

A PRAGMATIC PERSPECTIVE ON THE IMPLICATION OF ICT – A RESPIRATION AND INSPIRATION OF THE ENGINEERING EDUCATION

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ABSTRACT

Indeed, in this epoch of technologies, the students of engineering are the architects of future India. A vast knowledge explosion has made the world shrivel into a global village, due to the augmentation in science and technology which enhances social change, i.e. the synchronism of Information and Communication Technology (ICT), has opened up new panorama for social and economic development. To meet the growing population and the growing demands of the society it is necessary to utilize the potential of ICT, need of the hour in all the fields for the nationalized human resource development. As there is a demand for adopting ICT, a dynamic tool, also in the field of education, this paper goes on discussing the implication of ICT imparted into a blended learning model that provides “simulated environments” by using approaches such as virtual campus, Modular Object Oriented Developmental Learning Environment (MOODLE), Android App, etc., to enable the students apply their knowledge and skills to solve problems, get learning experiences and help in broadening their understandings, knowledge, critical thinking and creative skills in the ground of Engineering. Beyond this, this report adds the tools, principles and ways in which ICT is used, and how it creates new learning opportunities.

1. INTRODUCTION

As the new millennium unfolds itself, ours is a Cyber Age where the information generation, acquisition and dissemination are as quick as the speed of light and is accessible to all, without any marginalization. Information of not mere facts and figures constitutes learning; but organized, systematized and meaningfully generated information becomes the basic property of information today. Regarding this, it is wise to move rapidly forward and create a new equilibrium, that is, Information and Communication Technology (ICT), which synergizes traditional past, replicated present and envisioned future society. This poses tremendous challenges to educators to rethink their basic tenets, to restructure education and deploy the medium in novel and productive ways pertaining to the subject, methodology and quality of education that we are now experiencing. Integrating ICT matters not only instilling new materials but also reflecting in all aspects of the learning process. For instance, when

adapting modern technology, specifically with traditional methods of Instruction, it leads to blended learning, a kind of blending of suitable methods, techniques and resources applying them in an interactive meaningful learning environment, i.e. the perfect blend of informational technology and instructional technology to maximize learning experience. The technological revolution centers on the wide array of Informational, multimedia technological inputs such as television, video, cellular and mobile technology, computer networking and connectivity, satellite communication, Videoconferencing, Web Based Learning, which imparts global level learning experience to the learner. Even if, knowledge and power of the people get expanded, while modernizing, it is indispensable to balance between spiritual and material values of life. ICT has potential to revamp engineering education in India, for extending the outreach of education. The emerging trend of Inclusive Knowledge Revolution (IKR) with strides in ICT promises for progressive engineering society.

For re-engineering the emerging trends in engineering education, incorporating ICT in technological, managerial, pedagogical, ethical and economical issues is crucial. The technological issues are in connection with the telephone network, power supply, machines, maintenance, technical support, networking, etc. The managerial issues focus on the drafter policies, driving force, program formulation, time frame, resources and models of dissemination. The pedagogical issues deal with special needs, gender, language, curriculum, literacy, role of learner, teacher, law maker, policy maker, local community, parents, intellectual property, public domain, propaganda. There are economic issues emerging out of global domination and education market. Learning engineering skills in this ICT-based fashion, students would enable to interact, acquire up-to-date engineering knowledge and active learning, develop collaborative culture and utilize feedback in proper context. ICT-enabled culture engages the students in the process of industrial strength products or services. The future engineering education would further augment these ICT learning opportunities, and conduct engineering courses based on these open-sourced engineering building blocks. The improvement of mass instruction as well as individual instruction has structured to new models of teaching-learning process in engineering education such as:

- i) Programmed Instruction
- ii) System Approach
- iii) Management Technology and
- iv) Multi-media approach

2. PRINCIPLES OF ICT IN ENGINEERING EDUCATION

For more realistic learning experiences, ICT designs principles, which influence design practice, by providing high level guidance on what and why, but not the how questions of design. These can be influenced by task factors, context factors and technology platforms, and so forth.

- 1) **Promote creation and representation of self-identity:** Personalization of one's environment is the deliberate decoration or modification of the environment.
- 2) **Encourage optimal challenge:** Competence as a psychological need provides an inherent source of motivation for endeavoring to master the possible challenges that are developmentally appropriate. When the students face a difficult and complex task, they get interest and involve themselves for the competence need. Achievement is a learned social need makes one's desire to do well relative to a standard of excellence.
- 3) **Facilitate desire to influence others and to be influenced by others:** ICT, a computer mediated environment (CME), allow people with various levels of need-for-power to strive. For example, a wide acceptance of blog technology is that blogging satisfies one's

desire to influence others (by posting, expressing opinions), as well as one's desire to be influenced (by quietly reading and following others' postings).

- 4) **Provide timely and positive feedback:** Essential for checking on one's progress in mastery goals as well as performance goals.
Providing feedback timely is to set the goal whereas providing feedback positively is to achieve that goal.
- 5) **Induce intended emotions via surface features:** The cognition primacy hypothesis suggests the formation of certain emotions based on interpretation and reflection. The interaction makes a person easy and critical in generating intended emotions.
- 6) **Induce intended emotions via interaction features:** Cognitive absorption concepts include computer playfulness and computer enjoyment.

3. THE AVAILABILITY OF PARADIGM SHIFT

Virtual Campus: This platform is used to afford the best resources and support academically to engineering students. A student-centered system of learning environment is encouraged for learners, employing new technologies.

- In the use of Internet, learners and instructors can use the World Wide Web (WWW) and video conferencing for the collaborative development, present their design projects, deliver Computer Assisted/ online learning (CAL) materials, and serve as a bulletin board for student's questions. They utilize technologies such as email, discussion lists and Internet-based resources to supplement the more traditional telephone, fax and letter help services.
 - The use of CAL facilitates more learning because of its cultural relevance to the learners. CAL is used to educate the learning capabilities of cognitive strategy, intellectual skills such as concepts, problem-solving, attitudes, discrimination, higher-order-rules, motor skills and verbal information.
 - Under the Virtual Campus, a systematic instructional planning such as
E-Learning,
E-Teaching and
E-Tutoring
- A) **E-Learning**, an excellent educational paradigm, allows learners identify the contents they need to learn and access it quickly from a wide variety of educational providers. In this online learning scenario, the teachers are facilitators and student-centered pedagogies, who allocate time for student to use ICT and support to incorporate collaborative projects.
 - B) **E-Teaching** co-operates the students at many levels and prompts to get feedback/ formative assessment. Engineering students from e-teaching classroom showed significant and measurable gains in achievement. Based on a survey deals with the attitude of students towards course evaluations, it has been stated that the students prefer e-teaching than traditional lecture classes.
 - **Virtual 3 Dimensioned interactive models** can zoom in and out the displayed image, manipulate it as they like, and explore it from any angle. For example E-Blocks, modeled on scientific knowledge in the fields of linguistics and cognitive science.
 - **Visualization Map** is a powerful tool to represent the teaching- learning analysis and to simplify the data for easy navigation, citation and analysis.
 - C) **E-Tutoring**, the best supporter of educational institution facilitates teaching and assessment of students with the help of online technologies. E-Tutoring offers live coaching, helps to do homework and focuses to prepare exam given by the tutors,

irrespective of geographical location. By recent advancement of whiteboard and voice technology, online tutoring has been made very simple.

- **Teleconferencing**, an interactive telecommunication technology, offers possibilities for engineering educational institutions for a wide-range of purposes including formal instruction (courses and tutoring), connection with speakers/ experts, multi college project collaboration, professional activities to interact via two-way video and audio transmissions simultaneously. It is the eye-opener even to reach the unreached. The ultimate aim of teleconferencing is to transform the student community from reactive to interactive; interactive to proactive, making the students ignited.
- **Modular Object-Oriented Dynamic Learning Environment (MOODLE)**, a Language Management system (LMS), enables in creating powerful and flexible online courses and experiences for engineering students.
Moodle is used for tracking academics, attendance, liability, partaking sessions, mark assessments, project evaluation, tutorials, forums, blogs and assessment of the performance of LMS and Content Management System (CMS). MOODLE facilitates many approaches used in educational theories such as, Behaviorist, Cognitivist, Humanist and Constructivist.
- For quality education, the Government of India has created some digital repositories and learning objects namely
 - a) Multimedia Educational Resource for Learning and Online Teaching (**MERLOT**) and
 - b) National Program of Technology Enhanced Learning (**NPTEL**).

4. SOCIAL MEDIA TOOLS

1. **Facebook**, a web content, links users to share photographs, have chat lively, watch short video. Shared substance can be made accessible publicly or only among select groups of friends or family.
2. **Facebook Messenger**, a Microsoft Windows program, permits a user to chat online (Internet) with other users. Like text messaging in cell phone, Messenger is used for text messaging, video chat on a computer.
Users can be linked through webcam connected in their computers. By clicking friend's request, users are saved in contact list and then fixed in some other user groups for easier viewing and sorting.
3. **Whatsapp**, a messaging app, enables the user to send text messages, voice messages, videos, share images and documents used to promote services.
4. **Instagram** are used to transfer short videos and photos through mobile app. Users can caption to their posts and make them searched by other users within the app.
Each post appears on their followers' Instagram contents can be viewed either by the public when tagged with hashtags/ geotags or by the private followers.
5. **Gmail** is a free mail service from the side of Google Company for sending and receiving the emails for personal to business purpose.
6. **LinkedIn**, a social network, spotlights on career growth and professional advancement.
7. **Twitter**, a microblogging system, allows the users to post tweet, which can be up to 140 characters long. Twitter allows users to express who they are as a person, promote their research easily by providing links to their blog stories, journal articles and news items, build relationships with experts and other followers, follow the work of other experts in their field, reach a large number of people quickly through tweets and retweets, seek feedback about their work and give feedback to others, keep up-to-date with the latest news and developments, and share it with others instantly, reach new audiences, follow

and contribute to discussions on events, for example conferences that they can't attend in person.

8. **Padlet:** Out of many social media ICT tools, Padlet features are used to customize for teaching learning process. Android App, an important aspect of padlet wall, is a software running on the Android platform in smartphone or a tablet personal computer (PC) running on the Android OS.

Padlet, a multimodal production tool is to support learning English grammar, descriptive and inferential analysis of performance. Also, it reveals the high preference and positive attitude towards using ICT tools as a means for learning.

By clicking the option "invite people" in Padlet, not only the peer groups or colleagues within the college but also faculty from other Institutions can be connected for discussion in order to promote the teaching learning environment better. In general, the learning materials, assignment, tutorial questions and feedback from students are possible.

5. PROPOSED ICT STRATEGIES FOR ENGINEERING EDUCATION

On the implementation level, to reform the engineering education, three proposed approaches are:

- a) University-industry Cooperation,
 - b) Learning by Doing and
 - c) Internationalization
- 1) University-Industry Cooperation is used to select the essential means to screw engineering education with an industrial context. A wide-ranging platform should be established to incorporate universities and institutions for educating engineering talents. For instance, cloud-computing can be installed which is used for updating online course materials and other modern technologies. It is an entry point to the technology world in designing the systems obligatory to share their information across the internet.
 - 2) Learning by Doing, an experiential pedagogical methodology, requires integration of ICT learning activities to master the students in knowledge and skills by doing engineering projects.
 - 3) Internationalization is used to create and share student resource, identify the capability of students in engineering education through conference, exchange programmes, and ICT-enabled learning programmes.
Especially with the help of ICT-enabled learning infrastructures, these programmes will be able to boost the engineering talents for global human resource bazaar and also address the shortage comings of engineering talents.

6. IMPACT OF ICT IN ENGLISH LANGUAGE TEACHING (ELT) IN ENGINEERING

In today's techno-savvy world, English has played a multifaceted role such as global language, lingua franca, a major window on the modern world, medium of instruction, court language and library language. Keeping this point in mind, mastery over English has been acknowledged for any purposes in world-wide today. To be exact, English language is regarded as a vehicle to communicate anything, anywhere, anytime with anyone. In this milieu, integrating ICT with current learning methodology is in need to get the whole exposure of English language acquisition.

ICT-facilitated English language classes help the English faculty members feel comfortable to conduct classes. It has been firmly rooted as an outstanding method of enhancing English Language Teaching (ELT) and English Language Learning (ELL) process. In this era of technologies, even a toddler is familiar in using computers and laptops.

This is the first and foremost reason as to why technology has layered with the idea of ICT-enabled learning methodology, which could assist the kids of present age in a better way and boost their skills.

It has been crystal clear that ICT-enabled language learning boosts up the students to upgrade the competence and success rate of learning route. It is a very supple, interactive and affluent podium that would make possible to the users a whole novel experience. In this virtual age of technology, learners are eminent in using technological tools, without any instruction. In contrary, if they require instruction, they would be able to grab the technics and execute it promptly. These learners communicate with others using electronic mediums like e-mails, internet and so on. They obtain all the information from electronic devices, which has made such paraphernalia, a very crucial constituent in their every walk of life.

By means of ICT in a classroom, a contrivance for English language, learning has lots of advantage. In an ICT-facilitated ELT class, the engineering students would perform the activities on the computer software platform, i.e. Globarena Software, and they will not have any hesitations. ICT would make cyclical and repetitive tasks more appealing and would have curriculum in multimedia formats. For instance, Engineering English Communication courses namely Interpersonal Skills, Advanced Reading and Writing and Professional Communication are designed, according to multimedia approach.

While learning English in multi-media atmosphere, the utilization of ICT assists in creating a lifelong brunt on the learners. English staff acts a facilitator and tutor to the learners. Self learning methodology is being proliferated with the help of ICT-enabled ELT.

CONCLUSION:

Today's cyber-aged students are the best sources of innovation in framing content and formatting it related with ICT-enabled educational services and products. As the educational institutions are the base for the engineering students, it is mentors task to make the students involve in framing and refining ICT-facilitated educational programmes and infrastructures. Implementing ICT-based learning activities should be guided by technology-independent quality standards whereas the ICT-based learning strategies should be supported by international talents, experts of local industry needs. On advanced level, the ultimate aim of engineering education is not only to train engineering specialists but also to make them attain a balance between practical and theoretical tasks in career life. Engineering programmes are the sources that promote digital students' survival competency, a paradigm shift, in engineering education. With the ubiquitous help of ICT-enabled infrastructures, a new engineering education paradigm cultivates engineering talents globally. So it is the best to end with the sayings of Swami Vivekananda – "Let us perfect the means; the end will take care of itself."

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