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Technologies behind E-Learning: A New Paradigm of Higher Education

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Abstract

In current scenario, the e-learning has become an integral part of education in higher educational institutions. In today's world, rapid advancement of technologies has affected different phases of life that includes its effect on education, research, teaching-learning, health, innovations and communications. Progress and development in ICT in educational field leads to origin of new modes of learning i.e. e-learning. This paper provides proposed model for e-learning domain, various e-learning methods that can be employed in higher education institutions, its need, & the various pros and cons of these e-learning methods in higher teaching organizations.

Keywords: E-Learning, Open educational resources, MOOCs, Flipped classroom

1. Introduction

ICT plays an important role in present education system. Every facet of living is associated to ICT in some way or another. The state of the classroom teaching is shifting now towards new advancements in technology. In past, knowledge was disseminated by the educator in a teacher-centric mode that was unable to grow student's attention and student feels fed up. In these days, the teaching is learner-centric. In present education system, the concept of classroom is shifting from one way communication to the two way communication [1]. Nowadays, teachers and students both participate actively in the classroom discussions. Hence, teacher should be able to cope up with the latest advancements in technology to make teaching learning more effective and interesting. So, based on different changing needs of our education system, teachers should switch over to the new concept of teaching learning i.e. e-learning [2]. The recent studies shows that e-learning has a lot of positive impacts on the scientific literacy level of the students as it opens door to various opportunities of rapid search and spread of information in a well-structured manner.

2. E-Learning

E-learning primarily means electronic learning. In other words, **e-learning or** digital learning includes various sources of information & communication technologies. These include digital cell phones, television, internet, satellite communication, [3]. E-learning is the technique to gain knowledge any number of times, anytime & anywhere using computers, laptops and mobiles phones [4]. It differs very much from traditional or conventional mode of teaching & learning. The difference between method of conventional learning & e-learning are discussed in Table 1.

Table 1. Conventional learning vs. E-learning

	Conventional Classroom	E-Learning
Classroom Size & Way of Teaching	• Restricted size • Synchronous way of teaching	• Limitless Size • Anytime & anywhere • Asynchronous
Material	• Pen and paper • PowerPoint • Books • Videos	• Multimedia • Digital Content • Use the Internet to compliment learning outcomes
Personal Requirements	• One way learning	• Learning speed determined by learner

In present education system, there is a need for e-learning because the required target of progress is not being achieved by the method of traditional learning as it had some apparent deficiencies

2.1 Model for e-learning

In e-learning domain, there are basically three main targets: teacher, learner & the learning content. The proposed model for e-learning domain comprises of five layers that help in improving the e-learning process. These five layers are shown in **Fig.1** below:
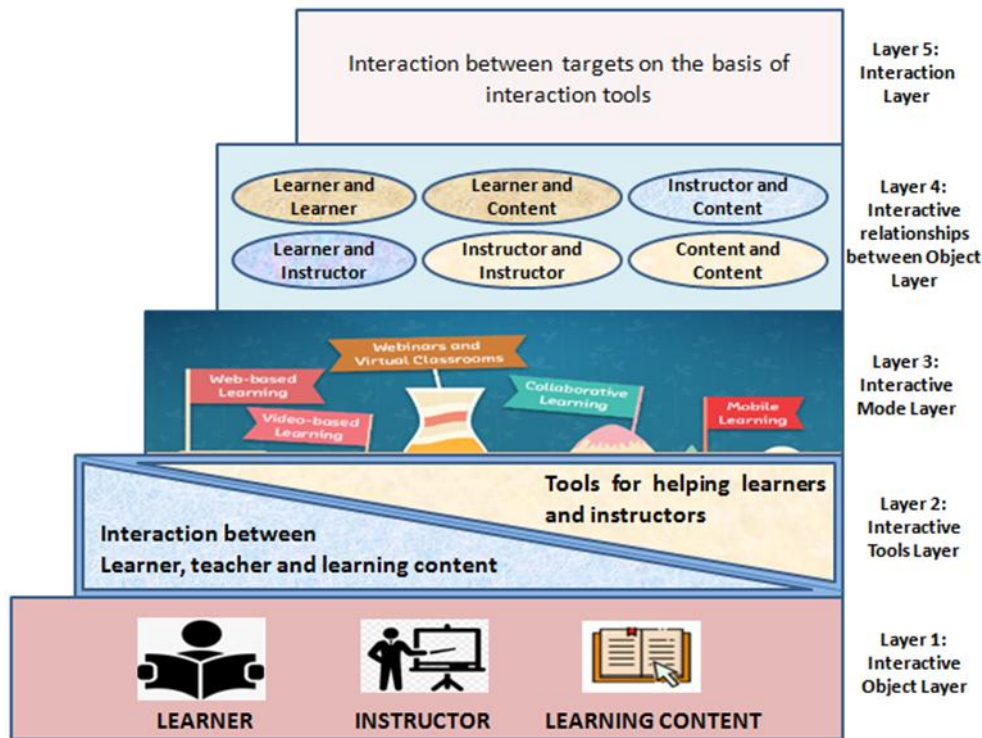

Fig.1 Layers in E-Learning Model

1. **Interactive Object Layer:** This layer includes different learning objects such as learner, instructor and various digital entities that support e-learning. These entities represent educational resource that provides assistance in a learning event.

2. **Interactive Tools Layer:** This layer involves various tools that assist learners in the learning process and instructors in creating good quality learning content. It also issues different types of learning resources. Thus, the main objective of this layer is to support interactions between instructor, learner and learning content.

3. **Interactive Mode Layer:** This layer includes different interactive modes of learning which can be either synchronous or asynchronous. These modes help learners to engage in active learning. This type of interactive learning takes place using simulations, interactive videos, animations, whiteboard etc.

4. **Interactive relationships between objects layer:** This layer involves six different types of interaction relationships such as relationship between learner and learner, instructor and instructor, content and content, learner and content, learner and instructor, content and instructor.

5. **Interaction layer:** This layer establishes the interactions between different targets on the basis of interaction tools used for e-learning. This interaction can be learner to learner, learner to teacher, learner to instructor, learner to content, instructor to content etc.

2.2 Need for e-Learning:

The traditional ways of learning had been used in India extensively. But, today the needs of education sector are shifting and new education standard is commanding itself & demanding the Indian education to undertake lots of alterations. The conception of e-learning is certainly gaining recognition in India but at a very slow rate as compared to other nations. The application of information technology may help in engaging the learners in a five-step process as shown below:

Watching ⟶ Thinking ⟶ Experiencing ⟶ Doing ⟶ Achieving

Development of ICT tools & various other digital tools provide a new arena of learning. It is common belief that "What I hear, I can't not remember; what I see, I do not forget & what I do, I can realize or can understand well." The multimedia and various software tools designed to teach different subjects create a virtual environment and a good experience for the learners that make the learning more useful and interesting [5].

- The necessary requirements of e-learning are-

- Training teachers to use latest technology.

- Inclusive infrastructure, communication tools &latest technology based computer labs.

- Building alluring instructional curriculum & study materials.

- Providing these instructional materials round the clock.

- Reducing prices of ICT tools

- Feedback from diverse culture

Today all professions require expertise in ICT. Hence e- learning becomes an important tool in today's society [6] New pedagogical innovations such as concept of flipped classrooms & massive open online courses (MOOCs) are replacing traditional face to face talk and chalk method of teaching in today's world [7] By these innovations, students can gather & exchange information at any number of times, anywhere, anytime. A model to build an e-learning culture is shown in Fig 2. To create a culture for e-learning:

- Learner should be self motivated, directed & regulated

- Teacher should be well versed with latest technology & skills and assist learning opportunities to the learners.

- Administrator should provide proper infrastructure, learning environment & resources for lifelong learning to the learners and teachers.
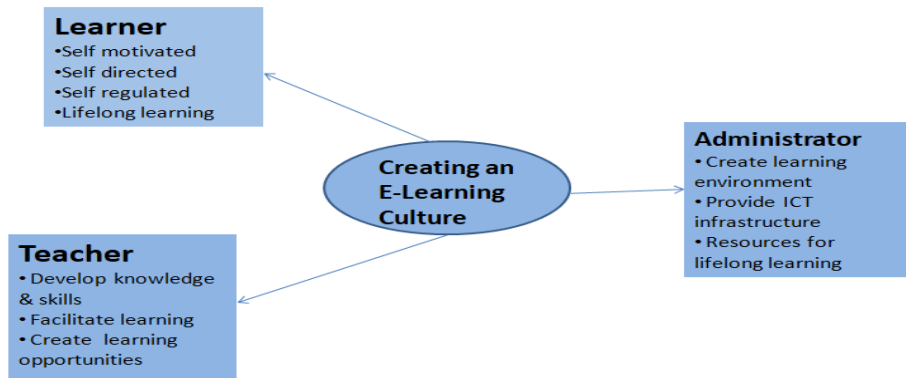

Fig.2. Model to build an e-learning culture

2.3 Open Educational Resources (OERs)

These are the most recent ICT tools used for education in modern society. These are any kind of teaching & learning content that are generously reachable & are accessible in the community sphere and can be utilized with a license known as Creative Commons. OERs are free for access by one and all; one can lawfully & generously duplicate the material, utilize it & also distribute it. OERs include lecture notes, textbooks, modules, course content, tests, projects, software packages, audios, animation and videos [8]. The different elements of OER's are diagrammatically represented in Fig. 3.
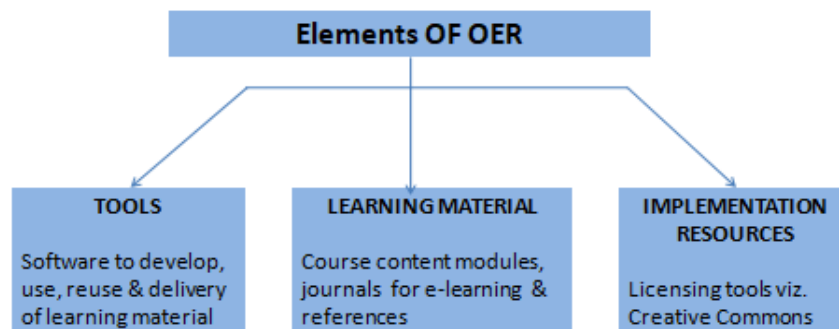

Fig. 3. Different Elements of Open Educational Resources

OERs are certified in a manner which permits the user with agreement to employ in its 5R's activities such as:

1. **Retain:** One has power to make copies of the material i.e. can download, copy, store, & control the content in own way.

2. **Reuse:** One has power to use the material in a broad array of ways i.e. in a class, in a group, etc.

3. **Revise:** One has power to adjust or alter the material i.e. can convert it into another language.

4. **Remix:** One has power to remix the two contents to create some new material i.e. integrate the material into a webpage.

5. **Redistribute:** One has the power to share the original material with others i.e. can provide copy of the content to someone else.

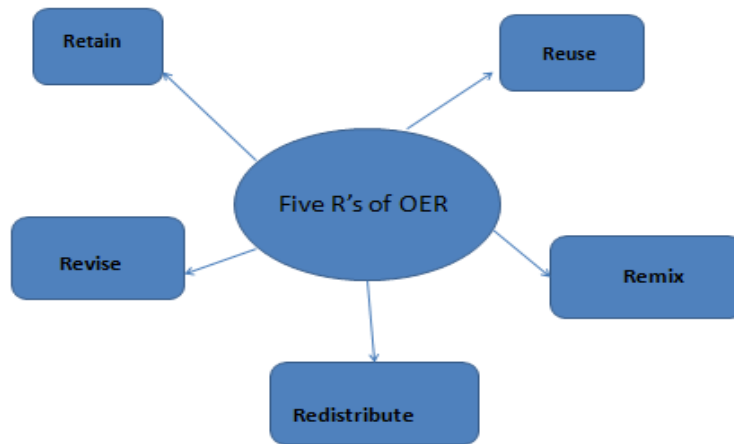Five R's of OER are shown diagrammatically in Fig. 4-

Fig. 4. Five R's of Open Educational Resources

2.4 Flipped Classroom

It is a novel concept of e-learning. It alters the idea of conventional learning through online learning matter provided outside the lecture room [9]. In this method, learners can see lessons or videos at house at any time suitable to them. Then, they will attend the class with their assigned work done at home and take part in the learning practice aggressively as shown in Fig 5.

The pros of flipped classroom are that learners can see the material or the videos provided to them as per time suitable to them. A student can learn according to its own speed & the educator can get sufficient time to accomplish the needs of learners. Moreover, learners get plenty of new insights of the content and explore the technical tools that may be incorporated in the class [10].

The cons of the flipped classroom teaching are that students can attend the class without doing their homework. Moreover, it may be that students do not have access to tablets, smart phones or laptops, and can also have poor internet connectivity.
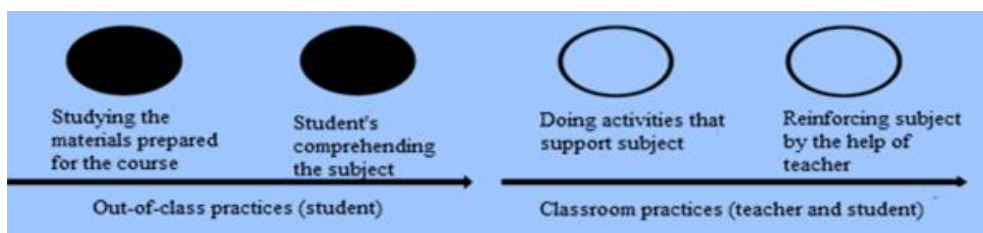
Fig. 5 Flipped Classroom Mode of Teaching

2.5 Massive Open Online Courses (MOOCs)

These are the well designed courses in which e-content is provided to the students in the form of a virtual class using an LMS portal. The e-content is organized in a logical order to compensate the specific outcomes framed for the learners [11]. Besides the content, there are many activities given to the learners in form of online quizzes, live chats & discussion forum.

The **fundamental idea of the MOOCs** is based on 4 A's i.e. anyone, anytime, anyplace, any

number of times. These are extremely reasonable as these are accessible without any cost. Various Platforms for MOOCs are MOODLE, EDX, IITBx, Coursera, Khan Academy, Future Learn, Canvas, Swayam etc. **SWAYAM** is developed by Government of India. It is a portal that provides a variety of

online courses. It uses most recent ICTs and covers matter of middle school level education with all higher education. In India, the MOOCs are developed by SWAYAM beneath the auspices of MHRD by NPTEL, UGC, AICTE, IITB, CEC, IGNOU, IIM Bx and NITTTRs etc [12].

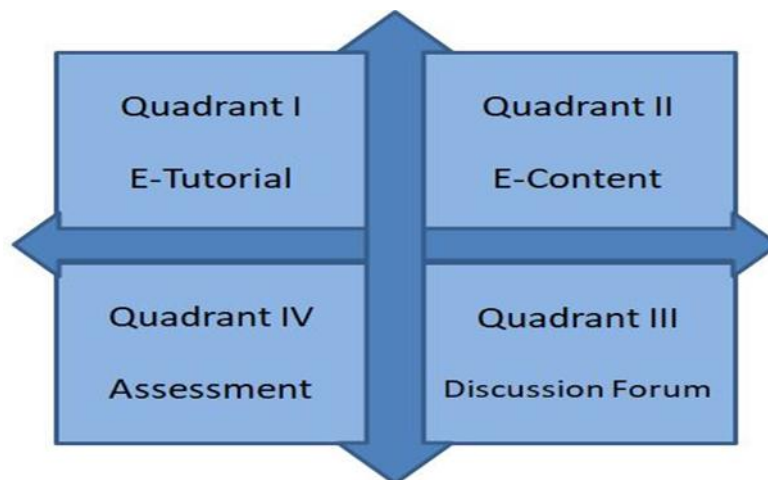Massive Open Online Courses are based on 4-quadrant approach and is shown in Fig 6.

Fig. 6. Four Quadrants of MOOCs

The **pros** of MOOCs are that learner can learn with its own speed at any time suitable to him. Another benefit is that it makes the education **learner-centric** & interactive [13].

The **cons** of MOOCs are that learners learn most excellent socially; hence it is unsuitable for persons who learn with inspiration. Moreover, low rate of completion is its main drawback.

3. Conclusion

To meet the educational needs of 21st century students, it is essential to employ novel approaches in education sector. There is no one method for determining the best possible level of ICT incorporation into the present educational system, innovative & well-trained teachers in higher education should incorporate innovative teaching & learning aids to teach students in their classes. For higher educational institutions to implement e-learning, various management agencies should provide sufficient funds. The traditional classroom has to be transformed and ICTs should be used in conjunction with well planned classroom teaching. In present scenario, only ICT & e-learning proposes new prospects to increase the educational standards in higher education.

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