# A COMPARATIVE STUDY OF E-LEARNING PLATFORMS AND ASSOCIATED ONLINE ACTIVITIES

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**ABSTRACT**
E-learning provides an opportunity of skill development and knowledge gain from anywhere, anytime and anyplace. Schools and higher education institutes are facing closures due to the spread of the COVID-19. During this period a noticeable impact is observed in take up of digital learning by students and professionals. Now a day there is variety in e-learning platforms. These platforms can be a mobile apps, video conferencing apps or LMS software. The purpose of this research is to study various activities performed in e-learning environment. This paper will present the comparative analysis of widely adopted e-learning platforms. This study would be beneficial for educationalist while adopting an online learning platform.
**Keywords:** E-learning platforms, LMS, Video Conferencing, online learning activities

## INTRODUCTION

E-learning, a term defined by Jay Cross in 1998, founder of the Internet Time Group, became prevalent. (Cross,2004, pp.103-110). E-learning is defined as 'Learning modules which can be accessed by individuals by internet enabled devices.' It is also referred as 'the use of technology to deliver learning and training programs' (E-learning portal, 2009). Online educational courses enable learners to log on and move through menu based choices anytime, anywhere at their own pace and leisure (Wisset, 2006, pp.269-277). Social learning, employability and entrepreneurship are some of the major dimensions of continuous learning. Multi-device offering and offline touch will provide more responsiveness amongst the learners. E-learning platform is advantageous in terms of enhanced learning, cost effectiveness, flexibility in timing, uniform quality of content delivery, re-usability of the content etc. In addition to that it places no age limit for the learner (KPMG 2017).

Platform is a software or hardware on which other applications could be developed and executed. The widely adopted platforms for e-learning are web based, mobile based and desktop based. E-learning platform allow learners to access online resources and information to support educational delivery and management. In 2020, emergence of video conferencing applications, dedicated dynamic content websites and evolution of internet leads to better opportunities in electronic communication and access and transfer of educational resources (Kirti Punia, 2013). Learners have started adopting language learning apps or online flashcards, schools are using online classroom services and professionals have different online certifications and degree programs etc.

The quality of an e-learning course is affected by the factors like student's engagement and training, content, granularity, interactivity, personalization etc. Open ECBCheck is an accreditation and quality improvement system for e-learning program that supports organizations to measure the success and permits continuous improvement through peer collaboration. (Ehlers, 2009)

## RELATED WORK

Mohammed Ouadoudet al.(2016) used software engineering and pedagogical engineering approach to evaluate the quality of platforms used for e-learning. The analysis is based on the characteristics like usability, functional suitability, compatibility, portability etc. The paper has presented a comparative analysis of four freely available e-learning platforms in qualitative approach. Study was aimed to measure the degree of competence between technology and the pedagogy. The objective was to present this study as a recommendation system for selected free e-learning platforms.

  

Gopal Sakarkaret al.(2012) article has provided comparative study of various architectures of e-learning platforms. This study has focused on research challenges and design issues in improvement of intelligent e-learning architecture system in providing online classrooms. Authors have suggested to use Semantic Web technology and intelligent software agents for learner's personalization in e-learning.

Păduraru Monica, Elisabeta, Mihăilă, Robert Alexandru (2018) compared 5 popular e-learning platforms present in the market. The comparison is done on the basis of user's profile, price, free trials, platforms used, facilities offered, technical and documentation support etc.

Adekunle I. Obasaet al.(2013) studied MOODLE as asynchronous platform while the Elluminate is synchronous platform for e-learning. This study involves the comparative analysis of online learning system platforms.

Yılmaz S., Erol İ.E (2019) presented a comparative content analysis of popular platforms preferred by universities in Turkey. The study as carried out to examine how online education is transformed into a more effective structure with the help of developing technologies. This study has determined that Augmented Reality and Virtual Reality make significant contributions to the instructor control, interaction and the experiential learning.

## ACTIVITIES IN E-LEARNING

E-Learning platforms allow instructors to coordinate their work, focus on learners and receive constant feedback from them. Designing of regular student activities are significant for student's engagement and to keep them on task. Gamification increases the student engagement and knowledge acquisition by incorporating fun, rewards, collaboration and competition in various activities.

Activities carried out at e-learning platforms can be categorized as Synchronous and Asynchronous activities**.** Synchronous activities take place in real time when people from both sides are present at a given time. Video and audio conferencing, online chatting, white boarding, application sharing and instant messaging are some the examples of synchronous activities. Self-paced courses, forums, blogs, messaging, streaming audio and video, sending e-mail etc. are asynchronous activities which are time-independent (Bailie, 2009).

In e-learning environment student assessment can be done through online quizzes, tests, postings in bulletin-board, projects, participation in chat/discussion forum, proctored tests etc. (Beaudin,2016) The table below, illustrates types of Online learning activities and Learning Outcomes based on Bloom's Taxonomy (Mirriahi,2020).

Table 1. Online learning activities and Learning Outcomes

| **Type of Learning Outcomes** | **Tasks** | **E-Learning activity** |
|---|---|---|
| Remembering | defining, identifying, recognizing, listing, naming, retrieving | Online self-test, online search, Flash cards |
| Understanding | Summarizing, comprehends, explaining, categorizing | Blogging, Tweeting, Tagging, Discussion Forum |
| Applying | Implementing, operating, using, editing, solving | Simulations, Virtual labs |
| Analyzing | Organizing, Outlining, integrating, comparing, validating | Polling, annotating videos |
| Evaluating | Testing, experimenting, checking, judging, moderating, critiquing | Blog critics, online debates, virtual labs, peer review |
| Creating | Compiling, Designing, publishing, developing, producing, inventing, constructing | Podcasts, video casts, Presentations, Digital storytelling |

## LEARNING MANAGEMENT SYSTEM

Learning content can be delivered and managed through LMS software framework. As per the definition given by OVAREP, 'the e-learning platform is a computing device that groups several tools and ensures the educational

  

lines'. LMS solutions provide vigorous reporting and tracking capabilities, assessment, assignment features and online access to learning material. Learners could share their experience through social platforms. Some popular and widely used LMS are considered here for comparative analysis:

Table 2. Comparative Analysis of LMS

| | **Moodle** | **TalentLMS** | **Chamilo** | **Google Classroom** | **LMS365** |
|---|---|---|---|---|---|
| **Customers** | Academic Freelancers, Non Profits, Public Administrations | Large Enterprises, Non Profits, Small/Medium Businesses | Academic Freelancers Large Enterprises , Non Profits, Small/ Medium Businesses | eLearning professionals and online educators facilitators, content creators, Large Enterprises, Small /Medium Business | Small/Medium Businesses, Large Enterprises, Non Profits Public Administrations |
| **Deployment** | Mobile Application, Self-Hosted Cloud-based | Mobile Application, Cloud services | Mobile Application, Self-Hosted Cloud-based | Mobile app or web based, Cloud based system | Cloud services |
| **Supported Platforms** | Windows, Linux, Mac | Windows, Linux, Mac | Windows, Linux, Mac | Windows, Android, iPhone/iPad, Mac, Web based, Mobile | Windows, Android,,iPhone/iPad,Mac, Web based |
| **Supported Browsers** | Chrome, Internet Explorer, Firefox, Safari | Chrome, Internet Explorer, Firefox, Safari, | Chrome, Internet Explorer, Firefox, Safari | Google Chrome | Safari, chrome, Internet Explorer, Firefox |
| **Activity Grading options** | Maintain Course History, Gradebook, ,Multiple grading scales Manual Grading | Course History, Manual Grading | Maintain Course History, Gradebook, Gradebook , Manual Grading, Multiple grading scales | Gradebook beta, customize Grading system, grade categories, transfer grades | Grades for Assignments, Custom Grades ,SCORM/AICC packages |
| **User Authentication** | Manual Accounts, Self-Registration with Admin verification | Active Directory /LDAP Integration, Manual Accounts, SAML2/API Integration Self-Registration | Active Directory/LDAP Integration, Manual Accounts, SAML2/API Integration, Self-Registration | One sign-in-with G Suite for Education accounts. permissions setting for users, G Suite for Education | Azure Active Directory and authentication, supports multi-factor and SMTP authentication |
| **Course Categories** | Assign Courses to categories, Create and Manage Categories | Assign Courses to categories, Create and Manage Categories | Assign Courses to categories, Create and Manage Categories | posts across classes and archives | catalog of courses and training plans for users |
| **Course Creation** | Assignments Built-In, Authoring Tool, backup, Survey, Tests Engine | assignments, Built-in Authoring Tool, reusing material, backup, LIVE events, Survey Engine | Assignments Engine, Built-in Authoring tools, reusing material, backup Options, curriculum | Create class discussion, manage discussion, Sharing of links, videos, and images | Creating and managing courses, Class Notebook, assignments, quizzes, certificates to learners |
| **Course Formats available** | Format Learner, Topics | Format Learner video conferencing webinar, Format Topics | Format Learner Videoconferencing / Webinar, Format Topics | Gamification Real time feedback, class discussions, video conferencing | Gamification, video conferencing |
| **Gamification** | Plugins for Gamification | Badge customization, Gamification, Leaderboards Levels, Points, Rewards | Badge customization, Gamification,mechanics Leaderboards Points, Rewards | badges, levels, achievements, and game points to the classroom | Recognition and rewards, leaderboards |
| **Interface Options** | Calendar, Location setting, Media embedding Multilanguage Support, Ready-made Themes | Calendar, Location Settings, Media embedding, Multilanguage, Ready-made Themes | Multilanguage Support, Media embedding settings, Ready-made Themes | Manage multiple classes, Co-teaching of course, Enrich assignments, SIS integration, Ready-made Themes | In Person, Live Online, Webinars, Documentation |

  

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|---|---|---|---|---|---|
| **Learning Types** | Blended learning,, Asynchronous Self-paced , Synchronous Virtual Classroom | Blended Learning,, Asynchronous, Self-paced Synchronous Virtual Classroom | Blended Learning, Asynchronous Self-paced, Synchronous Virtual Classroom | Asynchronous led, Synchronous, Virtual Classroom | Asynchronous, Blended learning, Course authoring, SCORM Compliance Synchronous Learning, Video Conferencing |
| **Security** | IP Blocker Anti-spam Anti-virus | IP Blocker domains restriction, Anti-spam, Anti-virus Strong Passwords | IP Blocker, domain restriction, Anti-spam Anti-virus, Strong Passwords | Classroom is covered under the core G Suite for Education Terms of Service | Utilizes data encryption, single sign-on and two-factor authentication |
| **User enrollment** | Attendance Tracking, Guest Access , Self-enrollment | Attendance Tracking, Guest Access, Self-enrollment | Attendance Tracking, Guest Access, Self-enrollment | Enrollment through e-mail invite, share class code, usage trends and monitor Classroom user activity as G Suite admin | Attendance Tracking with QR code or via mobile app |

LMS are available either as commercial or opensource solution for the users. Choice of LMS is dependent on the user requirements and ease of use. Main features like consolidation of e-content; tracking student activities and support for web or virtual classroom highly impacts adoption of LMS.

**EDUCATIONAL APPS**

Students and instructors can interact through video conferencing applications, learning management systems, chat applications, e-mails etc. Teachers could hold classes online. Video conferencing has turn out to be most reliable for people to connect from anywhere in real-time regardless of family & other work commitment (Verbrugghe,2020).

Table 3. Comparative Analysis of Video Conferencing apps

| **Zoom** | **Google Meet** | **Microsoft Team** | **Cisco Webex** |
|---|---|---|---|
| Freemium | Free | Freemium | Freemium |
| Free up to 100 users | Free | 5,00,000 per organization | Free up to 100 users |
| App required | App not required | App not required | App not required |
| Screen sharing & co-annotation | Recordings (in cloud), file and screen sharing | Recordings (in cloud), file and screen sharing | Recordings, file and screen sharing |
| Meeting participants can be grouped in breakout rooms for small group discussions | Integration with G Suite | Integration with Office365 | Pre assign Breakout Session Participants, multimedia, applications & file sharing |
| TLS encryption, Zoom service itself can access the unencrypted content of Zoom meetings | 'in transit' encryption of messages, video meeting links available only to business people. | Encrypts data 'in transit'. Secured datacenter networks for storage and use Secure Real-time Transport Protocol (SRTP) for audio, video, desktop sharing. | encryption for data in transit and at rest, flexible password management, role based access, robust data center security |

Some more popular apps include Khan Academy which provides videos, articles and problem-solving sets for the students. Duolingo is gamified learning app which acts as a comprehensive online language learning platform. Byju's app is highly popular among students with focus on mathematics and science. CameraFi Live is an Android app for live streaming of high-quality videos on YouTube, Twitch, and Facebook. It supports diverse camera connection and real-time video editing features. OBS studio is widely used open source software for live streaming and video recording. NIIT, Coursera, Udemy, Unacademy are some popular online education providers.

  

## INDIAN ONLINE EDUCATIONAL PLATFORMS

In order to provide better education facilities schools have started investing in information and multimedia technologies. Educomp has offered supplementary online solutions for educational institutions to open up novel ways of learning. Dish TV is providing educational channels of MHRD. Virtual labs motivate students to conduct experiments remotely in order to understand the subjects like science and mathematics better (Times Now Digital, 2020). Some of the digital platforms of MHRD for education delivery are DIKSHA, National Repository of Open Educational Resources (NROER), e-PATHSHALA, SWAYAM and SWAYAMPRABHA. Some more initiatives include AICTE Training and Learning (ATAL), MOOCS, ShodhShuddhi, Shodhganga, VIDWAN etc. According to Times New Digital (April 2020) news in India HRD Ministry's free online learning platforms were highly utilized during lockdown period. SWAYAM courses have observed rise of about 2.5 lakh strikes as compared to the former 50,000 strikes in the last week of March 2020(IBEF, 2020).

ePathshala is a joint initiative developed by MHRD, Govt. of India and NCERT. The purpose is to disseminate e-resources like textbooks, audio, video, periodicals, for students, teachers, parents, researchers and educators. It also enables participation in exhibitions, contests, workshops, etc. ePathshala mobile app is available on Android, iOS and Windows platforms. DEEKSHA mobile app has been effective since September 2017 for enhancing teaching and learning processes. It offers teachers, students and parents engaging learning material pertinent to the prescribed school curriculum. AICTE has launched the Enhancement in Learning with Improvement in Skills (ELIS) portal to encourage online learning and support student community across the country(Ghosh, 2020).

## CONCLUSION

Digital transformation has highly impacted today's education sector. Leading educational institutes have started developing apps and launching channels on YouTube for providing online programs to their students. This lockdown period has provided an opportunity and the right time to strengthen e-learning content to leverage its potential for learners and educators. Recent technological advancements like virtual/augmented reality, big data, artificial intelligence, cloud computing and gamification has brought revolution in the field of e-learning. Online certifications and up skilling are the major goals of online learning. This study has focused on popular and widely used e-learning platforms in the market. Currently available diversified online platforms were considered for this study. Various features and activities performed by learners and instructors during online learning were identified, analyzed and compared. It is observed that desktop client, mobile app and web clients in video conferencing applications are offering different features. Limited features and access controls are provided in web client and mobile apps in terms of sharing screen, video, recording and support of multi-tenancy etc. If user is unaware of this fact it may become tedious to use. In present scenario academic institutes are in need of secured software that integrates LMS with video conferencing and live streaming facilities.

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