RESEARCH ARTICLE

TEACHING AND LEARNING WITH ICT: CURRENT STATUS AND FUTURE DIRECTIVES WITH REFERENCE TO UNDER GRADUATE EDUCATION IN GOA

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ARTICLE INFO	ABSTRACT
	Each year, a substantial portion of educational institutions' budgets are allocated to supporting the integration of Information Communications Technology(ICT) into instruction under the assumption that ICT benefit teaching and learning, and can improve student academic performance. The goal of integrating and implementing ICT as a foundation skill area within all curricula is to help students on their journey toward digital literacy through the use, management, and understanding of ICT. Curriculum developers, teachers, and administrators play a significant role in working toward achievement of this goal. Strategies for the integration and implementation of ICT developed, with an understanding of the use and historical impact of technology will help facilitate positive change in the classroom and lead to ICT literate students. This study aims to analyze the current scenario of teaching and learning in the State of Goa, India, be it in the classrooms or outside. Based on the inputs obtained by conducting surveys and interviewing stakeholders in Undergraduate Education in the State, in particular, the study makes predictions regarding the changing roles of instructors, student expectations and needs related to online learning, pedagogical innovation, and projected technology use in online teaching and learning. The researcher would like to prepare a roadmap for ICT implementation in the State as an outcome of this study.

INTRODUCTION

Use of Information Communication Technology (ICT) in enhancing the quality of education is something that almost everyone is interested in, these days. Concepts like open content, open data, and open resources, along with notions of transparency and easy access to data and information is becoming a value. Massive Open Online Courses (MOOCS) are being widely explored as alternatives and supplements to traditional university courses. The workforce demands skills from college graduates that are more often acquired from informal learning experiences than in universities. Education paradigms are shifting to include online learning, hybrid learning, and collaborative models. At the same time, the teaching paradigms across all sectors are too besides including the above demand much more teamwork and collaboration. As the abundance of resources and relationships made easily accessible via the Internet grows, we are ever more challenged to revisit our roles as educators. The abundance of resources and relationships made easily accessible via the Internet is increasingly challenging us to revisit our roles as educators.

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Faculty training still does not acknowledge the fact that digital media literacy continues its rise in importance as a key skill in every discipline and profession. The demand for personalized learning is not adequately supported by current technology or practices. Economic pressures and new models of education are bringing unprecedented competition to the traditional models of higher education. A number of workshops, seminars and training programs in this area are being held regularly. There are also many conferences and publications in this area. However, still the adoption and effective utilization of technology in education is low. One of the contributing factors is the lack of awareness at the level of teachers and institutions, and perhaps the lack of access to usable resources and inadequate sharing of experiences among those working in this field. A study like this will help address this gap, by offering useful inputs and allowing for sharing of experiences with the relevant community. At the same time, the last decade witnessed dramatic increase in technology incorporated into tertiary education. Students are heavily immersed in Web 2.0 technologies, with internet playing an increasingly important role in student life providing countless options for learning. The opportunities are so vast, that navigating education requires an understanding of the current state and future direction of Information Communications Technology (ICT) in the teaching and learning process.

With this backdrop and keeping in mind the current scenario of Higher Education (HE) in India and the challenges that we are likely to face in the quest for remapping and revitalization HE and competing with world class Universities, undertaking a study like this will definitely be beneficial to all stakeholders. India has the policy and technology to implement both small and large ICT interventions in education. What is missing and what fails is in the translation of policy and technology into good practice. For obtaining right directions at this point in time we have to turn to literature on Educational Technology based on studies which portray situations and environments outside India. There are of course a few pleasant exceptions. If the right directions has to be obtained these exceptions will have to be made more regular. So that the findings, observations, suggestions and directions are more in the Indian context and the Indian educators environment is reflected in the studies. The state of Goa is a suitable test bed for study of this kind due to the availability of better access to ICT facilities. This can be contributed to its high literacy rate (82.32%- as per 2001 census) and high PC penetration (23.1 - Draft IT Policy of Goa, 2004) further increased due to a introduction of a scheme referred to as the Cyberage Student Scheme wherein every student from 11th standard onwards is offered a PC at a very nominal rate by the Government of Goa. The next impetus to the ICT scenario in Goa will be offered due to the establishment of the proposed Goa Broadband Network across the state wherein bandwidth of 2 Mbps upto 10Gbps could be offered for public use.

With this backdrop the research that I propose to investigate originated from a concern to establish the current status of teaching and learning with ICT with reference to Under Graduate students and teachers in the State of Goa. The primary purpose of this study is to examine the current trend of teaching and learning with ICT and then based on the outcome- (status), come up with a set of guidelines/pointers/indicators that will act as- (directives) for helping students, teachers, parents, managements and all stakeholders in Higher Education to effectively improve the teaching-learning process through ICT. A secondary outcome however of this study would also be to the various states in India who are thinking of implementing ICT in education and how to effectively integrate the same in the teaching-learning process. It is basically this path-the teaching and learning aspect with reference to ICT that has motivated me to take up this study.

Review of related research and literature on the study topic

Many researches reveal that the integration of ICT helps to reduce the complexity and enhance the overall administration of higher education (Krishnaveni & Meenakumari, 2010). When looking at the current widespread diffusion and use of ICT in modern societies, especially by the young the so-called digital generation then it should be clear that ICT will affect the complete learning process today and in the future ICT provides opportunities to access an abundance of information using multiple information resources and viewing information from multiple perspectives, thus fostering the authenticity of learning environments. ICT may also make complex processes easier to understand through simulations that, again, contribute to authentic learning environments. Extrapolating current activities and practices, the continued use and development of ICTs within education will have a strong impact on: ICT and teaching learning process; quality and accessibility of education; learning motivation, learning environment and ICT

usage and academic performance (Noor-Ul-Amin, S. 2013). The most critical issue facing Higher Education in general is how to provide access to instruction and services that will enable many more students to fulfill their postsecondary aspirations (Schroeder, 2011) and the biggest challenge faced in higher education in developing countries is the provision of quality higher education to the greatest number at the lowest possible cost. LMSs are at the forefront of online technologies making a serious impression on patterns of learning and teaching in higher education (Coates, 2006). While using ICTs in education has some obvious benefits, ICTs also bring challenges. The four most common mistakes in introducing ICTs into teaching are i) installing learning technology without reviewing student needs and content availability; ii) imposing technological systems from the top down without involving faculty and students; iii) using inappropriate content from other regions of the world without customizing it appropriately; and iv) producing low quality content that has poor instructional design and is not adapted to the technology in use (Meenakumari & Anthony, 2013). This clearly shows that faculty need guidance to integrate and use ICT effectively. While teachers are taking their initial strides into the 21st century, there is a feeling of helplessness as they bravely attempt to cope with a data-laden, technology-driven environment. There is a perception that they are more like 'digital immigrants' in the land of the 'digital native' as stated by Prensky (Prensky, 2009). The teaching community in general must strive to elevate skill levels from the bottom up, rather than aiming for excellence at the top of the education ladder. We need to reorient our teaching methodology to be vibrant, competitive, meaningful and purposeful; this is only possible if we strive to come in terms with the rapid change and powerful new technologies so as to have a profound impact on the future of education.

The General Enrollment Ratio (GER) pertaining to higher education in India is currently about 15 percent (Suneja, 2012) and with the prices of entry-level PCs and laptops having plummeted a large slice of India's 180-200 million middle-class homes now own computers. That pretty much describes India's Generation. A recent KSA Techno park consumer survey labeled this generation between the ages of 12 and 21 as Technology Babies those born between 1985 and 1996 and numbering close to 32 million. They were characterized as tech-savvy, gadget-crazy and Internet friendly. But of what use is all this so called tech-savoir-faire if we are not able to use these tools effectively for educative purposes? The scenario in Goa too is not different. Sometime back when I conducted a small survey on a sample size of around 200 college students, to study the impact and effectives of the Cyberage Scheme (Falleiro, 2005). The results were not at all encouraging. A majority of them seem to be using the PC more like an entertainment tool than for any other purpose and there was no proper operational awareness too. This should not have been the case, as the state of the art learning tool is made available to them. The potential of ICTs to enhance educational policies, objectives and practices are tremendous as discussed above. The effectiveness of ICTs-the realization of their potential-depends to a large extent on the context and quality of application. Moreover, since ICTs are only tools for education, it is difficult to isolate the factors that may be contributing to a positive result-such as educational philosophy, quality of teaching, parent support and students' characteristics. ICTs are as good as how they are used. The path from potential to effectives is neither easy nor automated.

Objectives of the study

In this study the Teaching and Learning with ICT is studied. Therefore, I have listed the objectives of this study in two perspectives the Learning with ICT Student aspect and the Teaching with ICT Faculty aspect. These objectives are therefore listed separately in the subsequent sections 3.1 and 3.2 respectively.

Learning with ICT

This study needs to consider/compare/identify whether the effects of how technology is currently used in colleges by students to learn or whether it should examine the effects of how technology could be used for the same purpose. The first approach measures the effects of ICT in actual practice (current status); the second measures the effects of approaches or techniques (future directives) that may not be widely used in colleges but may show great promise. These approaches are not exclusive, so combining them would be possible.

The objective of this study therefore has to be examined in two perspectives the current and the future. In the current perspective the areas to find out/study are:

- The *Usage pattern* of students
  i.e. what activities/operations they do on the PC? How much time do they use the PC for?
  - Use of *ICT as a study tool/aid* in learning?
    i.e. Academic work, projects, assignments, educational CD's, accessing E-content, lecture notes.
  - The *levels of IT consciousness, awareness, and operational* aspects?
    i.e. the IT skills in using various computer applications, overall operational/handling of the machine/drives/hardware
  - The *college environment* that is available currently for students' facilitate/conducive for learning with ICT.
    i.e. the IT infrastructure provide to students on campus be it in classrooms or laboratories, teacher competency, etc.
  - Discuss the *advantages and disadvantages* that students perceived in relation to the use of ICT in colleges
    i.e. the fears/apprehensions of the use of ICT as a tool for learning by the students
  In the future perspective the following issues have to be focused on and investigated so as to come up with an effective strategy for learning with ICT:
  Identifying the factors that can contribute to the successful use of ICT in colleges for learning.
    i.e. what conducive environment needs to be provided for students to learn with ICT in terms of infrastructure, teacher e-readiness and support by the management to help students learn effectively with ICT?
  - Investigate the ways in which the advantages and disadvantages of using ICT are linked to the issues of teaching and learning.
  - Identify the potential formative effect of reflective action research on developing students' attitude and understanding towards the use of ICT as a teaching tool.
    i.e. How is ICT use transforming learning?
  - Suggest ways in which ICT can create a community of sharing and learning and create life-long learners. i.e. a look on possibilities of collaborative learning with ICT

- To prepare and provide a set of indicators/standards for better/effective learning with ICT.
  i.e. I propose to come out with a grading system to assess if a student is ready to be an ICT learner and then provide a framework as to make him ICT-Ready.

Teaching with ICT

This study aims to look at ICT usage in teaching in undergraduate education in Goa from two different viewpoints of Current status and Future directions. The study will try to look at the enabling and inhibiting factors in successful deployment of ICT in teaching as to what are the pedagogical practices of teachers and students that promote or hinder the integration of IT. The following will be the issues of interest in this regard from the current trend perspective:

- Identification of factors for successful/non-successful implementation of ICT integration in classrooms. The indicators representing this could include level of expertise, teacher confidence, purposes for using of computers and Internet, subjects in which ICT is used, and frequency of use. These indicators will help determine the level of teacher's confidence and skills in the use of ICTs, the depth of the integration of ICT use in the teaching process and the type of pedagogy and learning process ICTs are being used for.
- Readiness of the teachers to use ICT as to specific levels of capacity and skills they possess in handling the more interactive, enquiry-based and problem solving based type of teaching induced through use of ICT.
- Requirement of a teacher preparation/training before they can use ICTs successfully in their teaching. The probable indicators could be type of training received (pre-or in-service), level (basic-advanced); number of training hours, source of training, and teacher incentives.
- Presence of an enabling environment. Indicators to demonstrate presence of enabling environment could include: computers and ICT access and number of hours used, access to email/Internet, location of computers, access after school hours, type of software used.
- Organizing baseline data on the availability and type of ICT usage amongst undergraduate teachers in Goa.
- Identifying problems related with ICT usage by teachers.
- Identifying the gap between the current ICT skill in Goan Undergraduate teachers and the ICT standard amongst teachers in and outside India where ICT is used in a more enriching manner in the teaching learning process
- Exploring the sustainability issues concerning the adoption of computers as a teaching and learning tool in the Goan colleges environment.
- Identifying as to what factors do teachers perceive as contributing to successful classroom implementation of ICT and how these factors act, and interact, to make their contributions.
- Studying of teacher practices and also their relation to broader educational issues: mandated curricula, pedagogical philosophies, and school communities.
- Looking at how the Three Ts of Education' — tasks, tools, and time — are used by teachers in their efforts to

'integrate technology into the daily fabric of their instructional practices' (Granger,2002).

- Looking at how teachers take advantage the fact that their students have more access to computers beyond school hours.
- Teachers awareness about new trends in h/w, s/w and other ICT related teaching techniques.

In the future perspective, from the information collected through study about the use of technology in colleges the study proposes to suggest ways and means for technology planning for the future. By studying the standards and best practices in ICT usage teachers in and outside Goa where ICT is used in an enriching and effective manner in the teaching learning process the study proposes to suggest

- Appropriate training and support
- Appropriate prioritization of requirements
- A plan for the future course of action.
- A mechanism to track progress as per the plan.
- Directions for creation of appropriate technology related policies.

Limitation and scope of the study

The sample considered for this study is only Under Graduate students & teachers from the Arts, Science and Commerce streams/faculties taking up courses like B.A, B.Sc and B.Com in under graduate colleges affiliated to the Goa University. I have not taken students & teachers enrolled for other under graduate programmes like B.B.A and B.C.A, as these are self-financed courses and are not funded by the State Government and therefore can be closed anytime on the discretion of the management of the college. Also, students & teachers from professional courses like Engineering, Architecture and the like are not part of this study, as their study requirements are different.

RESEARCH DESIGN AND METHODOLOGY

Research Method

The selection of an appropriate research method in investigating a research problem depends upon the nature of the problem and the kind of data that the problem entails. The present study is mainly intended to find out/analyze the current scenario and future of Higher Education in Goa w.r.t ICT. Various aspects of teaching & learning with ICT will be explored. A Descriptive Comparative Survey Method and Systematic Random Sampling are proposed to be used. A Survey study will be done by administering a survey questionnaire on the students & teachers in the undergraduate colleges in Goa. Review and analysis of records, files and documents from the various stakeholders like Management and Principals of the various UG Colleges, the Education department, Govt of Goa and Directorate of Higher Education about ICT related policies will be done. This method of data collection will be basically used in obtaining information dealing with all indicators on 'ICT-Based policy and strategy' component. Interview of key informants and observation method will also be used.

Sample

The target population of students for the study will consist of all Under Graduate students and teachers.

Procedure of Sample Selection

The Systematic Random Sampling Technique is proposed to be used on the sample under study. All the colleges affiliated to the Goa University will have to be identified and then classified/stratified on the basis of location (rural, urban, semi rural/semi-urban), funding for these colleges (Government, Private/Aided) and the faculties available in the college (Arts, Science and Commerce). Next, the students then classified in the following categories:

- Rural Government. College
- Rural Aided/Private College
- Urban Aided/Private College
- Semi Urban/Semi-Rural Private/Aided College

The number of such students will have to be identified and then using systematic random sampling, the survey will have to be administered to these students. The teacher sample will be classified on similar lines in terms of gender, age, qualification (PG/MPhil/PhD), subject of specialization arts/science/commerce, experience, type of college (Government/Private).

Tools for data Collection

I propose to use the following data gathering/collection tools for my study:

- Questionnaire for students
- Interview with teachers, principals, parents and Government Officials
- Checklist for Institution
- Observation

The investigator herself will develop all the above data collection tools. Besides this, the collection of secondary data i.e. the various circulars, correspondence letters/dispatch details/orders from the DHE to various colleges and then the subsequent issue details to students of the respective colleges; annual reports of the Government of Goa, IT Policy of the Government of Goa, will also be a part of the data collection strategy of this study.

Statistical Techniques for data analysis

The data will be analyzed using means, mode, frequency counts, percentages standard deviations, t tests, chi-square tests, correlation coefficients and analysis of variance depending on the requirements of the indicator.

Procedural steps for Conducting research

The following is a detailed description of research approach, sample, sources of data, and description of data gathering techniques, tools, collection of data, information reduction and data display. The overviews of the various procedural steps that I intend doing are as follows:

Step/Phase 1: *Preparation of Data Collection Tools and Selection of the Sample*

The following is a list of the tools that I intend to use for collecting data:

- **Questionnaire:** Keeping in mind the objective of this study, a questionnaire will be framed
- **Interview with Teachers and Principals**: The questions in the interview will focus on the views of 'Teaching with ICT'
- **Checklist for Institution:** A checklist designed on the guidelines of factors that are essential in understanding/knowing/building the Institution towards facilitating ICT in education will be developed.
- **Interview with Government Officials (secondary Data Collection):** This will help to know the details of the scheme, the views, the expectations, facts, figures of the scheme under implementation and future plans.
- **Observation:** In classrooms and laboratories to see how/whether students' learn/use ICT and teachers use ICT.
- **Step/Phase 2**: *Administering of the Survey and Data Entry*
- Administration of the questionnaire on a Pilot group to identify shortcomings of the questionnaire and flaws if any.
- **Step/Phase 3**: *Presentation, Analysis and Observations of the Data/Findings*
- This is the stage of my study wherein I will be able to know the current scenario/status of Learning with ICT
- **Step/Phase 4**: Analysis and Interpretation of the Results
- **Step/Phase 5**: *Typing of final project report, binding and embossing*

Conclusion

The study described here based on information gathered through the current status of ICT usage will make predictions regarding the changing roles of online instructors, student expectations and needs related to online learning, pedagogical innovation, and projected technology use in online teaching and learning. As institutions of higher education continue to embrace and debate online learning, it is important to envision where the field is headed. What might the next generation of online learning environments look like? Will they move from warehousing students in online environments to engaging them in interactive and motivational activities? What technological and pedagogical advantages will they offer? Current studies provide a glimpse of the pedagogical and technological possibilities. Clearly, we are entering a unique and exciting era in online teaching and learning. And perhaps the perfect e-storm is becoming less cloudy and ominous. The directives that will be formulated at the end of this study by analyzing and interpretations all the various information will definitely help the stakeholders in preparing a roadmap for effective ICT implementation and integration in the teaching-learning process. Institutions of higher education need to consider whether they are ready to meet growing learner demands in the coming years.

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