

ICT in Higher Education: A Review of Issues, Challenges and Solutions with Special Reference to India

Mohit Dixit^{#1}, Lovish Raheja^{#2}

#Parishkar College of Global Excellence, Shipra Path, Mansarovar, Jaipur, University of Rajasthan, Jaipur, India

¹yourmohit21@gmail.com, ²lovishraheja26@gmail.com

ABSTRACT- *The advancements achieved in the field of Information and Communication Technology (ICT) has its implications in almost all the fields known and Education is one of them. Education is itself referred to as a communication process, so the progress in ICT has proven to be playing an essential supportive role for the same. Higher Education is education, training and research guidance taking place at the post-secondary level. And at this level, the student is expected to understand higher-order concepts which are many times hard to assimilate. The use of ICT proposes various ways to simplify the approach. ICT helps in increase in the speed of learning, consistent instruction, higher and strengthened understanding, effective evaluation, simplified training management, obtaining efficient output and similar other benefits. But dealing related issues, on the other hand, is equally important. Ensuring the quality of content, attitudes of teachers and students, lack of technical support and cost are the major issues of ICT in educational implementation. Making Artificial Intelligence compatible with educational needs and making it able for emotion-involved communication is the main future challenge. Level of ICT awareness and continuous development of the ICT tools for educational implementation is must for the ICT enabled learning to grow in higher education. Educators are required to be aware of the effective use of ICT which ensures the highest level of mental development of the students so that their mental growth is not disturbed because it is easy to represent the content applying visual technology but that does not let the student-run his mind for conceptualization. That is why proper training programs focusing especially on this issue are required to be conducted by the respective authorities. The research article mainly focuses upon all these issues and challenges and propose effective solutions.*

Keywords: *ICT, Higher Education, Challenges and Solutions, Artificial Intelligence.*

I. INTRODUCTION

Information and Communication Technologies (ICT) have brought us in a new world which is now referred to as a small village. Quick and easy access to knowledge has given us the opportunity to develop ourselves. It has implications in almost all the fields including education. But education which is itself

referred to as a communication process is yet to adapt to the highest possible and optimal level of Information and Communication Technologies. Especially, higher education where concepts are to be developed in-depth and visualization are necessary. This research article mainly discusses the issues, challenges and solutions for the advanced development of ICT for educational implications at a higher level.

II. OBJECTIVES OF THE STUDY

To understand the concept of Information and Communication Technologies (ICTs)

To conceptualize the need for ICT in the Indian scenario

To identify the issues and challenges in the implementation of ICTs in the educational system

To think of possible solutions after the analysis of issues and challenges

III. LITERATURE REVIEW

In order to understand the development made on the issues, challenges and solutions for the implementation of ICT programs in higher education, the related researches have been studied, the review of which is given below:

Pegu (2014) in his study "Information and Communication Technology in Higher Education in India: Challenges and Opportunities" [21] examined the role of ICT in higher education in India. The study reported poor penetration of ICT programs in higher education and also due to the lingual diversities there are needs to create content in local/regional languages. Further, there are tremendous opportunities as these programs have high potential to achieve expected learning outcomes efficiently.

Chandha (2015) in her study titled "ICT & Present Classroom Scenario" [4] presented her opinion on technological learning tools for learning. She described various ways to incorporate ICTs to the mainstream of classroom teaching and tried to ensure a positive approach towards the successful

implementation of ICTs and suggested practical ideas to do so.

Deol (2015) in his research work on “Effectiveness of CAI Programs on the Achievement in Teaching of Social Studies” [5] tried to find out the effectiveness of Computer Assisted Instruction (CAI) programs on the achievement in the teaching of social studies. He took a sample of 50 students (both male and female) of 9th class of Sant Sundar Singh Public School of district Ludhiana (Punjab). He finalized the sample by conducting the Standard Progressive Matrices Test (developed by Raven) and the students whose scores were falling on average were taken. Then he randomly selected 14 students in the control and experimental group each and then conducted his research. He found that after the treatment of the CAI program to the experimental group, achievements of the experimental group were higher as compared to the control group. This implies that ICT programs had helped in better understanding of the content.

Kaur (2015) in her study titled “ICT Culture in Teacher Education” [14] found that the transformation to technology embedded classrooms requires the transformation of teacher-training. Making student-educators aware of ICTs and assure their compatibility to innovative technologies, she suggested various types of inputs in teacher training such as knowledge of basic hard drive skills, understanding system software, using multimedia, introduction to open-source software, and social, legal, ethical and health issues etc. which worth implementation in teacher-training programs.

Sandhu (2015) in her study titled “Integration of ICT in Teacher Education” [24] focused on the issues and concerns related to the integration of ICT in teacher education program. She arose a major issue that making teachers comfortable with innovative technologies is one of the major concerns to be considered as their comfortability will help integrate ICTs to the classroom teaching. For this purpose, teacher education should be transformed in order to prepare the teachers for changing scenarios.

Girish & Sureshkumar (2017) in their study “ICT in Teaching-Learning Process for Higher Education: Challenges and Opportunities” [9] focused on the challenges and opportunities for implementing ICT in the classroom for teaching and learning process. They also concentrated on the circumstances which are needed to be converted in order to achieve the full potential of ICT programs for better teaching-learning. They found various challenges such as expensive cost, lack of essential infrastructure required for the complex operation of ICT enabled tools for learning, and unfulfillment of basic needs like electric supply, etc. But ultimately there are opportunities for implementation of ICTs as the learning outcomes with their help have improved significantly.

MEANINGS OF ICT AND HIGHER EDUCATION

ICTs are defined by various institutions and scholars as follows:

According to the United Nation Development Program, “ICTs are basically information-handling tools - a varied set of goods, applications and services that are used to produce, store, process, distribute and exchange information.” (UNDP cited in [3])

According to Blurton (2002), ICT is defined as “a diverse set of technological tools and resources to communicate, create, disseminate, store, and manage information.”

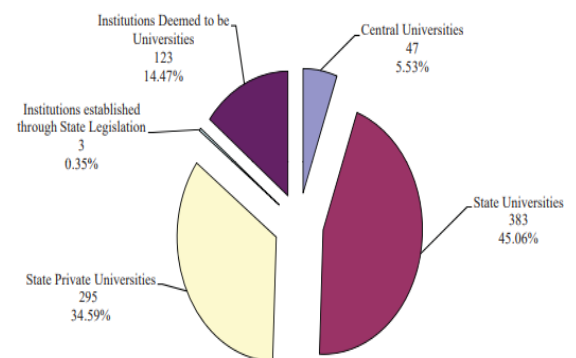
According to Ifueko Omoigui Okauru, “ICT is the digital processing and utilization of information by the use of electronic computers. It comprises the storage, retrieval, conversion and transmission of information.” [17]

Basically, “ICT can be referred to as a set of developing technologies which exist for the purpose of different operations to the information involving communication. These operations include storage, dissemination, creation, management, conversion, retrieval etc.”

In the World Conference on Higher Education in 1998 the adopted definition of higher education as follows, “Higher education comprises all post-secondary education, training and research guidance at educational institutions such as universities that are authorized as institutions of higher education by state authorities.” (World Declaration on Higher Education, 1998)

At this stage of education, students have to choose their respective field of specialization which requires a higher conceptualization than the past. One should have a strong basis to proceed further in his career to achieve a better status in society.

Presently, the number of higher education institutions is increasing rapidly. As per the UGC figures (2018), there were total 851 universities/institutions and 244 institutions/universities eligible for central assistance in March 2018 including central, state, state private universities and institutions established through state legislation, and deemed to be universities institutions as figured below (from UGC annual report 2017-18) [1]:



But the main problem is that technological advancements are not as progressive as the number of institutions. Ultimately, we are going toward the increment in quantity and decrement in quality as

quality education involves contemporary perspectives being up to date is an essential component of that.

The quality of higher education is directly related to vanishing the backwardness of society. The use of ICT eventually improves that quality.

THE NEED OF ICT

The main issue is that all systems have gone through a positive change after the industrial revolution and the development of ICT but educational system have not gone through such effective revolutions. The basic constitution of the classrooms has been the same for the years. The student to teacher ratio is on the peak this time which is one of the main reasons of quality degradation. Now ICT is unanimously helpful in this case, development of personal interaction through artificial intelligence, 24 x 7 learning because “doubts of 40 students cannot be solved in the 60 minutes of class.” Many private start-ups have emerged for this purpose and are quite successful but this common problem has not got a proper formal response from the government authorities and educational institutions. Though NPTEL and SWAYAM, and e-PG Pathshala are some of the ICT-based schemes of the government for quality higher education [1]. Systems need more advancements. Still, a common student does not have access to much of the authorised content. This is needed to be changed.

ICTs are also found to be motivating tools as young minds today are captivated by the new technologies. Also, it promotes co-operative and faster learning, encourages to reach the full potential of the learning and to gain wider reader-base and attention etc. [10]

The components of quality education involve the factors related to learners, teachers, environment and the tools used. Though ICTs are ultimately a tool, these have impacts on the whole system. Their effective use engages the classroom, prevents classroom study to be one-sided, increases and solves the curiosities of the students, make a better and controlled environment. Integration of ICT in Higher Education involves the quality up-gradation of teaching, learning, administration and academic research. Conducting fruitful seminars, management development programs, fast and secure academic activities and transparency are some of the major outcomes of this integration. Also, psychologically the sensory approach used in ICTs is effective to a very high extent, the major element of which is visualisation. [9]. This makes learning fast as well as of great quality.

Adam and Cross (cited in [19]) have talked about 4 major rationales of introducing ICTs in education which is classified into social, vocational, catalytic and pedagogical. Basically, these are the implicative fields of ICTs. For better social living and lifestyle, one needs to have ICT related skills due to the advanced and deep approach of ICTs in common usages. Further, currently, almost all sectors of the profession are imbued by the use of ICTs, that is why from the purpose of vocational development the involvement of

ICTs is a must. As mentioned earlier the processing through ICTs are faster than the traditional methods which means they allow smooth and rapid processing of administrative and learning activities. Another important aspect is pedagogical advancements as one can use audio-visual aids and mainstream teaching methodologies, projectors etc. for better learning outcomes and conceptual understandings, all as a part of it.

In a report prepared by NITI Ayog [26], various benefits of the ICT have been identified which are: instant access to the knowledge for the development of wide sense of understanding, helpful in the customization of the teaching material as per the needs of the students, awakening of the motivation to learn, respecting individual differences, capturing the attention of the students for a longer span of time, formation of a disciplined classroom-environment, etc. Phutela and Dwivedi in their study found [27] that e-learning enhances the interest towards and speed of students' learning. Students' become eager to learn especially in a group task.

As it is well known that the goal of education is to develop and open our minds, it is not just the superficial learning of concepts. For this purpose, the use of ICTs is to be utilized. Otherwise, we will end up with the student who knows and understands a lot but does not have the problem-solving skills. This is one of the major reasons why many educators have a negative attitude towards ICT. So, now we list major issues in the implications of ICT in educational programs-

MAJOR ISSUES

The concern of the quality of content prevents one to go online for learning. As said earlier the authorised content has less accessibility in the lack of which misconceptions take place due to which reliability and validity of the accessible content are less.

The cost of ICT programs is not necessarily less expensive to purchase or implement than traditional face-to-face learning. [2]

Lack of Technical Awareness causes a low confidence level to use online systems. [12]

The traditional curriculum framework is not suitable for ICT implications.

There is a possibility that advanced use of ICT would cause the Identity Crisis of the teacher.

Lack of creative skills for content designing makes the learning boring. [22]

Overlooking the cultural and local point of view also hinders ICT's optimal approach. [7]

Language barrier as most of the content available is in English. [16]

ICT Tools' unsuitability to the students with disabilities is an alarming concern. Accomplishing their needs is equally important for bringing inclusiveness and for the pursuance of the goal of development for all.

Online learning sometimes causes communication obstacles. [6]

Lack of coordination between the executive committees and individuals is also a hindrance. [15]

The radiation caused by the currently accessible ICT tools is very dangerous which is harmful to students' health. [13]

Lack of proper training programs for teachers and students.

Venkatesh and Davis (cited in [8]) identify the key factors as external variables, perceived usefulness, perceived ease of use, attitude towards use, behavioural intention and social influence processes which affect the decision of way of the usage of technologies when presented before the teacher. The factors mentioned are also relevant in the present context. External variables include limitations of accessibility, infrastructure, time, training systems, and lack of teacher's competencies. Perceived usefulness basically refers to those factors which let the teacher believe in the use of technologies such as job performance, effectiveness, increase in productivity etc. Perceived ease of use includes the understandability, easiness to use, controllability etc. Other factors are related to the individual and social aspects of the teacher. The environment he/she is surrounded by plays an important role and his/her personal views at the same time is important for the proper execution of the technological programs.

The fear of technology has also its own consequences resulting in ignorance of the technological upliftment by the educators.

A study by Nakaznyi, Sorokina, and Romaniukha [20] identify the insufficiently developed system of incentives for implementation of information and insufficiently developed regulations for the use of electronic tools in its local research but these issues can also be observed in Indian context as well.

Kundu et al. [25] also list some of the very essential issues in their study which are: lack of trained teachers, lack of knowledge for the integration of ICT with school and higher education curriculum, poor administrative support, financial issues, time-management related problems, lack of the required infrastructure etc.

IV. CHALLENGES (OBJECTIVES FORMATION THROUGH ISSUES IDENTIFIED)

To increase the number of authorised portals for improving the quality of learning.

To promote quality and productive research for direct implementation in the classrooms and gradually applying ideas to reduce the cost.

To run accessible and interactive training programs for students and educators.

To modify the curriculum framework with respect to contemporary knowledge and make it adaptable to the ICT.

To create more and more content in local languages for the preservation of cultural values.

To make the authorised content in clear and simple language to avoid miscommunication.

To ensure that the use of ICT would involve the human instructor as "emotions" have their unexcelled importance in learning and current technologies have not yet been optimised for emotional interaction.

To provide health-related instructions to the users.

To structure an integrated authority which monetises all the factors affecting the grassroots level execution of ICTs and working as an assistant body of the government in ICTs specialization.

To develop positive intent towards the use of technologies and innovative approaches among the students and educators.

To define the role of a teacher in a proper manner while using ICTs (UNESCO cited in [11]).

To prepare the students for being new educational agents (Cabero cited in [11]).

SOLUTIONS (AN ANALYTIC APPROACH TO THE CHALLENGES)

Governments need to take initiatives for the creation of the right knowledge. Several conferences and meetings can be organized for this purpose. The international communities like UNESCO may work on the subject contents of global knowledge. Quick up-gradation of global knowledge if possible, through the international level, would benefit a lot and make students a lifelong learner.

Research cells should be developed at the most possible micro-levels to encourage young minds and introducing their new ideas of the use of ICTs in educational practices in economic and advanced ways. These research cells may be working under the direct supervision of central or state government authorities. The innovations and ideas proposed by these cells must be taken into consideration. If found useful, these should be promoted for further investigations and advanced research in higher research authorities.

Students should be provided proper training for the basic knowledge of ICTs and these pieces of training should be properly reviewed time to time and the curriculum of these pieces of training must be compatible as per the modern needs. They should have a basic introduction not only to the operation of the computer but to the other concepts such as e-business, e-marketing, e-commerce, e-library etc.

Teachers and educators' training are needed to be done in a special manner. Making them technically aware and Training them for effective content delivery, developing the brains of the students are essential. An attitude test must be conducted so to analyze their attitude towards innovative approaches.

A team of experts should be constituted which keep analyzing the current curriculum framework from ICT perspectives constantly and give their recommendations to the respective authorities.

Local language development organizations should be framed inside and outside the educational institutions and second/foreign language development skills should be geared up [18].

Curriculum design may be done at the institutional level specifically related to the ICTs in order to have confident and competent teaching of the subjects [18].

Respect for the teacher must be maintained. Teachers should be using ICT as a supportive tool and not take or understand it as their replacement.

Lifestyle teaching should be involved in the curriculum.

The constitution of a pace-setting unit has been proposed in prior research. [23] This is basically a controlling, coordinating and execution committee consisting of the experts of many fields which would monitor global advancements in the field and implement in the country.

The educational environment should be designed in such a manner that innovative approaches can be appreciated by both the students and educators.

The role shifts of teachers and students can be identified as follows. As ICTs make the learning learner-centred which implies it is no more a single-pole concept, the teacher is no more a primary source of information, instead, he/she should take himself/herself as a facilitator of knowledge and a co-learner and let students realize their responsibility by themselves. The student should be active in learning and should develop the expertise of knowledge by himself/herself whenever possible. (Newby cited in [21])

V. CONCLUSION

Higher education is a very important subject to any country as it develops the realization of citizenship and most part of the working force serving the nation. Presently, higher education systems are growing rapidly. To ensure the quality along with quantity it is important to involve innovative approaches and technological advancements in the educational system. ICT is being implemented in all the fields including education. But the implementation of ICT in education is comparatively slow due to the issues mentioned in the article. The increasing use of information and communication technologies (ICTs) has brought changes to teaching and learning at all levels of higher education systems leading to quality enhancements. There are endless possibilities with the integration of ICT in the higher education system. The use of ICT in higher education not only improves classroom teaching-learning process but also provides the facility of e-learning. ICT has enhanced distance learning. The teaching community is able to reach remote areas and learners are able to access qualitative learning environment from anywhere and at any time. It is important that teachers or trainers should be made to adopt technology in their teaching styles to provide pedagogical and educational gains to the learners. Successful implementation of ICT to lead change is more about influencing and empowering teachers and supporting them in their engagement with students in learning rather than acquiring computer skills and obtaining software and equipment. Innovative technologies promote quality of education but their

implementation is not always easy. We need to take the note of issues, conceptualize challenges and think of possible solutions. This has been tried in this research article. Basically, the solutions lie in the positive attitude towards the new.

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