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 beings and it is described as the use of electronic media, educational technology and Information and Communication Technologies (ICT) in education. E-learning is a multifaceted phenomenon, covering a range of approaches and methods that will open access to increased population of education. 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 option.

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 information.

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ICT has been seen as a foreseen tool to tame various challenges in an educational system and in this context Learning Management System (LMS) has been identified as a most acceptable tool presently. It is the inclusion of modern technologies as Wi-Fi, fibre-optics, videoconferencing, Communications satellites, computer networks, and e-mail which allows us, to take a fresh look at the traditional approach and our normal distance learning models and open up new educational horizons. Information-based and knowledge-based society absolutely must have a modern education as it is being viewed as the need of the hour also. Understanding issues & challenges by introducing e-learning is of vital importance to the researchers involved in e-learning and will have a significant role in forming future practices of learning.

In this study, we employ a comprehensive survey tool to define the status of LMS and E-learning adoption in Indian Universities. This survey was based on Qualitative Content Analysis methodology, and results of the survey conducted are believed to be helpful in filling the gap in the literature and to gain insight information of the situation on the ground. The rest of this paper is organized as follows: Section 2 presents E-learning in India. In Section 3, the groundwork preparation for E-learning in India is showed. Then Section 4 is about the Implementation of LMS and Method of E-learning delivery. While Section 5 presents the type of LMS used; In Sections 6 we proposed theoretical E-learning Continuum model followed by the conclusion.

2. E-Learning in India

2.1 From Conventional to E-Learning Approach

As it is explicit from the facts, that changes in Indian demography (Table 4) would also invite challenges. The surging population growth and internet user percentage growth second highest in Asia 28%, much higher user growth rate 6980%, from the entire world’s growth rate 806%, is an alarm for education policy makers in India that we need to do more to cater the ever-increasing educational demands for resources resulted from this demographic changes. Ministry of Human Resource Development (MHRD) amended regulations to meet surging demand for education in India, invites private business and individuals to setup universities here and even legislations were passed to make it easy for them to lay down private Institutes and as a result of that today there are 195 private (established through legislation) and almost 128 deemed Universities (established as per Section 3 of the University Grants Commission Act.) in India. As a result of these efforts Today, India has 700 plus UGC recognized Universities (Central, State, Deemed, Private, IIT’s) (Figure 1, 6). Still the demand for educational resources is increasing day-in-out and universities are being forced to increase the intake capacity despite having the shortage of faculty and other resources.

India has been recognized as a big competitor in information and communication technology, it is quite astonishing to find that E-Learning in India is still in its budding stage. With an excellent business potential and only a few companies in the market, it is high time that universities/ institutions offered courses online because at the present time access to information is very much the need of the hour especially in case of rural India. In consulting the India’s research community, a number of research issues and challenges are essential that need to be addressed to encourage more efficient learning techniques.

Indian universities (Central, State, Deemed, Private, IIT) are taking huge steps in their use of E-learning and the universities surveyed in this investigation were found heading towards the same direction as far as implementation of LMS is concerned but the process is quite slow due to factors like social awareness, wrong policies from government, political abnormality, Low budget, technological challenges, and Motivational factors. Some of the well-known Indian Universities using LMS are IIT Bombay, SRM University, Birla Institute of Technology and Science, IITM, Delhi University, Amity University, University of Madras, ITM university etc.

![Figure 1. Number of universities in India (State and territory-wise)](image-url)
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 emergers that e-learning not only guarantee quality education and but desired educational outcomes also. 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.

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
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 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, 49 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 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 |
An LMS is an Information System (IS), which supports teaching and learning activities and the management 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

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.

### 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%       | 246,681,492                | 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%          | 806.00%                |

### Table 4. Internet Usage and Population Statistics of India

| Region (Year) | 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%          |

![Figure 6. University Type proportion](image-url)

![Figure 7. Apportion of Each University Using LMS](image-url)

various challenges which educational sector in India is facing today.

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 setup\(^6\). 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 resolved\(^9\). 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 result 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 support\(^20\). 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 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 technology\(^{21}\).

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

### 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 |
Figure 2. The objective of crossing stage 1 is to mitigate the challenge of adoption by adding LMS into and need to be dealt with proper planning. Here we will target both early majority and late majority faculty (critical mass 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 1 and 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.

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 mass 1, 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 stage 1 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 mass 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.

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.

8. References

1. Bose K. An E-Learning Experience: A written analysis based on my experience with primary school teachers in an E-Learning pilot Project. http://www.irrodl.org/index.php/irrodl/article/view/151/232. Date accessed: 05/08/2015.
2. Educational technology. https://en.wikipedia.org/wiki. Date accessed: 06/08/2015.
3. Alfadly A. The efficiency of the (LMS) in AOU, Kuwait, as a communication tool in an E-learning system. International Journal of Educational Management. 2013; 27(2):157–69.
4. Zameer Gulzar. Educational System of J&K in the light of Evolutionary Multimedia Technology: A Case Study. IJARCSMS. 2014 April; 2(4):66–75.
5. Arunachalam R. Bringing out the Effective Learning Process by Analyzing of E-learning Methodologies. Indian Journal of Science and Technology. 2014 June; 7(S5):41–43.
6. Hemant R, Manohar L. E-learning: Issues and Challenges. International Journal of Computer Applications. 2014; 97(5):20–24.
7. Poornima N, Raju T. A Novel Approach towards Proliferation of E-Learning in India through the Analysis of Existing ICT Scenario. Recent Trends in Information Technology. Proceedings of IEEE-International Conference ICRTIT, India: 2011, p.1298–1302.
8. Robin D. Web 3.0: Implications for Online Learning. Tech Trends. Springer. 2011 January; 55(1):42–46.
9. Fang H, Sarah H, Shannon E. Three approaches to Qualitative Content Analysis. Qualitative Health Research. 2005 November; 15(9):1277–1288.
10. Krippendorff K. Reliability in Content Analysis. Journal of Human Communication Research. 2004; 30(3):411–33.
11. Zameer G, Anny L. An Exploratory Analysis of Learning Management system as an Emerging ICT tool in India. Bonfring International Journal of Industrial Engineering and Management Science. 2015 June; 5(2):95–99.
12. Matar N, Hunaiti Z, Shahid H, Matar S. In: ICT Acceptance, Investment and Organization: Cultural Practices and Values in Arab World. IGI Global Publ.: USA. 2011, p.184–200.
13. Keogh K, Fox S. Strategies for Embedding e-Learning in Traditional Universities: Drivers and Barriers. Electronic Journal of e-Learning. 2009; 7(2):147–54.
14. The Indian Technomist. http://dxm.org/technomist/news/vsnlnow.html. Date accessed: 21/07/2015.
15. World Internet Statistics. http://www.internetworldstats.com. Date accessed: 21/08/2015.
16. Yuen K, Ma K. Exploring Teacher Acceptance of E-Learning Technology. Asia-Pacific Journal of Teacher Education. 2008; 36(3):229–43.
17. Klobas J, McGill T. The role of involvement in learning management system success. Journal of Computing in Higher Education. 2010; 22(1):14–134.
18. Matar N, Hunaiti Z, Hunaiti Z, Al-Naafa M. E-Learning Status in Arab Countries. Proceeding of the International Conference on Information Society, Indiana: 2007, p. 65–71.
19. Witdono. Utilization of E-Learning at universities Siwabangsa International: Issues and Challenges. Proceedings of 63rd Annual Conference of International Council for Educational Media (ICEM) IEEE, 2013.
20. Garrotte R. Barriers to a wider Implementation of LMS in Higher Education: a Swedish case study, 2006-2011. Eleed. 2012; 9:17–33.
21. Rogers EM. Diffusion of innovations. 3rd ed. Free Press, Macmillan Publication Company: New York, 2003.