

# A Survey on E-Learning System with Data Mining

Bhagyalakshmi Aechham<sup>1</sup>, P. Govindarajulu<sup>2</sup>

<sup>1</sup>Research Scholar, Dept. of Computer Science, Sri Venkateswara University, Tirupati, Andhra Pradesh, India

<sup>2</sup>Professor, Dept. of Computer Science, Sri Venkateswara University, Tirupati, Andhra Pradesh, India

**Abstract** - E-learning process has been widely used in university campus and educational institutions are playing vital role to enhance the skill set of students. Modern E-learning done by many electronic devices, such as smartphones, Tabs, and so on, on existing E-learning tools is insufficient to achieve the purpose of online training of education. This paper presents a survey of online e-Learning authoring tools for creating and integrating reusable e-learning tool for generation and enhancing existing learning resources with them. The work concentrates on evaluation of the existing e-learning tools a, and authoring tools that have shown good performance in the past for online learners. This survey work takes more than 20 online tools that deal with the educational sector mechanism, for the purpose of observations, and the outcome were analyzed. The findings of this paper are the main reason for developing a new tool, and it shows that educators can enhance existing learning resources by adding assessment resources, if suitable authoring tools are provided. Finally, the different factors that assure the reusability of the created new e-learning tool has been analysed in this paper. E-learning environment is a guide for both students and tutorial management system. The useful on the e-learning system for apart from students and distance learning students. The purpose of using e-learning environment for online education system, developed in data mining for more number of clustering servers and resource chain has been good.

**Keywords:** E-learning, Academic process, Clustering, Education system, Data mining

## I. INTRODUCTION

Learning is essentially a social process, which needs to take place in an environment where learners can share resources, communicate with each other and their tutors, and provide mutual support. E Learning is anticipated as the use of electronic devices or Information Technology (IT) for the purpose of education. The term "E" is most likely but not limited, implies e-learning process [4] to be conducted over the Internet. However, it could imply also the need of e-learning, as in distant learning or in Campus College. It further could include different aspects of technology that encompasses the way of mobile devices or smart devices, on what is known as mobile learning (M-learning) or the new term called smart learning (s-learning). E-learning transforms teaching and learning relationships, opportunities and outcomes. For example, a change in education at a University level, which is brought by the use of technology, concerns roles of the players. Basically, the use of IT will require new skills to be acquired by both tutors and students, which consequently will mean a transformation in traditional roles. Another ethical debate that will be of interest in any e-learning system is the traditional kind of interaction and communication between teachers and learners that will be affected, by adopting Information Technology. The teacher's role changes from that of the

authority to that of the Mediator, of the moderator of discourse. Many educators want to take advantage of the benefits offered by Internet and new technologies, such as, e-learning systems to support their teaching activities. One of the threats that can affect E-learning is ethical issues; therefore, there is a need to propose ethical polices and standards to be fixed in e-learning systems, in order to support students to participate in E-learning systems and to help mentors control the students' performance in the e-learning systems. No proper standards or measures are optimal for many of the e-learning environments available. However, an ethical criteria or framework has to be chosen, so that one can decide the best ethical practices and method for E-learning environment available on his/her organization. Even if there are so many common standards that could be shared, the ethical framework to be chosen should take into account the differences between different cultures. The one to be recommended in this paper also is not new; part of it is being used in some form in many colleges and universities worldwide. A list of ethical practices proposes an ethical framework to be implemented within any learning management system available at a University level. The issues of cheating, plagiarism, and copyright violation are to be discussed and considered within the proposed framework [1].

### 1.1 E-learning?

Quite simply, E-learning [31] is electronic learning, and mostly this means using a computer to distribute part, or all of a course whether it is in a school, part of your essential business training or a full distance learning course. In early days it received a bad press, as many people thought bringing computers into the classroom would clear way the human aspects that some learners need; however, as time proceed technology has developed, and now we embrace smartphones and tablets in the classroom and office, as well as, using a wealth of collective designs that makes distance learning [13] not only attractive for the users, but also valuable as a lesson transmission medium. Building association with quality training providers, and combining this with a committed experienced technical team and support staff, Virtual College it provides the perfect combine learning environment, offering anyone the chance to take their online training to the next level.

### 1.2 benefits

There are several benefits to E-learning whether you choose to need it on its own or to implementation your existing in-house training [31]. We have listed a few below; however, for more data on how your business can save time and money you can call today and speak to one of our Likely based support team.

### 1.3 M-Learning?

M-Learning is one of the latest developments in e-Learning, which takes advantage of mobile devices for learning on accessible portable platforms; ideal for people on the go or for taking your training away when you cannot access a regular computer. The term has more recently been adopted for the use

of E-learning on mobile device platforms, meaning smart phones and tablets, such as the iPad or Samsung Galaxy [11].

Learning Management Systems: As more E-learning [1] systems become available for online education, educators and other professionals try to get the most value and benefits from the application of these systems in the teaching process. Many Universities and higher education institutions have implemented Learning Management Systems to manage online learning and teaching, by providing support to staff and students to improve the speed and effectiveness of educational processes and communication among learners, as well as, between staff and students. Example of E-learning systems which are used in these universities and educational institutions are: Moodle, WebCT, Eduwave, and Renzoli. Some are commercial and some are open source.

## II. RELATED WORK

SoniSweta: [24] Several literatures proved that Adaptive E-learning have intelligence ability to understand and explore data from experience. With the advancement of information technology, this paper believes e-Learning will have a very promising future in the new era[24]. The future E-Learning will be featured with broadband and more reliable networks, and high-quality personalizes and customizes multimedia learning materials. Recent technologies will significantly boost the capacities, reliability, robustness, and speed of networks, so that the transmission of multimedia-rich learning materials will be much faster than today. NazeehGhatasheh: [23] This research introduced a number of enhancements to dynamic E-Learning systems in terms of knowledge transmission and evaluation. It proposed an abstract framework of futuristic learning systems, with more focus on the need of machine learning [1] for evaluation. The study of various user activities in such dynamic environments leads to a comprehensive decision scheme that is not biased, and improves commonly used evaluation methods. In literature, there exists a tremendous amount of attempts to empirically prove the accuracy of agent based evaluation and knowledge dissemination over traditional approaches. Combining the research efforts found in literature and several standards led to the formulation of a common base for the prospective learning systems, at the same time acts as a technological enabler for E-Learning trends. SVM models over-perform several classification models in terms of stability and error rates, therefore SVM-based models can play an important role in the evaluation of knowledge levels. MLP and SL models show a competitive performance, while Naïve and Tree based models do not show a significant capability.

Martin Drlík:[26] E-learning implementation is much more complex and difficult than anyone knew to integrate it into the traditional European university. And a much greater commitment of resources, talent, time, and energy is necessary than anyone knew. Problems have surfaced that may not have been expected, such as significant resistance to changing traditional models and the necessity for ongoing deep strategic needs analysis. It is becoming increasingly clear that there are many reservations, worries, objections and questions about e-learning from the pedagogical, professional, and sociological point of view that must be taken seriously. It is necessary to

see the E-learning implementation as a continuous and iterative process. The points of the entry into the process will vary depending on the institutional context and personal skills of the teacher. Mentioned approaches will not remain immutable. Mohammed A. Jabr and Hussein K:[20] As can be seen from reading this study, by using our learning management system facilities, the geographical barriers are eliminated, opening up broader administration and education options. The system can facilitate personalized delivery of contents based on the individual learner's knowledge and learning preferences. It will provide participants with an extensive list of summaries of related resources that they can choose to read, or archive for later use. A middleware for uniform access to all thesis resources that belong to different administration areas is proposed [20]. New technologies are described, including Web services, single sign on and AJAX and how they can be used in the improvement of our system. In this study, a 3-tier architectural E-Learning system is defined. The objective of this architecture is to supply a basis for designers, developers and instructors to construct practicable strategic E-Learning models suitable for their individual E-Learning environments. The proposed framework [1] using the Web Service approach will increase the performance and capability of collaborative learning in terms of Reusability, Interoperability, Accessibility and Modularization.

Tomoko Kashima: [19] In this paper, we proposed an e-Learning system with skill-based homework assignments. The applied method of how to let a lecture, E-Learning, and a push-type system cooperate was described. In order to distribute the exercise in consideration of each achievement, the exercises and the strength of student correlation were classified. It became possible to predict the exercises at which a student performed poorly. Specifically, for students with high correlation of their degree of study training achievements, it was shown that they also had similar degrees of comprehension. Information recommendation processing based on collaborative filtering was applied, to offer exercises connected with the skill level and the trend for every field to each student. Moreover, in order to construct an exercise distribution algorithm, content-based filtering with text analysis was used and it became possible to perform clustering [19] of an exercise, classification of difficulty, and so on. We implemented the exercise distribution by an e-mail push-type system based on the analysis result of E-Learning, and aim at processing all steps automatically. It is expected that a student's learning effect will increase, assisted by a teacher. Simultaneously, it is necessary to repeat further experiments and to verify the learning effect and quantify how much the degree of comprehension improves over a longer time scale. Ali Abdul-Fattah Alshaher:[1] The explosion of E-learning system is continuously increasing because various international universities allow, distant education all over the world. Those educational and non-educational organizations [1] have adopted these systems to train their employees or users. The approval of E-learning system is a complicated process of establishing and developing an integrated information technology system. This paper, in line with the literature, specified 23 E-learning [1] factor categories in 7S that can assist universities and instructors to efficiently and effectively readiness estimate E-learning system. The 23 aspects categories impact the opinion growth of E-learning system in

the volatile and heterogeneous world of the Internet. E-learning combines various contents and provides a variety to adopt E-learning system in higher education organizations. The fuzzy logic values were above 50% indicating high level of accepts.

Olisah Kingsley S: [2]This report proposes a user-centered approach to the development process of Web based learning [2] resources in school education. The approach was evaluated from three different perspectives: school teachers, students' parents, and school kids. The approach needs to be further developed through continuous cycles of design, implementations, and evaluations in various school contexts. The approach provides re-entry points into the analysis, design, implementation, and evaluation stages to allow for continuous improvements. For example, developers may return to the design phase to revise selected objects that are important for the learning process[2]. They may also return to the analysis stage to re-examine the context of use, influencing factors, or learning goals. Results also stress the importance of a thorough user-needs analysis, as well as, early and frequent assessment of prototypes with the users. Dr.P.Nagarajan:[3]He proposed a general formulation of interesting model for E-learning. This can help instructors to design courses more effectively, detect anomalies, inspire and direct further research, and help students use resources more efficiently. Additionally, quantitative and qualitative [3] data will be collected to evaluate the outcome and effectiveness of the online courses. Quantitative [3] data will include the pre- and post-course surveys developed by researchers and professionals. Qualitative data will be collected through focus groups with participants of the online courses. The long term objective is to create a full featured learning system targeted for academic environment.

Rashad Al Saed: [4] Educational institutions should move to adopt E-learning systems along with their conventional teaching learning systems to a greater degree than is currently the case. Since such systems have wide acceptance both from instructors and students, expanding E-learning opportunities may be a way to maintain higher levels of quality in the teaching-learning exercise. Although many institutions are moving towards more E-learning, it should be given more emphasis. In particular, educational institutions should recruit instructors with high levels of ICT (Information and Communication Technology) ability, in order to encourage an environment more conducive to the migration of the teaching-learning system in the direction of E-learning systems. The high level [4] of student acceptance of instructor-assisted learning, confirms the importance of instructors in the teaching-learning environment as a whole. However, educational institutions should work towards finding the optimal mix of instructor-assisted and E-learning-based teaching-learning environments. AlaattinParlakkılıç:[5]E-learning is a fast evolving network-dependent method of learning and education. Tight coupling between changes in information technology and changes in E-learning methodology provide opportunities and challenges. With the rapidly changing world of information technology and E-learning management, success requires a clear vision, purpose, and strategic direction. Change management methodology [5] must include strategic direction and planning, communication, and curriculum. Change management must also include

instructional skills, and resistance to change. Full realization of strategic aspects of change management discussed above is essential for the successful implementation and growth of E-learning system in the inconsistent and different world of the Internet. E-learning combines various contents and provides a variety of services to be used as a portal. After enhancement of E-learning system, it is measure to make it usable and implement it. Specially, information in health education content changes and completes its lifetime in short time.

Herman DWISurjono:[6] The AES that is evaluated in this paper presents learning materials that match students' learning styles i.e. visual, aural and kinesthetic either globally or sequentially. The system identifies the student's learning styles impulse through a set of questionnaire [6]. The questionnaire scores are used by the system as basis to provide the student a presentation of learning materials differently. The system is implemented by customize the LMS of Moodle. The ongoing evaluation at the design and make ensure that stage is done to make sure that each feature of the system works well. The evaluation results show that all adaptation functionalities of the adaptive E-learning have performed correctly. Michael KimaniMaina:[7]The study concludes that staff and students in institutions of higher learning have less experience in EMS. The study found that most of the students and staff have less than 3 years' experience with EMS. Both staff and students have been motivated to adopt EMS by the expected performance associated with the use of EMS [7]. The use of EMS [7] was useful, enabled faster completion of tasks, enhanced efficiencies and helped students to learn the topics. The use of EMS also increases chances of interactivity between students, teachers and even friends. The other expected aspect of EMS is flexibility. The users can study at any time and at any place of their convenience and even study at their own pace. The expected and perceived ease of use influences the adoption of EMS. The willingness to use EMS is driven by the ease of learning EMS, ease of access and availability of skills to use technology among the staff and students in institutions of higher learning. However, social influence was found to no strong influence in the willingness to use EMS [7] among staffs and students. The study found that neither friends nor peers influenced their willingness to adopt EMS.

Ahmad TasnimSiddiqui: [8] They have presented an interactive system for E-learning, which involves dedicated educational satellite to improve the education level and interest of students in Gulf countries, especially at the higher educational level. The system develops the ability of the students to visualize the enhancement of quality learning. In this system, the satellite is using spot beam technology for better performance. They have also explored Indian educational satellite EDUSAT and INSAT and success of Indian institutions like IGNOU and NIOS. The system contains an interactive Web application for more student benefits. Web application can also be used via mobiles to ensure the benefits to the maximum possible students. YasirEltigani Ali Mustafa:[9]Findings showed that students taught using the system with adaptation to learning style performed significantly better in academic achievement than students taught the same material without adaptation to learning style( $p < 0.05$ ). The findings supported the use of learning styles

as guideline for adaptation into the adaptive E-learning hypermedia systems [9]. The students were satisfied to learn with the preferred learning style and willing to use the system in the future. ReemRazzaq Abdul Hussein: [10] The proposed paper used Joomla to design a Content Management System (CMS), which enables you to build Web sites and powerful online community management systems. Many aspects, including its ease-of-use and extensibility, have made Joomla the most popular Web site software available. Best of all, Joomla is an open source solution that is freely available to everyone.

Johan Ismail:[11]The development and management of learning objects is the next step in E-learning. Granular information is essential to the delivery of the right information, to the right person, in the right amount, whether that information is received on a notebook or a PDA. The development of these systems will enable just-in-time learning and the convergence of E-learning with Knowledge Management [11]. Today, many vendors offer products called Learning Management Systems, which they claim provide a complete E-learning solution. However, products in this category do not address the need to develop and manage increasing volumes of content in smaller chunks by a larger group of content providers. Jason Haag:[12]The purpose of this study was to collect experimental data on the general efficient, as well as, begin to identify the challenges and concerns pertaining to M-Learning course delivery in military education and training [12]. This paper revealed the results of the study, and further provided a approach to developing and implements a mobile learning course targeted towards Smartphone browsers that support HTML5. Based on the results of this study, it is believed that mandatory training could be made more accessible and to feel less forced upon if a mobile alternative was available. Mobile course outputs of afford true self-paced opportunities for completion- anytime and anywhere.

YuceIugurlu:[13] They designed a new E-learning platform to teach graphical system design, and the system was embedded in traditional teaching courses. Practical experience showed that this hybrid approach was easy to adapt, and it was well received by students because of its rich content, flexibility, and convenience [13]. Student surveys indicated that programming skills improved when they covered specific topics according to their personal needs. A key achievement of the E-learning system was to teach some advanced topics, especially when it was necessary for student design projects. Thus, we focused on tools and resources for learning and further exploration, whereas traditional classes focus on the fundamental concepts of graphical programming. In the future, they plan to promote the utilization of E-learning technology and focus on system design projects to motivate and inspire students, thereby enabling them to meet various engineering challenges. Camille Dickson-Deane:[14] the definitions found in various articles mirror the conflicting responses provided by the respondents in this study. The lack of consistency in terminology inevitably affects not only the researchers who would like to build upon the findings, but also impacts designers who are creating similar types of environments. Terminology also poses a problem when the specific context of the learning environment is not described in sufficient detail, or when its identification is

not very prominent in both the discussion of the methods and the other sections of the paper. This not only impacts the evaluation of such learning experiences, but also the future of successfully delivered distance learning events. The findings not only show great differences in the meaning of foundational terms that are used in the field, but also provide implications internationally for the referencing, sharing, and the collaboration of results detailed in varying research studies.

Osmar R. Zaiane:[15] A recommender system is a program that sees what a user is doing and tries to recommend courses of action it thinks would be beneficial to the user. This is the idea behind some systems used in electronic commerce sites to recommend products to customers they might wish to purchase based on their previous purchasing history, as well as, the purchasing history of those who bought similar goods. Haroontarawneh:[16] One unexpected result of the multimedia revolution is the opportunity to improve the quality of E-Learning. Many E-Learning programs lacking in instructional design are presupposed as multimedia distance learning programs, because of the lure of cost savings in travel, space allocation, salaries, and time away from the job [16]. As a result, there is an opportunity to make E-Learning programs into something well designed that delivers the learning objectives. Up to now, the lack of infrastructure for delivery of high-quality multimedia applications, the weakness of supporting technologies for easy content creation, the absence of experience with the benefits of futuristic multimedia, and a variety of economic factors have impeded the widespread deployment of multimedia applications.

Herman DWISurjono:[17] The adaptive E-learning system that is designed in this Paper is expected to present learning materials that match students' learning styles i.e. visual, auditory and kinesthetic either globally or sequentially [6]. There are six learning modes that are accommodated in the system, i.e. Global-Visual, Global-Auditory, Global Kinesthetic, Sequential-Visual, Sequential-Auditory and Sequential-Kinesthetic. The learning mode refers to a combination of presentation mode Global-Sequential with variations of VAK. A basis used in deciding to follow a particular learning mode is the highest score obtained in each group of learning styles. Yousif I. Al Mashhadany:[18] This main outcome of this research is proposed E-learning model for Iraqi universities, specifically for Al-Anbar University as case study; the E-learning model validated through E-learning experts to ensure the usability, reliability, and quality of model structure and components. The proposed E-learning model considered as efficient solution to maximize the management performance of learning environment in Al-Anbar University in order to reduce the learning processes expenses or costs, and maximize the learning outcomes of teachers and students. The main success factors of the developed model are; (i) services and information availability and accessibility, (ii) flexibility of updating model components i.e. services and materials, and (ii) services and infrastructure management using central web server The proposed E-learning model provides the features of accessibility, availability, and flexibility in order to manage the learning aspects efficiently which lead to reduce the expenses of the traditional learning environments in Iraqi universities. TghridAlmardi: [19] Computers are now compact smart phone that can fit in a pocket and can be done anywhere are replaced

by. The rapid advance in the field of mobile technologies is a new territory, which is known as mobile learning, is created. Mobile learning E-learning that fascinates way through the smart phone, knowledge teacher presence and to assess their progressive student's record keeping, helps the system is the next formation of leads. This system send student a notice to his presence threshold, the same as an SMS gives as in this system can be implemented to automate most of the educational systems and it can be designed for cross platform and setting up environment on own machine. This phase involves installation of Java JDK, JRE, Android SDK, and Eclipse, GUI/build Main forms/ Sub forms and creates activities connected with each other. Error log module incorrectly enter network password; server up-downs such as non-authenticated transactions create which keeps track. Matjaz Kljun: [20] To our knowledge, more than forty comparison and evaluation papers were written in the last decade. Some were published in conference proceedings, whereas others were just internal evaluations of different organizations. We compared a third of them and tried to find out evaluated features in the past that were later developed in major LMSs. It seems like most features that were considered significant in the past are today included as default features. Some of evaluated features were not developed yet and it seems they never will be. If this trend is going to continue, new features will be added to aid teaching and learning. However, the development is not as fast as the marked expects.

Patrick R. Lowenthal:[21]We are fully aware that trying to develop a stable and comprehensive typology of the online learning [34]landscape is a challenging agenda. It may require more than an analytic exercise students and professionals, for example, could report the most salient features that distinguish one product or experience from another. We thus see this as a work in progress. However, we also recognize that many of the current ways we talk about and think about online learning are inadequate, in that, they simply fail to take into account the complexities of online learning. Glenn Gordon Smith:[22]To put the current study into a larger situation and provide readers with some final messages to take away, we now discuss: a) some possible new intellectual directions for E-learning and distance learning research, stemming from the current study, b) the practical implications for online instructional designers, would-be online tutors and current online instructors, and c) some logical directions for future studies. The current authors believe that much of the research on distance learning and E-learning has been conducted and reported with a tacit assumption of the identity of E-learning [22]. The results of the current study strongly suggest that the demands and solutions of E-learning can be differentiating by disciplinary clusters. It perhaps E-learning and distance learning research should also be so differentiated by discipline.

José Paulo Leal: [23] This chapter presents a comparative study on LMS interoperability. Given size of this category we focused on a couple of representative systems - Model and Blackboard - since combined they represent a Significant market share and cover both the commercial and open source development models. We proposed a framework for analyzing LMS interoperability by distinguishing two different facets in the way these systems communicate with their operational environment: learning content management and academic

management. We completed the analysis with illustrations of system integration for each facet.

Christos Emmanouilidis:[24]Maintenance training and educational activities are increasingly manipulate technological innovations. Desktop and Web-based E-learning applications offer academics and industrialists new tools to raise maintenance-related knowledge and competence. One recent action in this direction is the iLearn2 Main project [24]. The project employs E-learning technologies, offering customize maintenance management training, while facilitating the standardization of competencies assessment and learning evaluation. The maintenance curriculum was designed by taking into account competence requirements for maintenance management professionals and a user survey across several EU countries. This paper provides an overview of the iLearn2Main development and system.

Anthony G. Picciano:[25] Online learning in K–12 schools and to establish base data for more extensive future studies. Issues related to planning, operational concerns, and online learning providers were examined [25]. In line with most research dealing with relatively new and ever changing technology, this study adds a little more to our collective knowledge about online learning in the K–12 environment, while not necessarily providing definitive answers to key questions. However, much of the data collected and analyzed in this study supports existing research indicating that online learning [34] has been growing in K–12 schools and that this growth will continue for the foreseeable future. Joaquín Paredes: [32]The study assesses open practices with E-learning tools. It suggests that it is not ok. There are isolated practices and instructive teachers. There is neither school culture nor communities of practice. There is a lack of institutional culture. It is difficult to be optimistic about innovative view of educational models that underlie the uses of platforms. The new strategies enhance by the inclusion of uses of distance learning [32] platforms in Higher education should be open, with improvements in student participation, mentoring, assessment and resources, new ICT uses, as well as, professional knowledge. Some argues that the mere need of online tools adds value to teaching. The platform encouraged to explore and think (Castaño, 2003).

Lejla Abazi-Bexheti: [33] In the realization process of the LCMS we have used modular approach. All the above modules were first developed independently and then integrated into the final composition. Using this approach has two main benefits. The first is that modules were developed simultaneously, what saved us a lot of time. The second benefit is that the LCMS application is very scalable, which means that later we can easily integrate additional modules without affecting the existing ones. At the end, we would also mention that the main beneficiary of the LCMS system is the SEE University, who in one hand has less financial expenses and on the other hand it has a system that has been created according to the university needs. Patrick Lowenthal: [34]“Both as a student and as a teacher, I have always tackle with finding my voice networked. When I teach online, I want people especially my students to see me not only as a “real person” but also as others see me face-to-face. However, I know, from student's feedback, that one of my strengths teaching face-to-face is my energy and passion for my content area. I have struggled finding a way to

simulate this online [34]. So I began focusing on the use of storytelling online. I even developed a digital story about when I first began teaching to help introduce myself to my students online. The first time I shared the story was half way through an online course I was teaching; students remarked on how it changed their entire attention of me. I believe this is because the digital story helped students start to see me as a real person."

### III. CONCLUSION & FUTURE WORK

Existing E-learning systems have analyzed and undergone various perception level of testing and teaching process; however, it does not come ineffective manner. It creates new challenges and issues around, such as, ethics. It was not satisfactory and gives minimum level of help for management staff, academic planners and level/course advisers and even parents to properly counsel the students, most especially the academically weak ones, in order to improve their performance. This survey work will generally help to develop the start of the art E-learning tool to boost up their graduation grades with analytical and practical skill set development, with superior knowledge on various competitive skills through this literature work. Most of the existing works have failed to address the challenges and it may affect the quality of learning outcomes achieved by students. Introducing ethical polices and standards can help in strengthening these E-learning systems. In future, by using the more suitable survey on E-learning, browser free any device compatible E-learning tool will be developed and tested with various students groups available at the universities. It will show great results to both the students and tutors.

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