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# INFORMATION AND COMMUNICATION TECHNOLOGY AND ITS INNOVATIVE PEDAGIGIC PRACTICES IN HIGHER EDUCATION IN INDIA

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**ABSTRACT**

*Despite the innovations of new technologies and its innumerable usages in science and technology, the convergence of computer, communication and content technologies, have attracted a great deal of attention among the Universities, academia, and students to use it for making innovative pedagogic practices. Beside the fact that the institutions already highlighted the importance of ICT in education, it has been widely accepted as a major paradigm shift, and is imperative in education characterized by imparting instructions, collaborative learning, multidisciplinary problem-solving and promoting critical thinking skills and so on. Arguably, ICT have been the enabling technologies that mostly contributed to the emergence of the digital economy and the adoption of these technologies will better equip to learn systematically. This paper brings out some of the best policies, practiced at the University-College level, particularly on the eve of the announcement of 2010-2020 as the decade of innovation by the Government of India, and ICT brings out some of the best-suited modules for making a vibrant and energetic higher education system in India, leaving a fascinating chapter in the communication systems in India.*

## I. INTRODUCTION

Technology ushers in the information revolution in all aspects of human transactions. The internet has changed the way of life, the speed at which new findings of any kind reach all parts of the world in no time, and most of all, the prospects of innovation and development it has thrown. In such a scenario, no domain is likely to remain unaffected by its enormous force. ICT is the new idiom of change in the way the world operates today. While the world is making giant strides into the future, education has no way out but to keep pace with it. Education, which continues to accelerate the life affairs in an unimaginable way, depends so much on technology, particularly ICT.

Education will need to make use of the ICT revolution and invest itself heavily into it by integrating it in all its core processes-teaching, learning, evaluation, research and administration. ICT in education is not a new trend to be followed but it is a way in which education is defined today and more importantly, preserving its relevance in the 21st century.

It has been proved that many researchers use information and communications technology (ICT) tools to augment learning in a great variety of tasks. Pieter Beers et al in their paper argues that the effects of such

researchers are generally measured in terms of intended outcomes. They further argue that the use of additional, more general measures to obtain a more complete impression of the effects of ICT-tools. A study shows why tools should not only be studied in terms of their specific intended outcomes, but also in terms of their effects on working memory, and the cognitive mechanisms needed to achieve the intended outcomes. Another study uses cognitive load measurements and stimulated recall interviews to obtain a more comprehensive view of the effects of learning tools. Results suggest that traditional outcome measures need to be complemented with quantitative and qualitative measures of cognitive processes to substantiate conclusions about intended effects of ICT-tools.

ICT has become a phenomena in 'e-learning' in higher education settings. Ever since the emergence of the new information and communication technologies (ICT), Sarah Guri-Rosenblit argues that the distinct differences between 'distance education' and e- learning in the modern era is challenging in the campus-based Universities. Many policy makers, scholars and practitioners in higher education use these two terms interchangeably as synonyms. But the fact is that distance education in most higher education systems is not delivered through the new electronic media, and vice versa, e-learning in most universities and colleges all over the world is not used for distance education purposes. 'Distance education' and 'e-learning' do overlap in some cases, but are by no means identical. The lack of distinction between 'e-learning' and 'distance education' accounts for much of the misunderstanding of the ICT roles in higher education, and for the wide gap between the rhetoric in the literature describing the future sweeping effects of the ICT on educational environments and their actual implementation. It has been erroneously assumed on which many exaggerated predictions as to the future impact of the ICT were based upon, and it concludes with highlighting the future trends of 'distance education' and 'e-learning' in academia.

The Department for Education and Skills currently shows a high regard for the potential of technology transforming the British education system. Government white papers demonstrate e-learning-based unification strategies that reinforce the message that introducing Information and Communication Technology (ICT) will raise standards in schools. The effect of the developments on teachers and pupils, and questions the government's motivation for change. The introduction of ICT has not been complemented by increased levels of effective professional development for teaching staff in the pedagogy of ICT across the curriculum and may have merely served to reinforce the generational digital divide. In attempting to enchant the pupils, the government may have alienated the teachers. It is, therefore suggested that the Department for Education and Skills should place more emphasis on developing strategies and providing funding for solutions to gaps in the professional development of teachers in their pedagogical understanding of ICT across the curriculum. (Liz Beastall, 2006)

It is observed that the learner-centered university focuses on the educational needs of the student rather than the structure and needs of the teaching university. Learner-centered education enhances classroom teaching with new pedagogical approaches and the use of technology, engages students outside the classroom in experiences that connect learning to contemporary problems, and offers significant research opportunities to students at all levels. Integrating classroom experiences with research led by renowned faculty offers learning opportunities

rarely available in major research universities, especially at the undergraduate level. Learner-centered education at USC will increase the level of academic challenge, promote active and collaborative education, increase student and faculty interaction, enrich educational experiences, and provide a supportive campus environment. Students will graduate with skills in critical thinking, analytic reasoning, and strong written and oral communications. The environment will attract prospective students at all levels and improve retention. (Daniel Atkins, 2005, p. 14).

## II. OBJECTIVES

- To facilitate access to the students to the vast amount of information available on the internet and generate ways to use it in educational process.
- To compliment the teaching-learning process in the classroom through ICT resources, like Over Head Projector (OHP), E Mail, tele-conferencing, video-conferencing and so on.
- To equip the teachers and students with the digital literacy required to operate in a knowledge society and train teachers in the preparation of e-content, e-resources etc.
- To revamp the processes involved in examination, assessment and administration with the help of ICT.
- To impart training to the administration staff also so that administration can work smoothly and effectively with the help of ICT.

## III. LESSONS ASSOCIATRED WITH THE TEACHING-LEARNING PROCESS

### 3.1 Materials Developed By Teachers And Instructors

One of the key lessons found in this study is that it is necessary to focus on training teachers and instructors to use ICT to develop their own teaching support materials. This approach assures ownership by teachers and instructors and enhances the usability of products. Many projects still focus on using materials for teachers and students that have been developed externally; however, such materials often fall short of providing appropriate or relevant content for the local situation.

## IV. TRAINEE TEACHERS IN BASIC ICT AND PEDAGOGICAL SKILLS

Teachers and instructors need to be trained in basic ICT skills and ICT-based teaching methods to feel comfortable about using the materials. It is equally important to train them to integrate ICT in their teaching methods so the transfer of learning occurs when learning in one context enhances or undermines a related performance in another context. Transfer includes near transfer (to closely related contexts and performances) and far transfer (to rather different contexts and performances). Transfer is crucial to education, which generally aspires to impact on contexts quite different from the context of learning.

Research on transfer argues that very often transfer does not occur. However, sometimes transfer does occur. Findings from various sources suggest that transfer happens by way of two rather different mechanisms. Reflexive or low-road transfer involves the triggering of well-practiced routines by stimulus conditions similar to those in the learning context. Mindful or high-road transfer involves deliberate effortful abstraction and a search for connections. Conventional educational practices often fail to establish the conditions either for reflexive or mindful transfer. However, education can be designed to honor these conditions and achieve transfer.

## V. SUPPORT NETWORKING AMONG TEACHERS

Teachers need to be supported to set up platforms that enable them to share their opinions, experiences and teaching materials with other teachers. Face-to-face and virtual
exchanges are both equally important to motivate teachers and improve the quality of local materials. Networking between projects at the country level is also very valuable. For this, the national ICT for development networks supported by IICD represent one possible approach. Cross-country exchanges are also important as a way to motivate and promote the exchange of experiences in ICT for education projects and programmes. For more sustained learning, online communities of practice for practitioners can be an additional option.

## VI. INCREASE ACCESS TO COMPUTERS

Angus, Snyder and Sutherland-Smith, in their article titled, *ICT and educational (dis)advantage: families, computers and contemporary social and educational inequalities* bring out the growing gap between the information-rich and information-poor and voice their concern on how this divide has led to high-profile information technology policy initiatives in many countries (Angus et al., 2004). They also examined four families, one of which had long-term Information and Communication Technologies (ICT) access, and three of which took advantage of the Virtual Communities offer to get home computer and internet access for the first time and identified that their engagement with ICT and suggest that previously disadvantaged family members are not particularly advantaged by their access to ICT.

Any initiative, be it government, NGO or private sector based, should make lobbying for more investments in computers a priority. Most teachers, instructors and students cited insufficient access to computers as the main obstacle in ICT for education programmes. This is particularly relevant for educational institutions located in the rural areas where the school or training institution is often the only access point for computers. Although this will require massive investments in the infrastructure, it is nevertheless essential in order to guarantee equal access and overcome the digital divide.

## VII. INTRODUCE COMBINED OFF-LINE AND ONLINE BASED APPLICATIONS

Access to the Internet is viewed by most as an important tool for education as it allows for easier access to online teaching and learning resources. It also facilitates networking between teachers and between students. Finally, it is an important tool to exchange administrative and management information in the sector. Internet access is recommended where services are provided at a low cost and are of acceptable quality. Yet, in many areas Internet access is either unavailable or very costly. In such cases, alternative exchange modes such as CD ROMS need to be integrated right at the start of a project.

## VIII. SEARCH FOR LOW-COST SOLUTIONS

Even where computer and Internet access is available and affordable, do not develop or introduce expensive online education platforms that require high-bandwidth Internet access. The widespread availability of free and open access platforms strongly increases the feasibility of a dynamic virtual exchange of experiences, opinions and materials. Many discussions have taken place in recent years on the use of Open Source Software versus proprietary software, but clear-cut answers remain elusive. It is therefore important to consider the philosophy as well as the level of convenience and related costs. Second-hand computers are offered free-of-charge or at very low cost by various private sector and not-for-profit initiatives. However, second-hand computers usually come with additional costs for repairs, import taxes and costs to replace missing parts. Alternatives are found in the low-cost PCs such as the 100$ computer and similar initiatives by the private sector.

## IX. SETTING UP AN APPROPRIATE ORGANISATIONAL STRUCTURE

Strategically involving headmasters and parents is necessary for the institutionalization and longer-term sustainability management of ICT facilities. Setting up administrative committees to manage ICT facilities has proven to be very effective in ensuring the sustainability of ICT initiatives. Beyond the institution, it is important to seek political support from the local authorities and the district or national education authorities to prepare for longer-term opportunities of funding and to have ICT recognized as part of the curriculum.

## X. VIABLE FINANCIAL MODEL

Make sure that partners identify a locally feasible financial plan. Private training institutions may be able to generate sufficient income from trainees to afford more advanced ICTs. Larger public teacher-training and training institutions need to define how much of the institutional budget can be reserved for the re-current costs of ICT and take this as a starting point for an ICT plan. Smaller rural schools or vocational training centres will not be able to sustain costly ICT applications and should avoid high recurrent costs right from the start. Empirical evidence, however, does show that small institutions can also sustain smaller computer labs. Through contributions to the school, the Parent-Teacher Associations can be very supportive towards the ICT projects.

## XI. TECHNICAL CAPACITIES AT THE INSTITUTIONAL LEVEL

ICT managers in the participating institutions need to be sufficiently trained to ensure that they can maintain and upgrade the ICT facilities on their own without any outside help. As it is very difficult to retain ICT-trained managers, institutions need to train a select number of enthusiastic teachers and students to ensure that temporary replacements will be on hand if needed.

## XII. HIGHER EDUCATION INSTITUTIONS AS KNOWLEDGE COMMUNITIES

Daniel E. Atkins, in his paper brings out the nature of "universities in the digital age", which has been strongly influenced by the essay of the same name by John Seely Brown and Paul Duguid. They assert that the value of a university lies in the complex relationship it creates between knowledge, communities, and credentials. They suggest, "it is a mistake to think of the university 'delivering' knowledge or students as 'receiving' it. Central to higher education is the way universities provide access to *communities of scholars and testimony for a student's experience among these communities.* Consequently, universities should explore resources (most especially ICT) for bringing people together, not, as some interpretations of 'distance education' suggest, for reinforcing their isolation." Brown and Duguid assert "communities are at the heart of what universities do…"

ICT is one force for change together with others including demography, massification, the labor market, shifting public attitudes, internationalization, intellectual property rights, the state of the academic profession. ICT continues exponential growth in the capacity of computation, storage, and communication technology combined with the progress in socio-technical understanding about how to apply these technologies to knowledge-based activities. ICT is often treated independently as one force collinear with the others. ICT is actually cross-cutting with respect to the other forces and can be the basis for new organizational forms and ways of learning, discovery and creation that affect all the others.

High performance, global scale networking, a special type of software called "middleware", high performance computation services, data, information, knowledge management services, observation, measurement and fabrication services, collaboration service and so on have been considered to be the most important aspects of ICT in education. The network classrooms are becoming popular and the skills have been developed, where training given to the learners on the skills has become paramount in making the learning and training perfect. One writer seems quoting, "If we want to teach writing or help students learn how to write more effectively, then we have to see writing in the same ways that they do and be with them where they write. Networks are classrooms."

Describing the factors of ICT and its practices, it has been observed that using ICTs isn't enough, but critically understanding how these writing technologies enable new literacies and meaningful communication should also be a core curricular and pedagogical function of modern English education. (Jeffrey T. Grabill and Troy Hicks, 2005).

## XIII. INTEGRATION OF ICT IN HIGHER EDUCATION

Information and Communication Technology (ICT) presents to higher education institutions both an opportunity and a challenge for establishing a solid educational infrastructure. By using ICT, a university can provide increased flexibility to students and reach wider audiences beyond the traditional student groups. Park and Moser in their article argue that the goal of this research effort is to provide insights on what core needs and difficult is exist toward the implementation of ICT in higher education in emerging countries. An exploratory research design combining a survey, on-site interviews, participant observation and document analysis were employed to answer there search questions. Some of the major challenges in establishing technology-based learning environments had been identified in the area of pedagogies, finances, technological infrastructure, cultural change, organization, and management (Park and Moser, 2008). In order to facilitate the exchange of knowledge and experiences among institutions of all parts of the world, it is, therefore, recommended that a peer institution should be selected to assist the community through the organization of a symposium and online activities to facilitate the information exchange among community members.

## XIV. CONCLUDING REMARKS

The Information and Communication Technology (ICT) emulates the teachers and students with new skills, tactics and instructions on the basic usage of computing skills so that they may be well-connected with the latest technology in the field of education. The basic four skills in English Language - LSRW- listening, speaking, reading and writing are to be imparted to every teacher or scholar.

The impact of the new technologies on higher education environments will grow dramatically in the future, and will affect all domains of academic activity - research, teaching and learning, organization, finance and government policy. Unquestionably, the new technologies have the potential to provide new exciting possibilities to improve the quality of the study process, and affect the generation and delivery of knowledge both in campus and distance teaching universities. However, the provision of distance education will constitute a partial function of e-learning applications, while the campus will remain a center of university culture, knowledge generation, and the locus of students-faculty interaction. The new technologies are not likely to endanger the existence of the campus universities, but rather enrich, support and enhance many of their activities.

It is observed that the teachers are to be trained with ICT skills to instruct students on basic skills of computing so that they may be well-connected and equipped with ICT for teaching-learning process. The capability of a teacher, who has knowledge of computer skills to teach subjects will tremendously improve the way the Information and Communication Technology is used.

ICT will undoubtedly enhance globalization trends. ‘Internationalization’ and ‘globalization’ are new buzz words in higher education and practice. These two terms draw attention to the undeniable fact that boundaries of what were relatively closed national systems are increasingly being challenged by common international trends (Enders and Fulton 2002). Universities are at present engaged in becoming partners in inter-institutional

schemes and pushing forward in the drive towards globalization. Students, academic staff and curricula are transferred and exchanged between institutions; accreditation agencies ensure promptness in accrediting previous experiential learning and previous academic studies; governments append their signatures to cooperative projects in higher education. Strengthening agreements between academic institutions within a particular country and across national borders will be central to the mobility of adult students.

E-learning exerts global outreach. In an international market, students are able, and will be more so in the future, to approach any university where access policy encourages and extends to international students. This will be particularly true in professional training and postgraduate fields. The outreach of universities to international student clienteles on a global level could be activated at different levels, ranging from enrolling individual students from different countries, through collaborative ventures with other institutions to cooperative undertakings with governments, international corporations and intergovernmental organizations.

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