. Now a day, while the evaluation is accepted as an in-built and simultaneous process in teaching-learning, and while we have shifted towards concept of continuous and comprehensive evaluation (CCE) and fair/transparent evaluation, the need is there that the facilitator is in constant touch with and has record/recognition of all the activities of the learner, while undergoing the learning-process. The manual logging of all these formal and informal activities is not an easier task. Technology is

available for better evaluation through e-portfolio and rubrics.

2.3.1. e-portfolio evaluation

Using R-campus, e-portfolio can be created, managed and enhanced. The activities, facts, links, data, documents, audio, video, pictures, blogs, etc. depicted in the e-portfolio can be used, altogether, for CCE.

For instance, a field visit or educational tour or excursion or picnic can be a good activity for learning at elementary level. An e-portfolio can be created depicting various aspects pertaining to the visit viz. pictures, planning text, descriptions, history, video of the event, sharing experiences, some special sound clip, etc. It can also help in depicting and learning concepts related to time, distance, data, graphical representation, etc. (DEP-SSA, 2009b). This will reflect their learning which can help in better evaluation.

2.3.2. Rubric evaluation

Rubrics are the depiction of gradual hierarchical components of a task in order to assign a grade or category not only for evaluation, but feedback for improvement also. Using i-rubric or Rubistar, rubrics can be easily developed not only by facilitators, but also by the learners.

For an instance, a rubric can be developed for reciting a poem with expressions at elementary level. Learners can suggest not only various important aspects for a good recitation but also put them in an order as per their understanding. This can result into a rubric, which further can help in evaluation.

3. Technology for Facilitator and Facilitating Learning

3.1. Learning Management System

Learning management system (LMS) is an all-inclusive setup from beginning to completion of a learning task. Facilitator, with the help of learners, manages learning of his/her learners. They can share assignments, projects, activities, problems, feedback, qualitative assessment, exercises, etc. on a common platform. They can form groups, subgroups, etc. as per the need and task. These groups can be controlled or uncontrolled, closed or open, and facilitator-managed or learner- managed. Technology is helping in creating and managing learning through LMS.

3.1.1. Creating and managing wikispaces

Wikispaces and eXe are the exemplary tools which can be used as LMS. Learners can develop, edit, modify, enrich, and comment, etc. on documents in partial and full manner.

For an instance, addition and subtractions of large numbers (NCERT, 2011) can be performed by elementary learners in many ways. This becomes more varied though specific in nature while it is done mentally without pen and paper. A wiki can be created using

wikispaces where each learner can share how they perform such addition and subtractions.

3.1.2. Virtual classroom

Classroom 2.0 is one of the virtual classroom setting/platform, which can be used for various activities through discussion, deliberation, blogging, sharing resources, online lectures, etc.

For an instance, learners at elementary level may wish to share their co-curricular and co-scholastic experiences with their peers and facilitator while they visit their grandparents' home or some relative's place. These experiences may imbibe into them the moral and other values.

3.2. Facilitator Managed Communication Platform

Facilitator plays a vital role in facilitating learning. He/she, sometimes, plays the role of manager, controller, director, facilitator, demonstrator, guide, supervisor, resource, authority, listener, evaluator, etc. In this entire process, a communication platform is needed. Since facilitator is a formal agency for the formal learning, a communication platform managed by the facilitator is an essential elementary requirement. Technology has provided facilitator managed communication platform for enhancing formal learning through a blend of informal interaction with the learners and their parents, to.

3.2.1. Edmodo

Edmodo is one of the best facilitator managed communication platforms, which can be used for all the activities for sharing and interaction, including assessment and communicating to the parent of learners. The significant aspect of Edmodo is it creates different group code for every group, which can easily be shared by the facilitator to the prospective learners.

For an instance, elementary level learners can share instances of triangular shapes (DEP-SSA, 2009c) from their environment with others through pictures, videos, documents, etc. using Edmodo.

3.2.2. The Course Networking

The Course networking (thecn) is another communication platform, which has in- built system for self-achievement applause and motivation. This motivates the learner to proceed in addition to facilitator-managed communication for facilitating learning.

For an instance, elementary level learners can share year-long activities with the group thecn. The system gives some points to the learner for such a sharing and learning proceeding. This gives a sense of self-achievement to the learner.

4. Technology for Professional Development of Facilitators

4.1. In-service Training Programme

Professional development of facilitators is an essential element to help, in turn, in better facilitating learning and learning. During pre-service teaching,

facilitators, as trainee in any other profession, may not be acquainted with current trends, recent technology and updates in the field of education. Moreover, there is a need for consistent enrichment in the knowledge of facilitators related to latest educational policies, educational philosophies, educational strategies, recent changes and development, etc. for enabling them to facilitate learning in an efficient and justified manner. These are carried out through in-service training programmes (INSET). A large number of facilitators can't attend these programmes simultaneously and as and when needed. Technology has enabled facilitators to attend INSET programmes as per their ease, interest and requirement.

4.1.1. OCL4Ed and Coursera

Open Content Licensing for Educators (OCL4Ed) and Coursera are examples, which help facilitators to upgrade and enrich themselves by attending programmes and learning at their own ease and pace.

4.2. Academic Association, Collaboration and Forum

Academic association, collaboration and forum help facilitators to discuss their classroom problems, facilitating learning strategies and innovative ideas with other colleagues. They not only get solutions to the problems, but also share solutions to problems faced by their peers. Technology has made it easier to join some existing association, collaboration and forum or to create a new such body.

4.2.1. TICAL Community

TICAL is a community association for improving facilitating learning and learning by various sorts of activities.

4.2.2. Teacher 2.0

Teacher 2.0 is a collaborative forum of facilitators, where they can share their ideas, plan some activity, participate in conferences, seminars, etc.

4.3. Journals

Facilitators should know about innovative ideas, recent researches and should be able to share their own innovative ideas and researches about facilitating learning and learning. These can be best achieved with the help of journals in the field. Facilitators should have access to journals and periodicals. Technology has made it easier to explore for journals and specific content as per requirement to the facilitators.

4.3.1. DOAJ

Directory of open access journals (DOAJ) is an extensive source for a large number of open access journals. Journals can be freely explored, opened, read, referred, and most of the times downloaded, too.

4.4. Simple Data Tools

Facilitators, while facilitating learning and learning, needs to keep record of many other things also like assessment, progress, attendance,

percentage, data, charts, graphs, etc. Technology has enabled facilitators to keep all the data and operate with the data in an efficient manner.

4.4.1. Open Office Spread sheet

Open office is a set of application software for creating documents, presentations, spread sheets, etc. Using spread sheet, one can deal with the data and its editing in various possible forms.

4.5. Web Conferencing

No technology can replace facilitators and the value of their interaction with the facilitators. Even from NCF (2005), also, it can be drawn that ET/ ICT should be viewed as a supplement rather than as a substitute both for classroom facilitating learning and facilitator training. Hence face-to-face interaction is a must for better facilitating learning and learning. Technology has enabled facilitators and learners, not only to create virtual learning environment, but also to interact through real-time interaction platform, where they can see each other, talk to each other, accept each other and even feel each other's expressions.

4.5.1. Skype in the classroom

Skype in the classroom is a web-conferencing platform meant for teaching-learning purpose, where an expert can interact through online real-time visual sharing.

4.5.2. Google talk

Google talk allows people, or group of people, to interact among them freely for audio and video conferencing using the web.

4.5.3. WizIQ

WizIQ is meant for online classes, where along with text and audio, video and presentations can also be shared in real time. These classes go in a pre-planned manner and can be held free of cost as well as at some nominal charges.

5. Educational Technology Repositories

There are several educational repositories available for facilitators and learners, where they can find a lot of resources like text material, pictures, images, presentations, audio, video, links to the educational materials, etc. These repositories are very useful for facilitators keeping in mind various needs of various fields, subjects, topics, etc. Facilitators can explore these resources for making their facilitating learning efficient and facilitating learners in a better way.

5.1. Merlot

Merlot, as a part of its so many other varied important ventures, makes available a link-repository having documents, presentations, journal articles, books, videos, etc. which can be used for teaching-learning purposes. Merlot, in fact, creates links for material available at other places and then shares the links at a single platform. Hence, it can rather be said as a repository of web links of sources available at various websites.

5.2. Slide share

Slide share is a repository for presentations. Learners and facilitators can not only use and download the presentations, but also can upload their own presentations.

5.3. Open Clipart

Open clipart is a repository of pictures and images, which can be freely used and shared for various purposes for text, books, etc.

5.4. UNESCO and COL

UNESCO and COL websites are having vast repositories for a large number of educational resources on various themes.

6. A Note on OER and Web Educational Tools

Open educational resources are content, tools and licenses, which can be reused, reworked, remixed and redistributed irrespective of any restriction to the groups, fields, subjects, locations, specific-products, etc. without any copyright permission and that, too, free of cost. The principles lying behind the philosophy of OER are access, reach, quantity and quality education to all, in general, and to the last learner of the society, in specific. Now a day, endeavours, at large scale, are being made at national and international level, public and private level for creating, supporting and spreading OERs to the mass level for facilitating learning of the mass. There are open content, open tools, open platforms, open software and open repositories, too, which are boosting up the use of OER for facilitating learning and learning.

Web educational tools are online tools, which are helping in facilitating learning and learning. There are Web 1.0 tools, Web 2.0 tools and Web 3.0 tools, which are very well known. Web 2.0 tools are very popular among learners and have been supported at global level for better learning through active involvement and active participation. Web 2.0 is about user-generated content and the read-write web. The significant characteristic of Web 2.0 is people are consuming as well as contributing information through blogs or sites or site applications like Edublogs, Classroom 2.0, Teacher tube, web groups, etc. As revealed from various resources, Web 2.0 has some of the prominent aspects as being the read-write web, reaching one billion plus global users, focusing on communities, blogs (weblogs), sharing content, grand use of Wikipedia, XML, RSS, incorporating an enormous number of web applications, facilitating tagging ("folksonomy"), making websites more user friendly, reducing cost per click and valuing word of mouth etc. In the current era of Web 2.0, the dividing line between a consumer and content publisher is getting blurred, gradually. And, in some of the cases like wikispaces, this gap has been almost diminished, giving rise to equal and better opportunity for learning and facilitating learning.

7. Summary

Technology, due to its efficiency and advancement, has deeply mingled with the roots and flourishing buds of facilitating learning and learning in the current times. Technology is providing opportunity for collaborative content creation, enhancing creativity, fair, transparent and participatory evaluation in order to achieve quantitative, qualitative and acceptable facilitating learning and learning, depicting its trust in the principles of constructivism. Imagining facilitator in various possible roles, it supports learning and interaction through learning management system, web conferencing and various communication platforms. Technology, not only helps facilitator in classroom facilitating learning, but also to solve problems arising in classroom learning situations through INSET, academic association, collaboration, forum, etc. It provides access and reach to journals and repositories, where facilitators can find and share innovative ideas, recent development and resources for fruitful and efficient facilitating learning and learning. Though technology is available for various purposes, and in various forms, but facilitators can use one or many technologies as per the need and rationale. Finally, facilitator should be wise, free and justified to select, prefer, decide and apply the particular technology for facilitating learning and learning.

8. Let Us Have Some Hands-on Exercises

8.1. Explore Google docs/drive and create a collaborative document involving the learners.

8.2. Tell your learners to write a page in their own local language and try to type it using Indic language tool.

8.3. Create a rubric involving your learners on a topic of your interest using Rubistar and discuss it in your class.

8.4. Using wikispaces develop a write-up in your class on any topic by dividing it into five subtopics and each subtopic assigned to a small group of learners.

8.5. Tell your learners to explore five presentations pertaining to your subject area on slide share.

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