Innovations and Quality Enhancements of Teacher Education by Information Technology -Tools and Techniques

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Abstract- The education is very basic need of any society so it is very important to get education anytime and anywhere. Information Technology is very important in meeting this need.Information Technology has given a number of benefits like immediacy to information, anytime learning, anywhere learning, collaborative learning, and multimedia approach to education, authentic and up to date information and access to online libraries etc. In this paper I have put my effort to understand the role of Information Technology in the improvements in the field of higher education. The Information Technology has given a number of better methods to educate in higher education both for the students as well as teachers.

Keywords: Moocs; Information Technology; KSA; Virtual labs; Smart Class; Digital library.

1. Introduction

The parameter of Information Technology is so vast that it has become a very important part of almost every subject of education. Information Technology has played a very positive role in improving the quality of education from primary to higher education system. But there is always a scope of improvements in every field and this is also true in case of Information Technology. The first section of this paper is about the quality improvements in the higher education that are the byproduct of Information Technology and the second section describes that what further can be done for more quality improvements in the higher education.

2. Quality improvements that has been done by Information Technology in Higher Education

1) **Up to date information:** The success of most of the subjects in higher education depends on the data that is up to date and the latest. Data and information that is out of the course is not relevant for the students. Today a number of websites like Wikipedia.org etc. are the sources of information that is the latest is much useful. Such web sites contain data with graphical format like static pictures or animated pictures are very helpful in understanding the information.

2) **Easy to use and understand information:** With the help of Information Technology there is software available almost for every field of study. For example Statistics, Mathematics, Medical Science etc. the software tools are available to make the topic clear to the students. This software contain graphical user interface that is built with the help of icons, buttons and menus that makes the use of these software very easy. With the help of database drivers these software are capable to store almost every type of data that can be stored permanently and can be used in future. This feature lesser the effort to store data in and use it again and again.

3) **Accurate information:** The computer is a device that makes the calculations very fast as well as accurate. Therefore any package or software that is used in any subject is able to perform the calculation in fast and accurate way. The image processing and a number of scientific equations are solved with the help of high end server computers that otherwise is very time consuming and error prone task if only human beings are involved.

4) **Anytime and anywhere amiability of information:** With the advent of networks and smart mobile devices the information on a server computer can be made available at any place and at any time. This concept has very much importance in higher education. Video server like YouTube is very popular these days in learning process activities. Students of any stream are able to watch online lectures available on these servers. A numbers of professors belonging to IIT institutions and foreign universities have uploaded their very important lectures on these servers that can be used by any learner and at any time without any cost. In the higher education where there is no much time the class room to discuss the topic these web sites are proving very useful. For a single topic a number of lectures are available by a number of

different experts. The mobile devices of these days are not only just for making calls or sending/receiving messages. These are mini laptops. Today almost every software on the laptop or desktop there is a corresponding application available in these mobiles devices. The modern mobile device contain web browsers, office suit, pdf reader, calculator , video player, audio player , camera and a number of features that make the mobile phone a very handy device to learning subjects. The networks like 3G, 4G, 5G, LTE, and EDGE are able to download the data in a very high speed that is very helpful to watch online lectures and topics of interest.

5) **Quality improvements in the learning process**: The Information Technology has changed the way of teaching learning process. Now the learning has become more interactive and full of excitement. With help of presentation software like Open Office, MS Office, Libre Office etc a teacher can make the lecture more interesting because the presentation software are capable of embedding multimedia features like audio, video, 2-D/3-D graphics, images, animations etc. If the internet connectivity is available then it proves better. E topic is explained in depth and without getting bored. These features make the lecture more innovative and more useful for the students.

6) **Digital library:** The academic strength of any institutions depends on that how updated is the library of the institution. The Information Technology has provided a new face of traditional libraries that is Digital Library. These Digital Libraries stores the study martial like journals, books, magazines etc in the digital form. The various quality improvement of these libraries are any time and any where access ,round clock availability of books, journals , multiple access of the single resource, very fast information retrieval , easy to access etc. The students feel more comfortable with these kinds of features. On the other hand these digital libraries number of financial benefits for the institutions because the maintenance cost is very lower than tradition library, lesser human power is required, lesser storage space is required and finally the data is fully backed up. A number of projects are ongoing to digitize the books like Google Book Scanning Project. Almost every academic institution of today is using the benefits of these Digital Libraries for providing better study material to their students.

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7) **Smart classroom:** Smart classes are very popular these days in schools level but these smart classes are very useful in academics at any level. A smart class includes a smart board (Smart Board by Smart Technologies) that works much like a touch screen. It is connected with a computer or a projector via USB port. It works with a stylus to operate. A specific software tools (Smart Notebook) is installed to make it working. This tool allows the user to compile notes, pictures and other media format into virtual notebooks that can be projected and edited with Smart Board. Every student has a screen that displays the data on the board. The control is in the hand of the teacher i.e. what will be displayed and what will be the sequence of displayed information. With the help of audio output lecture can be made more productive. In Engineering, Medical, Mathematics these smart classes are proven very effective [6].

8) **Virtual labs:** Today the labs equipments are experiments are very necessary to learn in higher education or at any level of education. But most of the experiments and the equipments that are used in these experiments are very costly for lot of small institutions. The Information Technology has given a very effective and cheap way to deal with this problem. The solution is Virtual Lab. The web sites like www.vlab.co.in, www.virtlab.com and www.virtual-labs.ac.in are some popular web sites that provide interactive lessons and simulated practical. Only a better speed internet connection is required to do a practical experience. A number of streams are available for experiments. Now the students that are far away from better higher education institutions can learn a lot. Although it is not same as real time experiments but for most of the practical these virtual experiments are proven very effective.

9) **Language lab:** that is Language lab is an audio visual environment that provides an aid in modern language teaching, commonly found in universities, colleges and even schools. These laboratories allow a teacher to listen to and manage student audio. The Information Technology has changed the traditional language labs into digital language labs. These are truly software based systems that can be easily in deployed on the existing PC based networking infrastructure that makes them both multi locations in their access. These digital language labs have more rich features in managing the media that not only includes audio but video, flash based games and internet etc and the content that is now used in the new language labs is much richer and variety and speed of media delivery from students to

teacher is much quicker. In the modern times student s can access and work from these new cloud labs from their mobile devices at anytime and anywhere. The students can interrogate and record the audio, video files and be assessed by the teachers remotely.

10) **Mooc's (Massive Open Online Courses):** This is the latest step for the improvement in the quality of higher education. A number of web sites like Coursera, edX, Udacity,open2study and future learn, Spoken Tutorial etc. are providing a number of well demanded and latest courses free of cost. These courses are certified by top universities of the world. These courses include online video lectures through, complete study material with presentation slides, online tests and finally a student can get a certificate that is valid in each country. Courses are available in any discipline. A student can register online to the courses of his interest [7]. Moocs are available from matriculation to post graduate level. These are short term courses and very well structured.

11) **Improvement in the higher distance education:** Initially distance education continued a few courses but with the help of Information Technology almost every course is available in distance education. Internet has provided an easy way to manage a number of students far away and it is increasing year by year. The success of distance education is due to the well defined infrastructure of the Information Technology [4]. Now students can register online, get their roll numbers, result online. The study martial is available online. In short the whole course is done with the help of Information Technology.

12) **Improvements in the distance higher education:** Distance education covers a major population in every country. The Information Technology has a big role behind this. The advancement of internet has strengthened in e-Learning programs. A study at Kingdom of Saudi Arabia shows that growth rate of internet users is increasing at a very high rate year by year. [1]. The following table shows that statistics:

Table 1: Internet Growth and Population Statics at Kingdom of Saudi Arabia[2]

Year	Users	Population	% Pop.
2000	200,000	21,624,422	0.9 %
2003	1,500,000	21,771,609	6.9 %
2005	2,540,000	23,595,634	10.8 %
2007	4,700,000	24,069,943	19.5 %
2009	7,761,800	28,686,633	27.1 %
2010	9,800,000	25,731,776	38.1 %
2012	13,000,000	26,534,504	49.0 %

The IT centers has improved the quality of e learning with the help of web portals, blended learning approach [a], e-forums etc. One important issue that should be pointed out is that the Kingdom adopts the single-sex education practice, i.e. males and females are separated by the law and there is a strong commitment and implementation of this segregation principle between both genders. This principle creates a lot of challenges and obstacles against the educational programs in the country. Information technology could be the only solution to this cultural and social issue as it provides several techniques to facilitate education for both genders and implementing the law in this context. [1]

3. Need of improvements in Information Technology in higher education

Although a lot of efforts are done by the governments and many non government organizations to utilize the Information Technology for the improvements in the higher educations. A number of plans are executed [3] but the implementations are very poor. A poorly implemented plan is equal to no plan. The following titles highlight some of the ideas that must be taken into consideration so that the Information Technology can be use at optimum level in the improvements in the higher education.

1) **Proper infrastructure:** This is a very interesting scenario that sometimes an organization gets better faculty but it lacks a sound infrastructure of Information Technology. It can be found in Government Institution because in government institutions the selection of faculty is done according of guidelines of UGC or AICTE etc b5ut the infrastructures of professional

course is not available. This scenario must be changed so that better professional education can be provided [4][5].

2) **Latest syllabus and method of teaching:** The syllabus of Information Technology based classes and the method of must be state of the art. Although some basic subjects are always necessary for any I.T. based course but some of the subjects must be up to date so the students can be placed in well established companies and organizations. The method of teaching for IT based must include high resolution projectors, laptop/desktop with latest configuration, smart boards, wi-fi enabled internet and latest genuine software.

3) **Improvements at School level education**: Although the paper is for higher education but the Information Technology is also dispensable part of the elementary, middle education. The students that are taught IT based subjects at school level by a good teacher are more able to get better higher education. So the quality of the education system at school level must also be controlled so that quality of higher education can also be controlled.

4) **Faculty must be skillful:** Information Technology is very young stream and the experts are not available in most of the higher education institutions. But the target of governments and this higher education institution must be the skilled faculty. Government bodies like University Grants Commissions, All India Council for Technical Education that defines the guidelines for faculty always demands for selection of skilled faculty but most of the higher education institutions do not want to spend their money for skilled staff so these institutions hire non skilled and unprofessional persons for teaching. There must be a control of some kind so that better education can be provided, specifically in Information Technology field.

5) **Sufficient packages must be provided to the skilled faculty:** It is seen that most of the skilled persons do not take any interest in participating their time for giving higher education because the packages are small. So these skilled generation either go to abroad or try to run their private business that may be educational or non educational. So the institutions must give interactive money to the faculty so that they can share their knowledge and research with the following generations. In the field of Information Technology the genuine researchers are very rare and they must be motivated to share their knowledge.

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