

## A review of E-Learning in Higher Education

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### ABSTRACT

The e-learning has become an important part of higher education in light of the crises facing humanity, including wars, displacement, and the epidemic. On the other hand, information, and communication technology increases the use of digital devices for many purposes in the world, especially education, through which learning can be achieved, such as higher satisfaction, motivation, and increased student participation. This paper provides a background for e-learning in higher education institutions and reviews the concept of e-learning, its requirements, and the various strategies of e-learning, in higher education institutions.

**Keywords:** E-learning, Higher Education.

### استعراض التعلم الإلكتروني في التعليم العالي

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### المخلص:

أصبح التعلم الإلكتروني جزءاً مهماً من التعليم العالي في ظل الأزمات التي تواجه البشرية من حروب ونزوح ووباء. من ناحية أخرى، تعمل تكنولوجيا المعلومات والاتصالات على زيادة استخدام الأجهزة الرقمية في العديد من الأغراض في العالم، وخاصة التعليم، والتي يمكن من خلالها تحقيق التعلم، مثل زيادة الرضا والتحفيز وزيادة مشاركة الطلاب. تقدم هذه الورقة خلفية عن التعلم الإلكتروني في مؤسسات التعليم العالي وتعرض مفهوم التعلم الإلكتروني ومتطلباته والاستراتيجيات المختلفة للتعلم الإلكتروني في مؤسسات التعليم العالي.

المصطلحات الرئيسية: التعلم الإلكتروني، التعليم العالي.

## 1. Introduction

In the tutorial environment, students' characteristics are raised through the service gained among the coaching method. Increased utilization of technology during this process can develop capability and encourage students to need a lot of inventiveness, and would possibly cause more output [1].

Aside from learners, such learning or training is in addition essential for the lecturers. Furthermore, to the skillset they already possess, this might assist lecturers in developing more creative teaching ways still as more sensible student analysis systems [2].

E-learning is also a viable different to an ancient teaching environment wherever the lecturer and students occupy identical physical space. Analysis reveals that E-learning encompasses management of students' educational outcomes. This could be seen in sensible assessment or examination results, additionally as a usually positive perspective from the students. This reflects the actual undeniable fact that good results and positive reviews are necessary so on encourage the intention to utilize E-learning [3].

E-learning, as delineated by Khan, is "an innovative approach for delivering well-designed, learner-centered, interactive, and expedited learning atmosphere to everyone, anyplace, anytime by utilizing the attributes and resources of varied digital technologies together with different kinds of e-learning materials suited to open, flexible, and distributed learning environment" [4].

There are five parts that directly influence e-Learning:

- E-Learning obtains info from lecturers. This info includes the content of the course, course topics and schedule, course assessment, and connected study material. This info is delivered by lecturers and constitutes the idea for course necessities. Content may be a key part since it's one of the differentiating factors that separates effective from ineffective e-Learning [5]. Content must not be treated as an independent substance that is freelance of the setting wherever it has learned and used.
- E-Learning obtains info from learners and their characteristics. Learners have very different information backgrounds and learning designs. The dissent in however they read the educational setting. Learners in numerous social-cultural environments react otherwise to competition, authority figures, and gender variations, etc. Hence, values and learning designs implicitly have an effect on the means during which learning is undertaken [6]. For example, learners might have difficulties overcoming their ancient roles as passive listeners, and that they might have difficulties to adapt to the construct of e-Learning.
- E-Learning is littered with learning theories and associated pedagogic ways. These types the terribly basis of any e-Learning system. Learning theories are one among the key forces behind e-

Learning as a result of the powerfully have an effect on its implementation. Hence, vital to the planning of e-Learning may be a pedagogic foundation engineered on solid learning theory. Learning theories will be associated with 3 main models: behaviorist, creative person, and cooperative learning. e-Learning obtains this info from academic researchers and practitioners.

- E-Learning is littered with the knowledge technology being employed, which refers to the hardware and software package infrastructure of e-Learning. In distinction to ancient software package systems, that are engineered employing an unvaried technology infrastructure, e-Learning systems run in a very heterogeneous computing setting that features multi-platforms, multi-browsers, multi-software, and multimedia system support. This setting has programming languages, machine-controlled tools, and plenty of different means that of implementation, like LMSs (Learning Management Systems). Additionally, wireless technologies are triggering a replacement wave of mobile e-Learning [7].
- Finally, e-Learning is influenced by the establishment or organization, during which the system operates. The institutional context includes info problems, like timetabling and course of study of courses. additionally, legal and moral problems play a very important role since e-Learning is littered with legal

constraints, moral conventions, together with copyright protection of data producers, security against information manipulation, and every one style of cheating [8] Finally, academic policies of the establishment exert sturdy influences on e-Learning [7].

E-learning platforms may be accessed anywhere as long as there is an online association, as well as reception, the geographic point, restaurants, or whereas traveling. E-learning is additionally cost-effective, less time overwhelming, and reduces the burden on each student and educators [2].

## 2. E-learning Requirements

To deliver and manage their learning processes, establishments are using learning platforms. A learning platform could be a set of interactive online services that give learners access to data, tools, and resources to support instructional delivery and management. Learning platforms square measure sometimes remarked as a learning content management system (LCMS), virtual learning environments (VLEs), or learning management systems (LMSs) [9].

Here are five kinds of the essential requirement for e-Learning:

- Teachers' needs evoked from lecturers represent the course data. These capture the academic goals, the teaching content and associated topics, teaching ways, the kind of ideas and skills that learners ought to acquire, assessment procedures, etc.

- Pedagogical needs derived from educationalists (educational researchers and practitioners) specify the foremost applicable learning ways nonmoving in current learning theories, e.g. behaviouristic psychology, art movement, collaborative.
- Learners' needs evoked from learners describe the learners' characteristics, like learner's learning designs and ability levels, and learners' previous data and skill. The specification of learners' characteristics permits the thought of individualized learning.
- Technological needs from info technology employees refer to the hardware and software system platform of e-Learning (Web, Internet, LMS, LCMS, etc.) and associated set of technical standards, like flexibility, interactivity, responsibility, efficiency, web site structure, cross-platform, screen look, navigation, linking, transmission style.
- Institutional needs evoked from institutional leaders consult with the organization, within which the system operates. These needs describe legal constraints, moral conventions, copyright protection of data producers, security against data manipulation, and every one style of cheating, further as instructional policies and privacy issues [7].

Learning platforms exist as proprietary or open-source software systems. Proprietary LMSs square measure commissioned underneath exclusive legal rights, restricted from modification, more

distribution, reverse engineering, and different uses. They are distributed as closed-source programs with LMS license prices supported a per-user fee. Open-source programs, work under the terms of the GNU General Public License, which is meant to ensure the liberty to share and alter the program and make sure that it remains free for all users. The Solutions for low net property may be thought-about, like local area network (LAN) -based LMS, offline players, and mobile-learning technologies [9]. The E-learning necessities are:

- Comprehensive infrastructure, quick communication tools, and trendy pc labs.
- Training academics to use technology.
- Building enticing instructional curricula and materials.
- An effective program for the academic method of student registration, follow up, and analysis
- Providing these instructional materials round the clock.
- Reducing prices [10].

### 3. E-learning Technology

#### 3.1 Open Educational Resources (OERs)

Any form of learning and teaching materials that are freely accessible and are obtainable within the property right is termed Open Educational Resources (OERs) and may be used with an open license (Creative Commons). OERs embody course materials, modules, textbooks, lecture notes, assignments, tests, projects, computer code tools, audios, videos, and animations. The setting of those OERs is that they need free access to

everybody; one will lawfully & freely copy the content, use it, and additionally re-share it [11]. For educational activity, there are four classes of OER particularly, open textbooks, open

courseware, open on-line courses, open-source code, and tools as in Figure 1 classes of OER for higher education [12].

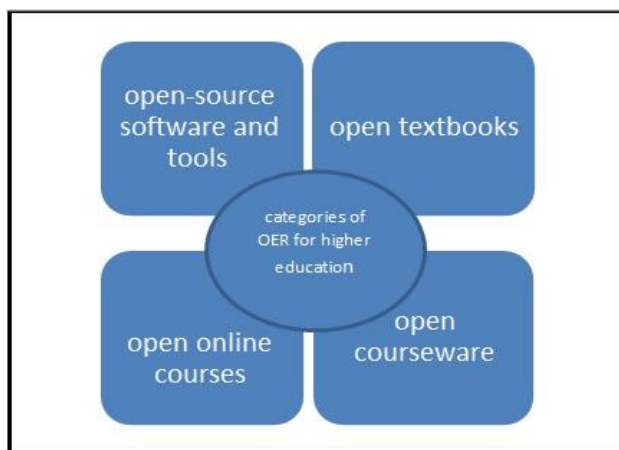


Figure 1. Classes of OER for higher education

Creative Commons (CC) license is one in every of the general public Open copyright licenses that let the free distribution of a proprietary work that active by OERs [13], an author needs to allow people the correct to share and use the work that has been created by him will use a CC license.

In addition, OERs are authorized to permits its users with free permission to interact within the

actions as shown in Figure 2. The Retain (can transfer & manage the content), apply (can use the content during a class or creating the video), Revise (can modify or translate the content), Remix (can combine two or additional contents to form a new content), distribute (can share the content with others) [11].

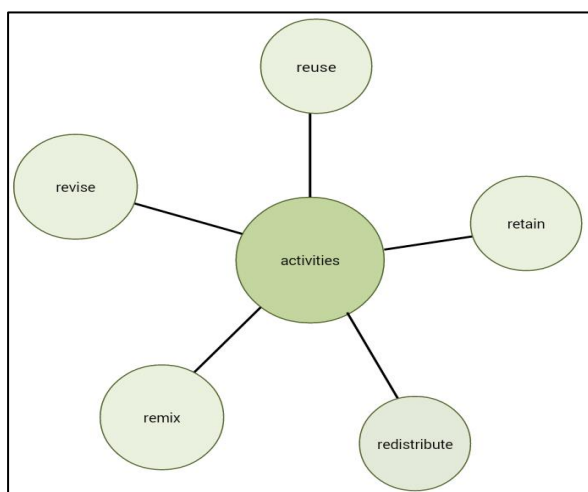


Figure 2.The actions of Open Educational Resources

One of the variety OER is user-generated contents like Wikipedia (2013) has gathered twenty-six million articles in 286 languages and Wikibook (2013) has gathered over 2,600 open textbooks, and institution-led open courseware and on-line courses (OCW, 2013; OUUK, 2013; EdX, 2013; Coursera,2013) Open courseware has created 2,150 open courseware (OCW, 2013). Coursera (2013) has existing several open online courses, the digital warehouses of learning objects, materials, and textbooks (CCOTC, 2013; FDLC, 2013; FlatWorld, 2013; CNX, 2013). Connexions has hosted over 17,000 learning objects and modules for open access and adaptation (CNX, 2013), and open-source software and tools to support teaching and learning (Moodle, 2013; Sakai, 2013) [12]. Moodle Example of generally used Open source instructional software and its compatibility Linux system, UNIX, Windows, Mac OS X, FreeBSD, and the other system that supports PHP and Downloaded regarding five hundred times on a daily basis. Over 28,000 registered locations, over 1,000,000 courses, a learning community of ten million.

### 3.2 Blended Learning

Blended learning could be a novel model of learning, which mixes the advantages of each ancient face-to-face learning, and ICT supported

learning as well as each offline and on-line learning no matter the management over time, location, path, or speed. It is a large chance for collaborative; constructive and computer-supported learning [14]. It desires precise efforts, the proper perspective, a decent money budget, and extremely qualified lecturers and learners for its unvanquished implementation. It is a tough project because it consists of diverse modes, which can be complicated to contain into the present gadget of education [11].

### 3.3 Flipped Classroom

The flipped classroom reverses the thought of ancient learning by providing on-line educational material outside the classroom. in a flipped-classroom approach, the on-line lectures are seen by students, and work along as a team in on-line discussions, perform analysis research, and use the ideas within the classroom with the steering of an educator or a mentor [15].

Briefly, in flipped classrooms, students see lesson videos at any time convenient to them. In getting to know the learning process, actively they arrive in the classroom with their homework and participate [11].

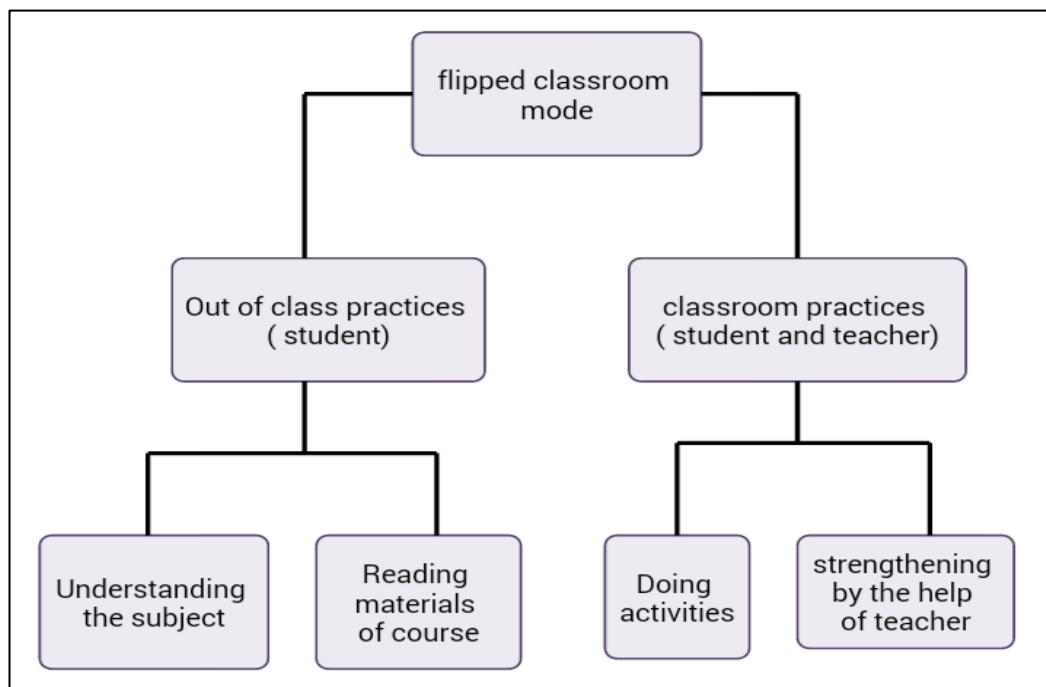


Figure 2. Flipped classroom mode

As shown in figure 3 in flipped schoolroom mode the places of schoolroom activities are modified out-of-class activities. In addition, the teacher is not any longer teach students as a lecturer and supplies a versatile learning setting for his or her students. The topic that is not understood by the students is argued via lecturer and place stress on

the assorted topics of the topic with the assistance of special activities [16] for every student and therefore the teacher within the schoolroom ought to be equipped with a personal laptop digital computer. The subsequent table summarizes the hardware requirements [17].

Table 1. Summarize the hardware requirements

Hardware Specifications	Minimum Requirements
Processor	1 GHz 32-bit (x86) or 64-bit (x64) processor
Hard disk	16 GB available hard disk space (32-bit) or 20 GB available hard disk space (64-bit) for Windows 7 installation. 16 GB of additional space must be available for course applications and files.
RAM	1 GB RAM (32-bit) or 2 GB RAM (64-bit)
Network interface card (NIC)	Wireless, 10/100 Ethernet, or Gigabit Ethernet

Sound card/speakers	Required
Video adapter	DirectX 9 graphics device with WDDM 1.0 driver
Network connectivity	Enough wireless nodes, hubs or switches to allow classroom computers to communicate and access the Internet.
Monitor	1024 x 768 screen resolution using a VGA, DVI or HDMI connector
Web camera (Webcam)	Any type of Web camera. Some monitors include an internal Webcam. USB Webcams are a good choice.

The minimum requirements for the Virtual Classrooms show in table 2 [18].

Table 2. Speed requirements/ recommendations

Call type	Minimum download / upload speed	Recommended download / upload speed
Audio Only	30kbps / 30kbps	100kbps / 100kbps
1:1 Video	128kbps / 128kbps	300kbps / 300kbps
Group video (3 people)	512kbps / 128kbps	2Mbps / 512kbps
Group video (5 people)	2Mbps / 128kbps	4Mbps / 512kbps
Group video (7+ people)	4Mbps / 128kbps	8Mbps / 512kbps

The Zoom one a widely known example of a classroom that gives on-line practice applications. The information measure utilized by Zoom is going to be optimized for the most effective expertise supported by the participants ‘network. It

will automatically regulate for 3G, WiFi, or Wired environments. The following table suggested bandwidth for conferences and webinar panelists [19]:



Table 3. Recommended bandwidth for meeting and webinar panelists

download / upload speed	high quality video	720p HD video	Receiving 1080p HD video	Sending 1080p HD video
For 1:1 video calling	600kbps (up/down)	1.2 Mbps (up/down)	1.8 Mbps (up/down)	1.8 Mbps (up/down)
For group video calling	800kbps/1.0Mbps	1.5Mbps	2.5mbps	3.0 Mbps
For Zoom Phone	60-100kbps			

### 3.4 Massive Open Online Courses MOOC

Now, the foremost smart approach accustomed provide on-line courses is MOOC that is the large course designed to support unlimited (logically) participation and are offered through a platform. Since the time of its development in 2008, MOOC has gained plenty of recognition. As of December 2016, more or less fifty-eight million students are registered for the MOOC courses, offered by quite 700 universities and around 6850 courses [20], offered by numerous suppliers like Coursera, edX, Udacity[21]. MOOC courses have a schedule with starting and finish date. Also, there are some self-paced courses always available for registration that do not have any time restriction to link a course and are solely 6 % all MOOCs offered [22].MOOC platform delivers a MOOC course, that provides some specific feature. As an example, for the native users of various origins belonging to different states/ countries, the platform itself is provided in multiple languages, not the content. Sometimes, the platform used for

delivering the course is on the market with its code for everybody, to be used or tailored for giving their own MOOCs. Therefore, anyone curious about giving MOOC will use the already existing platforms that are on the market free either as open-source or acquire proprietary that's a closed platform not on the market to be repurposed. The Indian government has a policy to market the utilization of open technologies.

Nowadays, users can access the courses via mobile devices together with tablets, smartphones, than ever before. By considering the issue and for ease of the users, suppliers are providing mobile applications for their MOOCs. Moreover, these applications will support multiple platforms like android and iOS, permitting the learners to use mobile devices to induce enroll, access to course content, and participate in altogether course activities [21].

For example, Course Builder The platform provides basic practicality for presenting course material. It provides basic services like Google accounts, hangouts, friend circles, that may well be used as the social networking feature if implemented properly. Yet, the platform does not incorporate social networking in and of itself. Course Builder is constructed on the google app engine. It is written in Python. It uses the Google app engine for hosting the net application and python for server-side scripting. In 2013, Google declared to figure with edX as a contributor to the open source platform, Open edX. Since then, they are solely providing maintenance for his or her previous platform; no future improvement is completed from then [21]. Here could be a list of high 5 MOOC suppliers by enrolled users:

As example Course Builder The platform provides basic functionality for presenting course material. It provides basic services such as Google accounts, hangouts, friend circles, which could be used as the social networking feature, if implemented properly. Yet, the platform does not incorporate social networking as such. Course Builder is built on Google app engine. It is written in Python. It uses the Google app engine for hosting the web application and python for server side scripting. In 2013, Google announced to work with edX as a contributor to the open-source platform, Open edX. Since then, they are only providing maintenance for their previous platform, no future enhancement is done from then[21].

Here is a list of top four MOOC providers by registered users:

- Coursera – 23 million [23] the goal of this

enterprise springs from this idea: “to empower folks with education, (...) to attach folks to an excellent education so anyone around the world will learn while not limits”. The more share their hope to at least one day be able to provide access to “a foremost education”.

- edX – 10 million [23] edX’ goal is to bring education to students around the world. However, additionally, to the enlargement of access, they additionally address the problem of pedagogy; which means to “enhance teaching and learning on field and online; advance teaching and learning through research”.

- FutureLearn – 5.3 million [23] similar goals as Coursera and UdaCity. “We need to inspire learning always. We provide various choices of free, high-quality online courses from a number of the world’s leading universities and different outstanding establishments. Our aim is to attach learners from everywhere the world with high-quality educators, and with one another. we tend to believe learning ought to be agreeable, social expertise, with lots of opportunities to debate what you’ve studied, so as to kind|to create} recent discoveries and form new ideas”

- Udacity – four million [23] that aims to “bring accessible, affordable, engaging, and extremely effective education to the world”. It additionally mentions the upper prices of education and shows its issues relating to the ways that of teaching in the ancient domain. In their read, what should be inspired in education is “less passive listening, however additional active doing” [24].

Massive Open Online Courses (MOOCs) incorporates the online courses, which are

developed as per the pedagogy and have a four-quadrant approach as shown in Fig 4.

- Quadrant I: It consists of e-tutorials, which has video and audio contents, animations, simulations, video demonstration, etc.
- Quadrant II: It consists of e-content, self-educational materials, e-books, case studies, etc.
- Quadrant III: It consists of net Resources, which has supplementary reading, assignment and solutions, e-quizzes and the feedbacks, discussion forum
- Quadrant IV: It consists of self-assessment. It includes numerous issues and solutions, MCQs, fills within the blanks, match, etc. and numerous e-quizzes and the feedbacks. It conjointly includes a discussion forum, wherever learners will ask for clarifications or doubts and difficulties from the course coordinators [11].

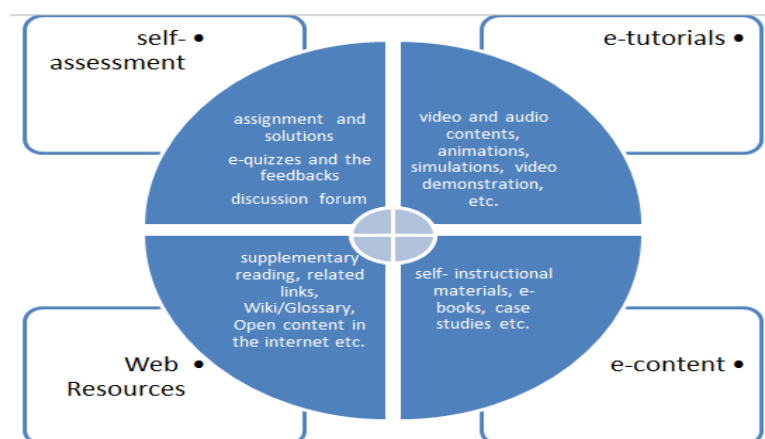


Figure 3. Approach of Massive Open Online Courses (MOOCs)

#### 4. Conclusions

This paper has been presented a background for e-learning in higher education establishments and reviews the thought of e-learning, requirements, and techniques of e-learning in teaching and learning in n higher education establishments such as Open Educational Resources (OERs), Blended Learning, Flipped Classroom (FC), and Massive Open Online Courses (MOOCs).

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