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Importance of Information Technology in higher education in India- A review

Aruna[1], Dr. Indrajit Singh Yadav[2]

Author[1]: Research Scholar at department of Management at SSSUTMS, Sehore. MP

Author[2]: Professor at Department of Management at SSSUTMS, Sehore-MP

Abstract

Education is the foundation on which the socio-economic development (Paas, 2008)[1] of the citizens and the nation as a whole hinges. Growth of a country depends on its ability to continuously educate the population and create skilled manpower. Particularly, the higher education is the major driver of economic competiveness. Professional Educational Institutions which want to gain competitive edge need to begin searching for creative and efficient ways to attract, retain and foster stronger relationships with the students. Therefore, it is necessary to improve the quality of education by restructuring, reengineering, strategizing and resource planning using state-of-art tools to satisfy the growing expectations of the students. In the present era, use of Information Technology (IT) based services in management and delivery of education has become essential part of educational processes. Internet and Communication Technology (ICT) increases the efficacy of transactions and productivity in the information driven society. Many institutions engaged in imparting higher education are utilizing information technology services as an effective tool for monitoring and improving organization's academic and administrative performance (OECD, 2004).

Keywords: IT, Higher education, ICT, Classroom

1. Introduction

With the emergence of new categories of higher education providers like private colleges and Universities, self financing courses in state Universities and government colleges, distance education providers and foreign education providers, the education system is witnessing a revolution. Indian government is also going to facilitate foreign Universities to establish their campuses in India (Singh, 2007)[2]. There has been a sharp growth in the number of courses as well as in number of students' enrollment which has made the management of educational institutions complex.

This complexity requires use of powerful tools for efficient administrative operations, better communication among the stack-holders (students, parents, teachers, industry, government, funding agencies, society etc.) and better personalized services for the students. New methods and teaching aids must equip the younger generation to learn more Gosh G. (2013)[3]. However, today's educational institutions are facing basic problems like providing improved on-line access of services to the students, improving quality of the teaching-learning process and reducing the administrative and operational costs. Traditional educational providers will have to face challenges in terms of pace and magnitude from the new competitors. The educational institutions will have to reorganize their basic academic practices to take advantage more than that of administrative advantages. They will also have to implement technology holistically rather than just placing them on the current processes (Bansal, M., Bansal, J., Saini, H. S., & Gupta, B. M. (2015)[4]. They will have to improve their physical infrastructure to suit the increasing needs and use this infrastructure for automation in administrative and academic processes.

2. Information Technology and Professional Education

Whether IT should be used in higher education is no more an issue. Computers are so common in an educational system that there absence is more noteworthy rather than their presence. Information technology is a routine aspect of higher education as the information is necessary for the survival of the organization.

Traditionally, higher education in India was looked after by government. However, with the growing economy of the country and rising demand of professionally trained graduates, particularly after economic reforms of 1991, the demand of management and technical education was opened up for the private entrepreneurs. Currently, following types of institutions in higher education exist in the country

- Institutions of high reputes like IITs and IIMs which are set up by Ministry of human Resource Development (MHRD) to create professional managers for the corporate world. They are highest rated in terms of quality. Their success may be attributed to the autonomy granted to them by the government.
- National Institutes of Technologies (NITS) and Indian Institutes of Information Technology (IIITs).
- Teaching departments of Universities and affiliated colleges of the Universities in the purview of National University Education System and regulated by University Grant Commission (UGC). The courses in these institutions are designed and monitored by respective Universities and their quality depends on the reputation ofthe concerned Universities.
- Private Universities and autonomous colleges approved by AICTE.
- Distance Education Universities/institutions like Indira Gandhi National Open University (IGNOU), New Delhi and Bhoj University of Madhya Pradesh.
- Unaffiliated institutions which are neither affiliated to any university nor approved by AICTE. They don't seek any approval and their success is measured by their market acceptance (Satyanarayan, 2004)[5].

The fields of Engineering, Management and Computers Science are dynamic in nature with new tools and techniques continuously being introduced for improving efficiency and effectiveness (Ozden, 2007)[6]. Demand for higher educational institutions is also increasing exponentially. To maintain the current growth rate, huge number of Universities, professional colleges and schools will be further needed by 2020. Educational institutions need to use information technology effectively for improving organizational performance. The emphasis is on ensuring that technology is used effectively to create new opportunities for learning and promote students achievements (Varshney, 2006)[7].

Indian higher education system has grown in a remarkable way and has become one of the largest systems in the world. The growth is in terms of number of students' enrolment, number of Universities, institutions and increasing percentage of educational expenditure. Our higher education system is emerging as one of

the largest education system in the world. Around 16 million students were studying in 634 Universities and approximately 33000 colleges in 2012. In the 12.5 billion population,

2.5 billion (25 crores) are youths between age group 15 to 24 years that is going to rise by 13% annually which is much greater than the average growth rate in the world. Therefore, India is emerging as an attractive market in higher education. Presently, the market in terms of money is 400 billion dollars which is expected to rise to 1150 billion dollars in next 10 years. It is expected that 12th and 13th five year plans will be centered on expansion and development of higher education. Government of India is increasing the investment in this sector by 30% to 40%. By 2020, the enrolments of the students is planned to rise by 30%. In addition to the expenditure, Foreign Direct Investment (FDI) can also be attracted without compromising the quality and relevance (Gautum, 2013[8], Gaikwad, N., & Suryanarayan, P. (2019[9]).

Year	No. of Universities	No. of Colleges	No. of Students
1950-51	30	695	397000
1960-61	55	1542	1050000
1970-71	103	3604	1954000
1980-81	133	4722	2752000
1990-91	190	7364	4925000
2000-01	256	12806	8399000
2010-11	564	33023	16975000
2012-13	700	35500	20327000

Table 1: Growth of higher education in India

Source: www.ugc.ac.in

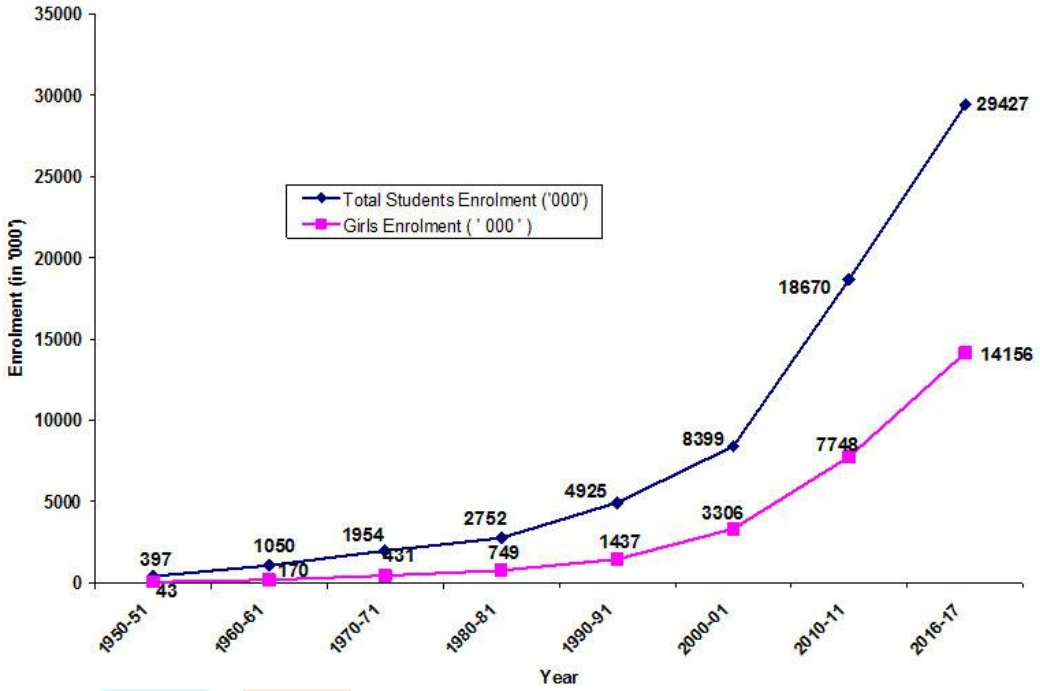

Figure: 1, Growth of Students Enrolment (000) in India

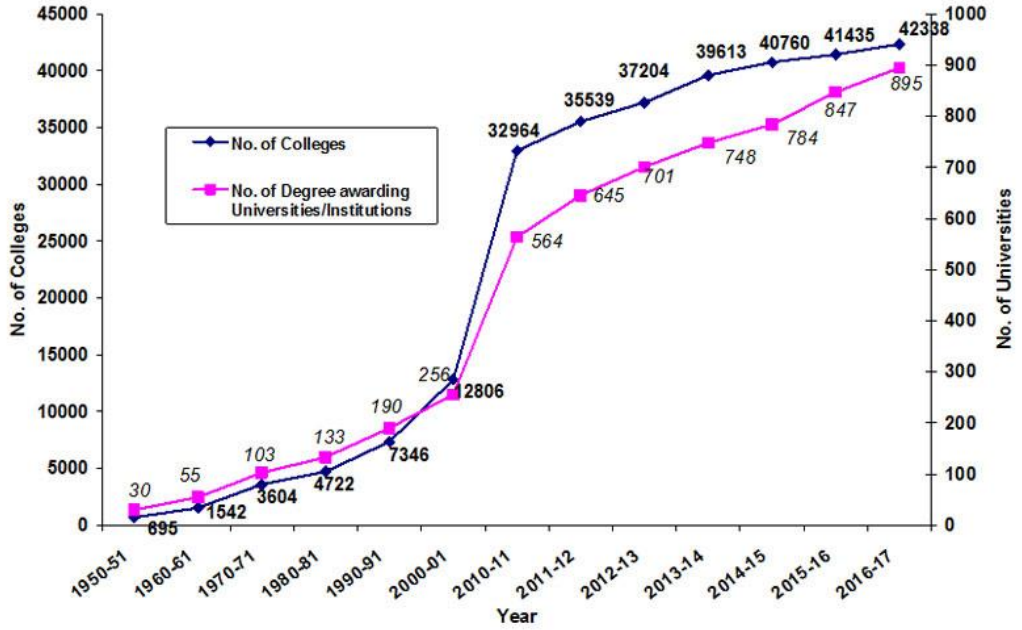

Figure: 2, Growth of No. of higher educational institutes in India

Source: Graph1 and 2- www.ugc.ac.in

2.1 SPECIFIC USES OF IT BASED SERVICES IN EDUCATIONAL INSTITUTIONS

IT services have been used in higher education institutes since 1970 for student admission and records, results and transcripts, human resource database, finance database and management information system (Support and Services for Higher Education and Beyond, 2011). The rapid growth in number of students has accelerated the need of fast, systematic and accurate storage and retrieval of data.

Moreover, the growing potential and effectiveness of technology has provided the solutions which were not available three decades ago. E-Governance, online registration and admission of students, online course material, assignment submission, examinations, result processing through online entry of marks and the discussion forums of students and teachers are few example of use of ICT in higher education (Barta, 1995[10]; Magni, 2009,[11]).

With the availability of ICT for administration, large and complex organization could be created which are able to serve a large population of students even in terms of lakhs in highly efficient and user friendly manner (Buabeng-Andoh, 2012)[12]. IT services can be used in administration of higher education institutes in planning, setting goals, effecting change and monitoring the results of major functional units. The objectives of using ICT solutions in Higher Education Institutions are for:

- Improving the quality and capability of information systems to support strategic decision-making and policy implementation;
- Stimulating and facilitating free flow of information throughout the higher education system; and
- Responding to the needs and demands of the students for better and increased access to university services and information through the web.

E-learning strategies allow individual learners to choose content, time and pace of learning. It has all three major components of learning viz. content management, learning methodologies and teaching methodologies and is capable of replacing traditional educational system. The success of e-Learning strategies depends on how best the different forms of computer based learning can be combine, namely, CD-based education, classroom-based learning and web-based learning (Peterson & Caverly, 2006)[13]. Major advantages e-Learning include:

- Effective and interesting teaching-learning process using ICT
- Availability of variety of study material
- Support for Distance Learning
- Improved admissions, enrollment and examination systems.

3. NEED OF IT SERVICES IN PROFESSIONAL EDUCATION INSTITUTES

The integration of ICTs in higher education is inevitable. The demand for higher education has stimulated sharp growth in both private and public educational institutions. Open Universities, which depend extensively on technology-mediated learning, are expanding and a large number of conventional Higher Educational Institutions are adopting ICT based teaching learning for flexible and lifelong learning.

Eleventh five year plan has proposed for launching of a National Mission in Education through Information and Communication Technology (NMEICT) to increase the coverage in 378 Universities and 18064 colleges. The mission aimed to focus on digitization and networking of all educational institutions developing low cost and low power consuming access devices and making available bandwidth for educational purpose. Collaborative efforts of agencies such as Ministry of Human Resources Development (MHRD), Department of Information Technology (DIT) and Department of Telecommunication (DoT) would be utilized to ensure fully electronic Universities and digital campuses. Snehi (2009)[14], has concluded that the contemporary higher education systems are aiming for acquisition of ICT skills as part of the core education system, provision of infrastructure and fully equipped laboratories, professional assistance and other support needed to enhance the qualityof education.

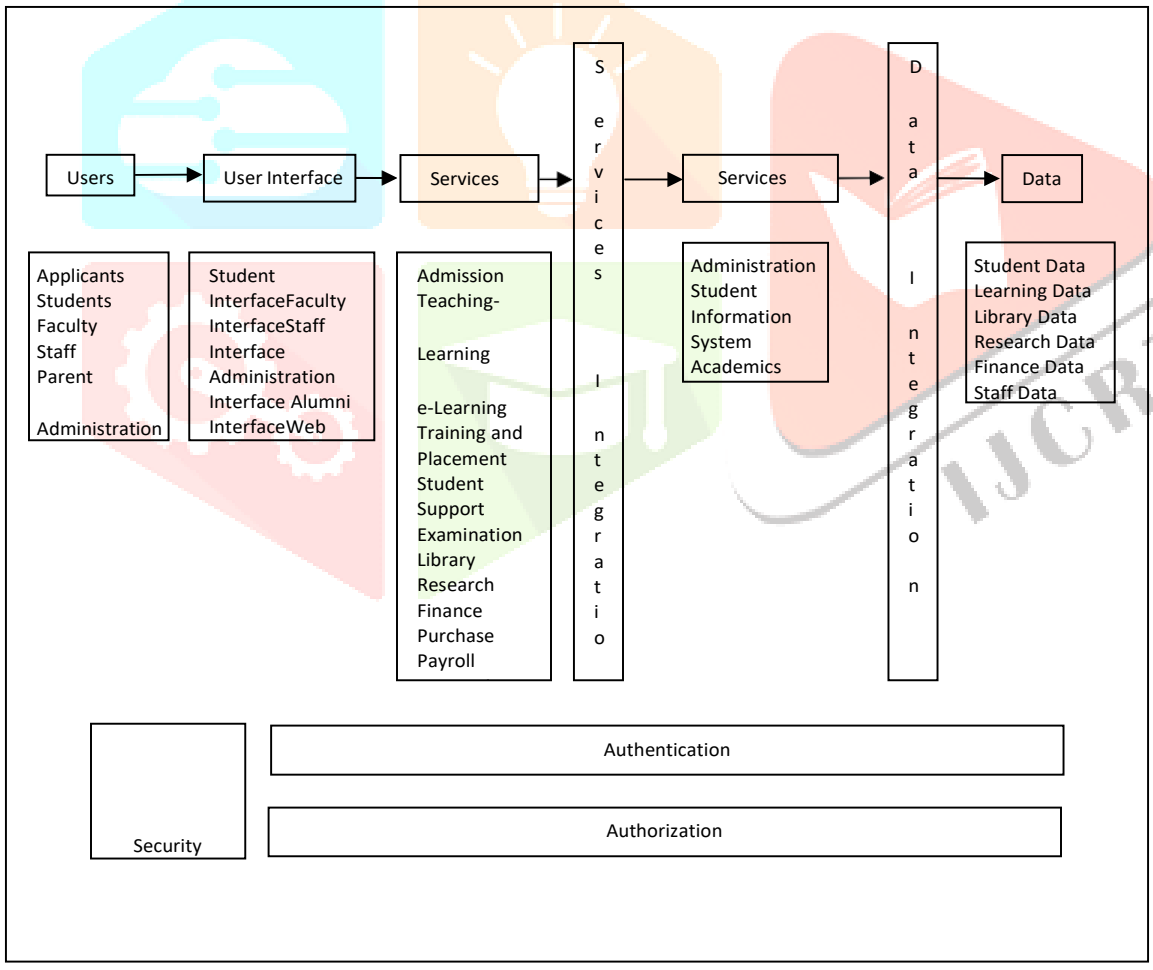

Fig. 3: Preliminary Theoretical Framework IT Services for Educational Institutions

The key elements of various information technology services which are important to researchers and practitioners have been shown in the theoretical framework in Figure 1. IT services are concerned with the collection, storage, processing and transmission of relevant information to support management operation within in an organization. IT services provide better interface to students, parents, teachers and administrative management. Implementation of IT services need accurate repository of data across the departments to store voluminous data from multiple sources. This repository is the enterprise information infrastructure (Bhanti., Kaushal & Pandey, 2011)[15]. The framework depicts five major areas in the educational institutions that can influence the performance viz. IT services for administration, IT services for teachers, IT services for students, IT services for teaching-learning and IT services for research. Within educational institutions, there are stack-holder groups viz. Applicants, Students, Faculty, Staff, Parent, Administration and Alumni. These stack-holders have different perspectives of IT services

3.1 Enhanced Teaching-Learning using e-Learning

ICT based education gives flexibility and choice to join a course. Steps like providing access to video lectures and tutorials by faculty of top institutions, e-Learning modules, multimedia case studies etc. will solve the problem of access to quality education to every student. A number major global institutions and Universities are offering online educational courses. The education can be provided at affordable cost to the meritorious students who can't afford to join the conventional classroom based programs (Kohli et. al, 2013)[16].

In his paper on "Study on the Impact of Information and Communications Technology (ICT) and New Media on Language Learning," Anne has described study carried out by Agogi through an international team of experts on the impact of information and communications technology (ICT) and new media on language learning which was commissioned by the Education and Culture Executive Agency (EACEA). The study was concentrated on assessing current and future use of ICT for language learning. (Anne, 2007)[17]. Learning (e.g. following a course, researching various subjects) can be accomplished by using following IT based techniques

- Various websites
- Real-time communication (e.g. voice over the Internet, chats, videoconferencing, virtual worlds)
- Asynchronous (i.e. non-real-time) communication (e.g. SMS, email, blogs, boards,forums)
- Social networking 'places' (e.g. Face Book, MySpace, del.icio.us)
- Broadcasting services (e.g. TV, web TV, web radio, podcasts)
- Entertainment digital media (e.g. films, music) and digital games
- Various office applications (e.g. word processing, spreadsheets)
- Specific learning applications

Summary

Roblyer, Castine, & King (1988)[19] made comparative studies before and after 1980 and presented their findings. In the pre-1980 studies, nearly all the estimated 200 studies indicated positive evidence that computer-based treatments offered some benefits over other methods, although a clarification was that there were few clear disagreements among the reviews. A summary of the findings indicated:

- Reduction in learning time;
- Limited improvement in motivation towards learning
- Computer-based treatments were generally effective in mathematics and reading/language
- Computer-managed instructions (CMI) was more effective as a supplement at lower grade level
- Slow learners and under-achievers seemed to gain from computer-based methods than more able students.
- Computer-based methods are generally more effective at lower grade levels.
- Effectiveness of computer-managed instruction (CMI) seems to increase at higher grade levels while CAI effects seem to decrease at higher levels.

Conclusion

For the post-1980 review, positive effects were noticed for achievements in analysis of the 85 studies except for Computer Aided Instruction (CAI), achievement in females and attitudes toward computers as instructional media.

The impact of ICT on the learning process is more important and requires looking beyond the curricula. According to Ping & Shelley (2007)[19], and Youssef & M.Dahman (2008)[20], improved student outcomes have been observed using ICT learning with regard to: enjoying learning, motivation, self-esteem, improved ICT skills, better collaborative skills, subject knowledge, information handling ability etc

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