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Integrating Information and Communication Technology in Higher Education System for a Learner Centric Teaching Approach

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Abstract

Education is a process which facilitates learning. It helps a child to acquire knowledge, information, skills, and above all the capacity to observe study, analyze and 'construct' new knowledge. The educational system develops a child's mind and personality through a system which enables learning in multiple dimensions. The role of the education process and in particular of the teacher, is to 'lead out' the hidden talents of a child by developing the powers of the mind - physical, mental and moral. Today education is a complex and comprehensive science with broader objectives. It is a deliberate and systematic process of instruction, discipline, and harmonious development of the physical, intellectual, aesthetic, social powers of the child. A shift in teaching paradigm the teacher to the learners or 'Learner centered approach' has become the focus of the hour i.e the 'constructivist approach'. Constructivism is a departure in thought about the nature of knowing, hence of learning and thus of teaching. Constructivism paradigm believes that a teacher is a facilitator to help students become active participants in their learning and make meaningful connections between prior knowledge, new knowledge, and the processes involved in learning. In this teaching and learning process the teacher plays a pivotal role of - a knowledge provider facilitator, mentor and guide. ICT is an important tool which can assist the transformation of the traditional teacher- centered learning environment into a learner -centered environment. ICT can improve the efficiency and effectiveness of education at all levels by enabling us in adopting the new paradigm of the teaching learning process. This paper briefly outlines the paradigm shifts in teaching and learning process, the principles of constructivism theory and importance of implementation of ICT and the role it plays in learner centered teaching approach. The paper discusses the methodological framework of learner-centered learning and use ICT in Higher Education.

Keywords –Constructivism, Higher Education, ICT, Learner Centric Teaching.

Introduction

"Goal of education is not to increase the amount of knowledge but to create the possibilities for the child to invent and discover, to create....." – Jean Piaget

Education is a process which facilitates learning. It helps a child to acquire knowledge, information, skills, and above all the capacity to observe study, analyze and 'construct' new knowledge. The educational system

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develops a child's mind and personality through a system which enables learning in multiple dimensions. The role of the education process and in particular the teacher, is to 'lead out' or 'to unfold the hidden talents of a child' by developing the powers of the mind- physical, mental and moral.

The early definitions of education defined it as a bi-polar process of interaction between the educators, who imparts knowledge, with the students to develop their personality. The tri-polar definitions broadened to include the social environment. The role of the teacher was redefined to design and plan educational experiences in the light of social environment. Today education is a complex and comprehensive science with broader objectives. To quote Redden, "Education is a deliberate and systematic influence exerted by the mature person upon the immature through instruction, discipline, and harmonious development of the physical, intellectual, aesthetic, social and spiritual powers of the human being according to the individual and social need..."

Today in the teaching and learning process the teacher plays a pivotal role of - a knowledge provider facilitator, mentor and guide. The present education system in India still emphasizes on traditional teaching approach i.e. lecture method where the teacher focuses on the curriculum and the student on memorization of imparted information rather than creative thinking and participation. The learner in the classroom is an inactive passive listener to the lecturer. The knowledge is transmitted through a direct and unilateral instruction method. Limited interaction between teacher and students limits the development of the ability of critical thinking, analysis and application of knowledge acquired. However, learning is active, social and involves a continuous development of complex and interrelated mental structures.

An approach to teaching that focuses on the learners rather than on the transmission of content and encourages learners to actively construct their own knowledge and puts the responsibility for learning on the learners is 'Learning Centered approach'. To quote Weimer, "learner-centered teachers teach students how to think, solve problems, evaluate evidence, analyze arguments, generate hypotheses—all those learning skills essential to mastering material in the discipline."¹ Learner-centered teaching focuses on developing skills in both learners and teachers for making the students involved actively in the learning process. Learner-centered methods are superior to the traditional teacher-centered approach because the outcome is long-term retention, in depth understanding of course material, acquisition of critical thinking and creative problem-solving skills, and a high level of confidence in knowledge or skills.

The emerging views of education with ICT tools have shifted the education paradigms from teacher centered instruction to learner centered instruction which emphasizes on teaching and learning in an interactive learning environment. ICT tools support interactions between students and teachers and amongst students themselves and therefore assist learner centered teaching. In order to upgrade the quality of higher

¹ Weimer, Maryellen, Five Characteristics of Learner-Centered Teaching, 8 Aug, 2012, www.facultyfocus.com



education a framework for using ICT to support learner-centered teaching in higher education institutions is the need of the hour.

This paper briefly outlines the paradigm shifts in teaching and learning process, the principles of constructivism theory and importance of implementation of ICT and the role it plays in learner centered teaching approach. The paper discusses the methodological framework of learner-centered learning and use ICT in Higher Education.

Objectives of Study

- To briefly review the paradigm shifts in teaching and learning
- To define the principles of Constructivism and characteristics of a constructivist classroom
- To study the role of ICT in the learner centered teaching approach
- To briefly outline the ICT tools which are required for increasing access to ICT Facilities in the learner centered teaching approach

Research Methodology

The paper is based on information and secondary data sourced from various studies and articles on the paradigms of education, constructivism and learner centric teaching approach using ICT in higher education in India. As per the objectives of study, the paper is descriptive in nature.

I. Paradigm Shifts in Teaching and Learning

The 20th Century has witnessed a paradigm shift in Teaching-learning process, particularly within higher education institutions towards 'learner-centered teaching-learning'. This shift emphasizes on blending classroom teaching with e-learning and self-paced e-learning facilitated by virtual learning environments. Therefore, the adoption of ICT learning tools as well as tools of educational planning, learning design, management and administration of the learning and delivery of content to the students is being promoted. Some of the prominent paradigm shifts that have taken place in education are -

Reproductive learning vs. Productive learning – The traditional teaching-learning methodology assesses the learners' achievements on the basis his ability memorize and reproduce the knowledge that the teacher 'transfers' to them rather than the skills acquired in the application of knowledge. Today learning has been redefined. Learning is seen as the construction of meanings by the learner rather than simply acquiring information.

Teacher-centered vs. Learner-centered - Traditional teaching methods focus on the preferences and teaching style of the teacher. The teacher is not only the primary source of information; he also determines the learning environment and activities as per his perspective. The ideal teaching methods to transfer the subject information to the learners mainly use lecture method. In the new paradigm, the focus is laid on the learning perspective i.e optimizing learning which uses teacher-learner interaction.



Teaching vs. Learning facilitation Teaching activity of the teacher implies 'transfer of content' and for this emphasis is laid on presentation/delivery of a lecture. Learning-centered education paradigm focuses on optimizing the learner's learning process. Teachers have to facilitate rather than merely impart knowledge. Use of ICT tools to provide the learners access to an infinite amount of diverse data and information is crucial in this aspect. The teacher's role is to teach or guide students in accessing information, analyzing and interpreting it.

Content-based vs. outcomes-based – The traditional content-driven approach to education focuses on subject content. The emphasis is on the qualification to be acquired and curriculum related to it, level of difficulty, evaluation and grading. An outcomes-based approach focuses on the learning outcomes to be achieved by the learners. The subject content is selected keeping in mind the relevance of the learning outcomes.

Content-based evaluation vs. Outcomes-based assessment Content-based evaluation measures a learner's achievement by the quantity as well as the quality of knowledge reproduced. Outcomes-based assessment use a productive view of learning where the learner's achievement is assessed by the evaluating learning outcomes. These new paradigms are supported by the pedagogical design of 'Constructivism' where the teacher creates a collaborative environment and facilitates students to construct their own knowledge in their guidance.

II. Constructivism

"It is assumed that learners have to construct their own knowledge-- individually and collectively. Each learner has a tool kit of concepts and skills with which he or she must construct knowledge to solve problems presented by the environment. The role of the community-- other learners and teacher-- is to provide the setting, pose the challenges, and offer the support that will encourage mathematical construction." (Davis, Maher, Noddings, 1990, p.3).²

The constructivist or student-centered learning emphasizes on 'posing a question to the students' and then helps them to work together to discover one or more solutions Thus students play an active role in learning. They are able to acquire an in depth understanding of the subject matter. It is now universally acknowledged that constructivist teaching-learning methodology is more productive. Constructivism shifts the focus from lecture and evaluation toward the development of learning-centered, knowledge-centered, assessment-centered environment. In the constructivist approach, the students are in the center of the teaching and learning process.

² Quoted in Ültanır, Emel, An epistemological glance at the Constructivist Approach : Constructivist Learning in Dewey, Piaget and Montessori, International Journal of Instruction July 2012, Vol.5, No.2 e-ISSN: 1308-1470, Vol.5, No.2 e-ISSN: 1308-1470.



The basic principles of Constructivism -

- Each Learner expands his knowledge on the foundations of his existing conceptual framework which is based on his previous experiences of life.
- The role of the teacher is focusing on the learner and making the classroom environment interactive.
- The teacher as a mediator provides quality experiences to learners for meaningful learning.
- In the classroom the teacher should use multiple tools to assist the learner to express his knowledge besides lectures only.
- Classroom interactions - group discussions, answering questions with peers, experiments and projects, designing research and problem solving are an integral part of learning.

Characteristics of a Constructivist Classroom -

- Active participation of all learners
- Student-centered
- Democratic environment
- The teacher facilitates a process of learning
- Interactive and dynamic learning process
- Emphasis on social and communication skills, collaboration and exchange of ideas.

The Constructivist classrooms encourage teaching and learning through activities like - experiments research projects, field trips, video films, group discussions and use of online sources of information rather than mere class lecture by the teacher, assignment and evaluation. Thus the role of teachers in the constructivist classroom is much broader and diversified. The learner-centric classroom strengthen the involvement the learners due to high level of interaction. Incorporating information technology into the classrooms to support teaching- learning methods helps in meeting the goals and conditions of a constructivist classroom. ICT supported learning provides learners with an environment which exposes them to multiple perspectives. The teacher is assisted by many more ICT tools rather than confined to the chalk and board.

III. Role of ICT in Learner-Centered Teaching Approach

ICT has transformed the nature of education: where, when, how and the way learning takes place. A variety of ICT tools and strategies to improve the teaching and learning experience include, computer technology - hardware and software, training in use of technology, application of Technology in instruction using software, application, and learning tools.



Box. 1. Transformation in Teachers Role with the Use of ICT

Transformation in Teachers Role with the use ICT	
Transmitter of knowledge	Guide & Facilitator of knowledge
Controller of Learning	Creator of Learning Environment
Deactivate	Interactive
Information provider	Facilitator, Guide, coach, mentor
Transformation Learners Role with ICT	
Passive receiver of Information	Active Learner
Reproducer of knowledge	Constructor knowledge
Dependent Learner	Autonomous Learner
Solitary Learner	Interactive Learner
Memorize Content	Learning, creative thinking, analyzing and application of content
Drill and practice	Collaborative learning
Examination for evaluation	Portfolio and qualitative performance
Improvement in Curricula and teaching Methodology	
Factual based content	Inquiry based content
Memorize and reproduce	Experiment, understand, practical application
Lecture method of teaching	Flexible teaching using multiple ICT tools
Outreach limited to the classroom	No boundaries with growing online teaching methods
Modern, expanding media applications	
Read and Listen	Read, listen, do, see, say
Delivery of information	Exchange of Information

IV. ICT to Promote Learner-Centered Learning Paradigms in Higher Education in India

“With the emerging new technologies, the teaching profession is evolving from an emphasis on teacher-centred, lecture-based instruction to student-centred, interactive learning environments. Designing and implementing successful ICT-enabled teacher education programmes is the key to fundamental, wide-ranging educational reforms.” UNESCO 2002

Higher education emphasizes on in-depth knowledge and understanding as well as the development of the ability to analyze and critique on contemporary issues and broaden the perspective of the mind. As of 2016, India has 799 universities - 44 central universities, 540 state universities, 122 deemed universities, 90 private universities, and 75 Institutes of National Importance. However 10 % of Indian youth go to college as against 40-50% youth in developed countries. Further, the education techniques are predominantly student-centered. Emphasis is being laid by on the need for improvement and recognition of quality in Indian higher



education system because two third of the Indian universities are providing education to students with the only objective is acquire a degree. Attendance has dropped drastically and class room teaching has become mechanical lecturers. There is a great need to bring quality education in higher education. For this, adoption of the constructivism paradigms and a learner-centered classroom is imperative. For the integration of ICT in higher education the role of teacher will have to change from a source of information to a learning facilitator, collaborator, coach and knowledge navigator.

Increasing access to ICT Facilities requires teaching and learning activities requires many ICT tools-

- Wireless Networks, Local Area Networks
- Equipment (computers, laptops, mobile phones)
- Video conferencing
- Lecture Presentation using PPT
- Instructional Designing
- Student feedback using ICT
- E - content development specialist.
- Information and Library Network(INFLIBNET)

Quality of content development for ICT based educational material has to be encouraged. This needs educational content development specialists. Various courses should be launched by using ICT in this respect. To ensure effective learning, a framework using ICT in course design and delivery, institutional infrastructure is required.

India has taken up major initiatives in imparting higher education through Information and Communication Technology. Gyan Darshan launched in 2000, Gyan Vani, education programs are broadcast on Gyan Darshan and Doordarshan's National Channel, E-Gyankosh for digital learning resources launched by IGNOU in 2005, The National Programme for Technology Enhanced Learning (NPTEL) launched in 2001 a joint initiative of IITs and IISc, are some important schemes. The "National Mission on Education through ICT" is undertaking initiatives for developing and standardizing digital content for higher education segment.

To support the Universities, the University Grants Commission (UGC) has taken some ICT enabling initiatives, which are:

- eNetwork of Universities and colleges - Formation of national educational resource portal
- Consortium –access to electronic subscription of scholarly journals to more than 50 Universities in the country.
- INFLIBNET - UGC has created various Inter University Centers (IUCs), for connectivity network and e-content development. This consortium also has access to e-Journals.
- National Knowledge Network to connect Universities and colleges throughout.
- EDUSAT - for streaming educational content in classrooms.



- SWAYAM (Study Webs of Active–Learning for Young Aspiring Minds) is a programme initiated by GOI to facilitates e-courses (MOOCs) taught in classrooms to be accessed by anyone, anywhere at any time.
- National Programme of Technology Enhanced Learning (NPTEL) and Multimedia Educational Resource for Learning and Online Teaching (MERLOT) are working on development of digital content for different levels of education

The application of ICT in higher education and inclusion of all institutions across the nation is a challenging task. There are many problems which hinder the achievement of this objective like:

- Poor penetration of ICT in higher education institutions due to lack of IT infrastructure.
- Lack of teaching staff trained in basic computing skills and ICT utilization.
- Need of the development of content in multiple languages to increase ICT applications due to linguistic diversity in India
- Need of expensive supportive infrastructure for developing online material along with issues like quality, flexibility and validity of online study material.

Conclusion

The focus of education needs to be shifted from merely acquiring and storing knowledge and memorization for examinations. It is necessary to integrate formal, theoretical, practical and self-regulative knowledge. The challenge is how to develop a curriculum and teaching methodology to achieve this objective. Further, constructivist learning requires a qualitative assessment approach rather than exam based evaluation.

The use of ICT is needed to strengthen the educational system. The teachers have to adapt to use of technology. Access to digital libraries, online databases, networking, etc., has to be enhanced through inter-institutional collaboration to ensure optimal usage of ICT expertise and resources. The government has increases investment in ICT for education and efforts must be made to ensure that this will have a positive impact. ICT helps in extension of education to hitherto inaccessible geographic regions and empower teachers. It can be successfully and widely used only when policy level interventions are directed toward deploying it in school education. The role of technology is to support and enhance school education and not replace it. The development use of technology needs training of teachers. ICT to Promote Learner-Centered Learning Paradigms in Higher Education will play a crucial role in increasing enrollment and retention levels, return on investment, institutional recognition, and improvement in academic performance and quality of students, teachers, research and education in higher education institutions.



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