

Proliferation of E-Learning in Indian Universities through the Analysis of Existing LMS Scenario: A Novel Approach

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Abstract

Objectives: The first objective of this paper is to evaluate the present Status of E-learning in India by collecting facts about the usage of Learning Management System, its proliferation and adoption in Indian Universities. The second objective is to prepare a model that could help us to achieve the transformation in teaching-learning process. **Methodology:** The basic purpose of this study is to understand where does Indian modern education Stand with respect to modern means of technological tools available in the market. The study was based on Content Analysis Methodology that included a survey of visiting more than 700 official websites of Indian universities and the services they offered by using Learning Management System. **Findings:** As far as India is concerned, Learning Management System has been adopted in the corporate world for in-house training purpose but very much inadequately in Indian Universities, and by the result of that we are lagging behind from benefiting by modern means of educational tools. In this Study, it was found that even with surging internet user's percentage growth rate in India which is second highest in Asia 28%, still only 6% of Universities in India are using Learning Management System application for E-learning Purpose. The cause for such low percentage might be Very Low broadband speed Connections and Lack of motivational Factors. According to the survey conducted it was found 95% of Indian Universities are using Open source Learning Management System and the approach they use is mostly ICT enabled and few with blended learning approach. **Novelty:** In this paper we attempt to propose a new Strategic model applicable to the current E-learning scenario in India to make E-learning as well as Learning Management System popular in Indian Universities to provide a way for better E-learning approach.

Keywords: Content Analysis, E-learning, Learning Management System, Open Source, Proliferation

1. Introduction

E-Learning is defined as the use of Internet, digital and other communication technologies to create experiences that educate fellow human beings¹ and it is described as the use of electronic media, educational technology and Information and Communication Technologies (ICT) in education². E-learning is a multifaceted phenomenon, covering a range of approaches and methods that will open access to increased population of education³. The Internet is being seen as a critical and main catalyst who could transform the society because of its ongoing penetration

in all walks of life and extensive usage. Due to the swift expansion of Internet technology and its wide Variety of uses its incorporation in education has become a viable and inexpensive option⁴.

The Flexibility of time, place, pace and individual learning is the most important reason behind the Popularity and success of E-Learning in developed countries. In order to use technology for faster, better and suitable delivery of information using E-learning is becoming an essential strategy for almost all institutions to deliver the information⁵.

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About 54% Universities in India are governed by Government and the rest of 44% (28%, 18%) are private and deemed Universities, and it is likely possible that private sector will surpass the Govt. run institutions very soon (Figure 2). The Number of Universities which have initiated the E-learning process by adopting LMS is very low 5.78%, and among that the contribution of private Universities is highest followed by Govt. and deemed Universities. The necessity and the biggest challenge at this stage are to examine the development and progress of Indian Universities and the declining universities ranking on comparing with other International universities. It is a good opportunity for universities / Institutions to implement LMS and offer courses online because knowledge and information access is the need of the hour to reach rural and remote areas of India.

Based on the research outcomes and already proven by some Universities in Asia, UK, USA Europe etc, it emerges that e-learning not only guarantee quality education and but desired educational outcomes also¹². Some of the Institutions in India have started using LMS for E-learning and offers different courses are IIT's IIM, some central and state Universities also. The advantage of e-learning being less expensive, time, space and pace independent, attractive and more than that a different pedagogical approach to lifelong experience. E-Learning initiatives in India are based on the belief that technological tools could improve access to education (teaching-Learning) at minimum expenses. Government plays a key role in running and administering the higher educational affairs in our country with Trends in higher education show an ample Usage of ICT in an everyday education process.

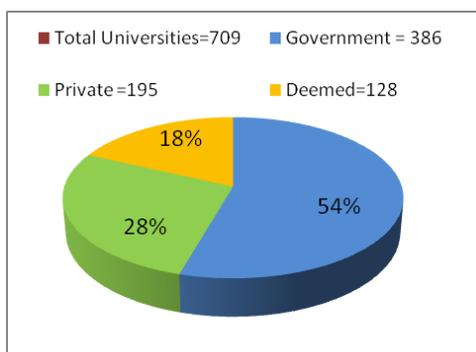


Figure 2. Percentage of Govt., Private and Deemed Universities in India

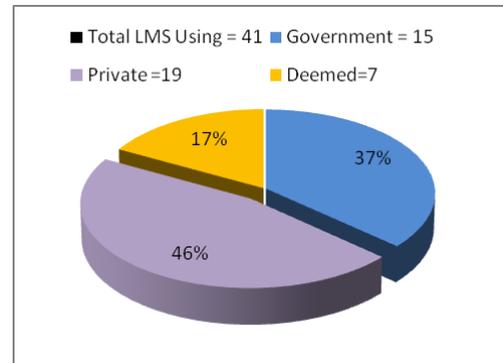


Figure 3. Percentage of Govt., Private and Deemed Universities using LMS

2.2 Where does India Lag Behind?

Indian Universities are struggling with multiple problems ranging from shortage of skillful human resource, deficient in infrastructure, Scarcity of funds and severe absence of explicit vision. Table 1 for Asia's Internet Usage and Broadband Speed Statistics (Internet World Statistics, June-2015), (Self made Ranking on the basis of Broadband Speed). Universities are not at par with other Universities of the world raising quality higher education and because of this most of the Indian Universities are showing low performance both in education and research. India is facing troubles in its higher education and as a developing country, Indian Universities are facing some issues in e-learning.

- Very Low broadband speed Connections.
- Concept of less significance of degree through e-Learning (Affiliation problems).
- Lack of motivational Factors.
- Lack of technical support and LMS promotion in Universities.
- Need of Common learning Object repositories.
- Load shedding of electricity especially in rural areas.
- Reluctance to change the learning ambiance.

From Table 1 it is clear that China is having the highest number of Internet users in Asia followed by India, and as far as Broadband download speed is concerned India is lagging behind all other Asian countries given in Table 1 excluding Pakistan, even though being at number 2 in internet user percentage of Asia. Download Speed, if taken into consideration, Singapore is at top with 121Mbps speed followed by Hong Kong (104 Mbps), Japan (85

Table 1. Internet Usage and Broadband Speed Statistics June-2015

Rank	Asian Country	Internet Users % Asia	Broadband Download Speed June-2015
1	Singapore	0.3 %	121.25 Mbps
2	Hong Kong	0.4 %	104.0Mbps
3	Japan	7.9 %	85.19 Mbps
4	South Korea	3.3 %	59.08 Mbps
5	Taiwan	1.3 %	48.77 Mbps
6	China	46.3 %	31.57 Mbps
7	Thailand	1.5 %	20.08 Mbps
8	Kazakhstan	0.7 %	18.68 Mbps
9	Vietnam	3.0 %	17.14 Mbps
10	Tajikistan	0.1 %	14.14 Mbps
11	Bangladesh	2.9 %	11.3 Mbps
12	Nepal	0.3 %	8.31 Mbps
13	Bangladesh	2.9 %	11.3 Mbps
14	India	17.5 %	7.29 Mbps
15	Pakistan	2.1 %	4.05 Mbps

Mbps), South Korea (59 Mbps), Taiwan (48 Mbps), and China. The rate at which technology is changing today offers us new hope that education in India can upsurge into the new age of global knowledge at less cost than the developed and modern countries have experienced. Some of the Indian universities have implemented this technology (Usually LMS) not only to achieve diversity in the delivery mode of learning material but also to enhance the process of learning¹³. Suggests that Knowledge delivery approach for teacher and student has been changed due to the tremendous growth of the internet in India. So it is right time is to change the pedagogical approaches to be at par with the technology and the universities all around the globe.

3. Methods of Delivery in E-Learning

Based on the facts collected during the survey, it was found that almost all 41 universities (Figure 4) use ICT enabled and few with blended E-learning approach (5%-10%). In the blended mode of e-learning, both traditional means

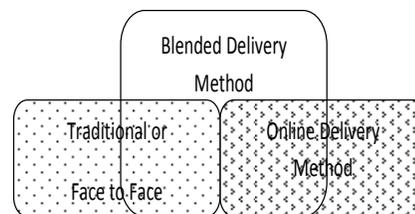


Figure 4. Defining Blend

and technological means of course delivery is used. The degree of each component both from e-learning or traditional to be chosen depend on the course being taught and the availability of the course material for that particular course. Eg. Courses which are having high practical or Lab content shall have less e-learning content as compared to the courses having high theoretical content shall have high e-learning content.

The higher education institutes should consider the technology based learning for following reasons:

- To do more with less.
- To meet the learning needs of the society
- To create an impact of new technology on teaching and learning.

Nowadays a number of universities have started using LMS (Moodle) for E-learning, and the mix of Online and traditional learning is gaining momentum in India. Some IIT's (Delhi, Bombay, Kharagpur, Roorkee, Madras, Guwahati etc.), few Central Universities (Delhi, Mizoram, Hyderabad), along with State, Deemed and Private Universities (Goa, Karnataka, IISC, Amity, ITM, SRM etc.) have taken steps to go for e-learning. From figures and tables provided in this paper, it is quite evident that both Govt. and Non-Govt. universities are getting conscious about using LMS as a tool to help in disseminating materials to the learners, and it is required to have an LMS that can be adapted easily to changing requirements of an institution. It is likely possible that within a span of 5-10 years online degrees provided in Indian Universities will be accredited all over India and rest of the world too.

4. Licensed or Open Source LMS

During the past decade (2000-2014) several companies are trying to build and adapt their LMS to cater the demands and challenges for quality improvement of e-learning process. Our survey shows that most Universities have a

common choice for using Learning management System. One of the most widely used LMS in Indian Universities is Moodle and the choice is mainly due to the low financial status of the university, technology infusion theory, and motivational factors as well. Table 2 will show the University type and the particular Learning Management System they are using for E-learning. It has been seen that most of the developing countries of the world whose educational institutions are not financially sound usually opted for open source Learning Management Systems Moodle. According to the survey conducted the E-learning adoption percentage shown in Figure 5 is higher in non-government Institutions and also it is evident from Table 2 that 95% of Indian Universities are using Open source LMS and rest 5% remain in-house or undefined (*Ekluvya* and *Brihaspati*). Further, breaking the data provided, we are able to determine the percentage of Govt., private and deemed, IIT's Institutions who are Using LMS; this is depicted in Figure 7. Out of Govt. run institutions 6.66% (3/45) belong to central Universities, 1.53% (5/325) from state universities, 43.75% (7/16) from IIT's, 9.74% (19/195) belongs to private universities, 5.4% (7/128) from deemed institutions (Figure 3).

5. Preparing Foundation for E-Learning India

E-learning has produced new dimensions to teaching and learning, both within and beyond the classroom and is still looking at opportunities of becoming more useful by using Learning management systems and other technologies. E-learning plays a significant role in developing countries and will help to improve the higher education, thereby playing an important role in contributing the sustainable development. More than 90% of Indian Universities are still traditional universities, learning

Table 2. LMS adoption by Different Universities in India

University	Moodle	Sakai	Web CT	Others
Central	3	×	×	×
State	5	×	×	×
Deemed	6	×	×	1 Ekluvya
Private	19	×	×	×
IIT's	6	×	×	1 Brihaspati

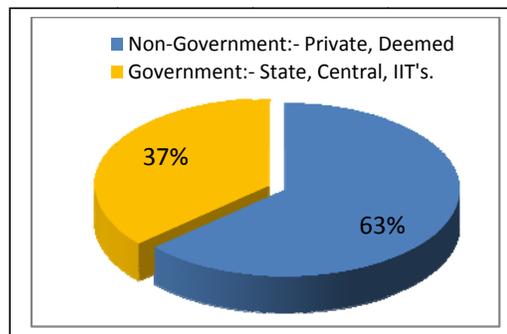


Figure 5. Percentage of Govt. Vs non-Govt. adoption for E-learning

infrastructure had slight or no provision for interaction and the most decisive challenge to these universities is to develop the capacity to change. To offer E-learning in India or anywhere in the world Internet is the most popular and significant media for it. In India,¹⁴ first internet access for public was provided via dial-up service by *Videsh Sanchar Nigam Ltd. (VSNL)*, in 6 cities of India, on August 14, 1995, and since then the usage of the internet technology has grown up exponentially with technological advancements and speed of internet which is clear from Table 3.

The study shows (Table 4) that India alone(excluding the rest of Asian countries) has Internet penetration population rate of 28% , and accounts 22.6% percentage of Internet users of Asia (India = 354,000,000, Rest of Asian countries = 1,209,208,143) within a span of just 15 years. Though India has the second-highest number of Internet users in the world after China, its online penetration rate has reached 28.3% percent¹⁵. It is this Internet growth which will drive users in rural areas and with the availability of low-cost Smartphone's together with low mobile and internet tariffs will empower users. Therefore, within a span of few years, we will be seeing more Internet penetration usage from those areas, which creates an opportunity to spread education and to reaching masses by providing E-learning facilities to them through the use of learning management system.

There is tremendous internet user growth which is 6980% within a span of just 15 years. The Internet and applications associated with education are being seen as an opportunity that should be apprehended by higher educational institutes in India especially Universities to leverage change and to transform themselves and the use of LMS has been seen as a revolutionary tool to overcome

Table 3. Internet Usage and Population Statistics of Asia (Internet World Statistics, June-2015)

Asia Region	Population (2015 Est.)	Pop.% World	Internet Users Dec 31- 2000	Internet Users 30-Jun-2015	Penetration (% Population)	Internet% Users	User Growth 2000-2015
Asia only	4,032,466,882	55.5%	114,304,00	1,563,208,143	38.8 %	47.8%	1,267.6%
Rest of World	3,228,154,236	44.5 %	246681492	1,707,282,441	52.9 %	52.2 %	592.01%
World Total	7,260,621,118	100.0 %	360,985,492	3,270,490,584	45.0 %	100.0 %	806.0%%

Table 4. Internet Usage and Population Statistics of India

Region	Population (2014 Est.)	Pop.% World	Internet Users Dec 31- 2000	Internet Users 30-Jun-2015	Penetration (% Population)	Internet% Users	User Growth 2000-2015
India (2015)	1,282,390,303	19.24%	5,000,000	354,000,000	28.3 %	22.6 %	6980%
India (2014)	1,267,401,849	17.50%	5,000,000	243,198,922	19.19%	17.54%	4764%
Total Growth in one Year 1.74%			5,000,000	110,801,078	9.11%	5.06%	2216%

various challenges which educational sector in India is facing today¹⁶.

This survey is showing that out of 709 (Figure 6) Universities/ Institutions in India only 41 have adopted LMS and are represented in Figure 7 respectively. It is clear from the data that handful proportion of LMS's adopted by different universities. It is clear from the Table 2 also that 39/42 of these Universities are using Open source Learning Management System, Moodle and the rest of the 2 are in-house namely *Eklavya* and *Brihaspati*. LMS can act as an aid to raise the quality of education and promote the pedagogy which would be learner controlled. On the basis of extensive research and proven by the experience of some universities , it was found that E-learning not only guarantees' delivery of learning material but maintenance and high standards in education with the desired educational output. It is the right time in for Universities to decide and take action to establish a foothold in E-learning market

6. Proposed Model for Implementing E-Learning in India

An LMS is an Information System (IS), which supports teaching and learning activities and the management

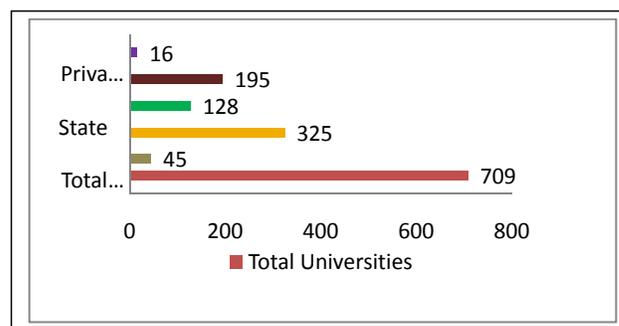


Figure 6. University Type proportion

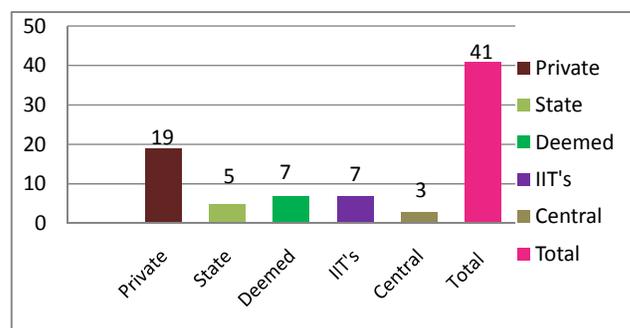


Figure 7. Apportion of Each University Using LMS

and communication associated with them¹⁷. Nowadays, there are more than 100 LMS's available in the market, both licensed and open source, so universities in India

will find it easy to adopt E-learning for their students and faculty and it is because of these open source LMS e.g. Moodle that low budget universities will not be stalled by their financial setup¹⁸. LMS without proper planning for implementation is useless and is not going to help in learning how efficient it might be. During LMS integration in an Institution, one can face challenges for LMS implementation like technology satisfaction; infrastructure, faculty's competence, and motivation etc. To enhance the traditional form of teaching LMS have been very useful in reaching this goal but the staff workload issue mostly in the form of redesigning their pedagogy remains a challenge to be resolved¹⁹. Other Significant barriers that hamper LMS implementation were the lack of Financial and non-financial motivations, time constraint, and author's rights. E-learning Implementation in any Institute will results in reconstitution of faculty roles and for that purpose faculties need to be motivated and should be given enough time to transform. Adoption is the biggest threat because to beat the challenge of LMS cost, universities have opted for an open source LMS, but a successful transition to E-learning using LMS requires motivation, communication and support²⁰. Major challenges related to the implementation of LMS in Indian Universities given in Table 5 are related to faculty only as their role is very crucial and important in the successful implementation of LMS.

There were many models presented before like business models, Innovation acceptance model etc. which focuses on activities like content, context, connection and commerce e.g. Technology Acceptance Model (TAM), which focus on post implementation effect or success of LMS or any other tool, keeping in view faculty and students perception after its implementation in Institutes. There is no such model present that focuses on pre-implementation challenges and provides strategies to make implementation of LMS a success, more effective and trendy as well. Therefore, it is imperative for current scenario of the E-Learning in India to have some best models

Table 5. LMS Implementation Challenges

Adoption	Workload	Motivation
Academic	Pedagogy Shift	Non financial support
Technical	Poor Skills	Technical support
Time Constraint	Content Creation	Software Support

and ideas implemented to popularize LMS to stabilize the E-Learning culture in Indian Universities (only 6% Indian Universities use LMS) because adoption of technology is a complex issue even if teachers are proficient. Looking for some creative ways to enhance traditional ways of teaching, the need for a flexible strategy to be able to support well-planned ICT enabled and blended learning scenarios emerges. Therefore, we propose a model which is the combination of Rogers Innovation adoption curve, E-learning continuum and faculty categorization, in order to mitigate the major barriers like Workload, Adoption and motivation (Table 5) in the propagation of E-learning and LMS in Indian Universities.

With the increasing level of Internet penetration and high user growth in India, it is the right time to adopt and deliver E-Learning in different Institutions of our country. Basic infrastructure is essential for E-learning start-up to deliver information through communication technology and it will be available in almost all Universities but the current ability of any Institution in India lacks technology implementation. Without consent and active participation by the faculty, it is very difficult for Institutions to impart E-Learning because faculties play an important role in E-learning success. With this background, we have suggested an LMS implementation model based on faculty categorization utilizing Roger's innovation theory mixed with barriers to mitigate and to promulgate LMS in Indian Universities to promote E-learning. According to Roger's' innovation theory, certain Characteristics determine the acceptance of a technology²¹.

1. Relative Advantage (Over other tools)
2. Compatibility (with User, Society)
3. Complexity (Ease of use)
4. Trail ability (Opportunity to try)
5. Observability (Gains are clear to see)

Roger classified Users On the basis of technology adoption e.g. LMS (Figure 8). We use the same classification for teachers and categorize them into five different segments, based on their susceptibility to adopt a specific innovation like an LMS. They are Innovators (Enthusiastic or Initiator), early adopters (Follower), early majority (Deliberate), late majority or late adopters (Avoiders), laggards (contenders). We are also aware that there exists a digital gap between faculties both old and new as far as latest educational technology is concerned and that gap will be maximum in critical mass 2. Keeping in view this

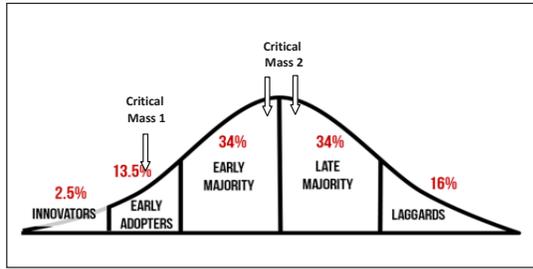


Figure 8. Roger's bell curve for Innovation Adoption

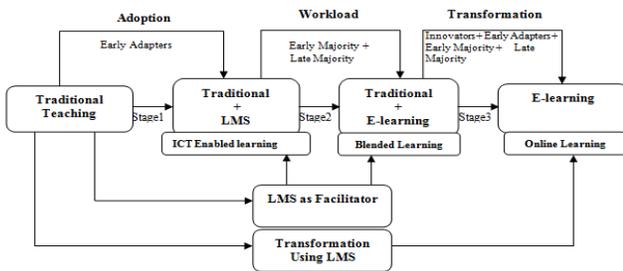


Figure 9. Proposed Strategic E-learning Continuum Model Using Roger's Innovation Adoption Curve.

digital gap, the faculty categorization and roger's adoption curve were mixed in order to create a new form of e-learning continuum (Figure 9).

To achieve e-learning scenario the continuum has been divided into three different stages along with two main Challenges covered and each stage need to be crossed in a well-planned manner, as the adoption of E-learning depends mostly on the faculty. From Rogers bell curve in Figure 8, it is obvious that the success of E-learning solely depends on critical mass 2 while as the success of LMS adoption lies in Critical mass1, as most of the tech savvy faculties will fall in Innovators and little proportion may also fall in early adapters category. Most of the faculty who comes under digital gap scenario fall in critical mass 2 and if we ignore this group it is impossible to achieve the aim of E-learning.

From Figure 9 it is clear that E-learning continuum needs to be initialized by using early adopters (13.5%), to cross stage1 because it would not suffice to make an initiation to introduce LMS with innovators only as their number is very low only 2.5%, but innovators will be working at back end throughout the continuum to actively participate in providing motivation and support to the team. An institution must take consent from the faculty before starting a project of E-learning, and should target to achieve maximum with the help of early adopters

or Critical mass 1. The objective of crossing stage 1 is to mitigate the challenge of adoption by adding LMS into the curriculum and to achieve ICT-enabled learning which is the first goal of our model.

The stage 2 is the backbone of our continuum model which should be crossed with utmost care and need to be dealt with proper planning. Here we will target both early majority and late majority faculty (critical mas 2), with motivational factors along with the support of early adopters and innovators, in order to overcome workload barrier, so that we can achieve blended form of learning. By crossing stage 1and 2, LMS still will be treated as a facilitator only because its approach should be transformative in nature and for that purpose we need to cross stage 3. For institutions who will cross first 2 stages, it will be less difficult for them to cross the stage 3, as there are minimum barriers and the digital gap would also have been minimized at this stage which is a major concern as far the implementation of LMS is concerned. While crossing stage 3 Innovators role is important and other three categories of teachers excluding laggards should be psychologically ready to support the transformation from traditional to E-learning approach. Laggards have no role to play in e-learning continuum, either they will follow their peers or will perish. The job of administration is to encourage faculty, provide motivational support mentioned in Table 5 and should give enough time to cross all the three stages.

7. Conclusion

The basic purpose of this study is to understand where does Indian modern education Stand with respect to Status of E-learning and Learning Management System, and what needs to be done to make E-learning popular. We are sure that if the model proposed will be followed by Indian Universities, Learning goals will be achieved in a structured manner in less time and the E-learning concept will widen over a large spectrum. E-learning can also ensure deep penetration of information even in remote areas and results in the growth of knowledge economy which will lead our country towards Digital India concept. It is very sad to see that researchers pay no or less attention to this part of the world, which may be due to financial and political instability. In this paper an analysis of the situation of E-learning at present is provided which helps us to find out and mitigate the weaknesses, persisting digital gaps and challenges in popularizing

e-learning system in India. The key result highlights the fact that both Govt. and private Universities have almost equal adoption levels of E-learning or LMS and both rely on free open source applications. Despite the fact that during past few years the adoption of LMS in Indian Universities has accelerated, still more studies need to be done to understand the full potential of e-learning. It was also evident from the study and model as well, that faculty is key to successful implementation of LMS. They should be given self-sufficiency to decide the components and tools used in e-learning to achieve their goals and should be motivated financially or non-financially as well. Once the transformation is achieved the new form of learning will be created, and LMS will become a part of Faculty teaching process which may last lifelong.

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