



How to cite this article:

Muruthy, A. E., & Yamin, F. M. (2017). The Perception And Effectiveness Of Learning Management System (LMS) Usage Among The Higher Education Students. *Journal of Technology and Operations Management*, 12(1), 86–98. <https://doi.org/10.32890/jtom2017.12.1.10>.

THE PERCEPTION AND EFFECTIVENESS OF LEARNING MANAGEMENT SYSTEM (LMS) USAGE AMONG THE HIGHER EDUCATION STUDENTS

¹Aggilanda Easwary Muruthy, & ²Fadhilah Mat Yamin

¹College of Othman Yeop Abdullah, Universiti Utara Malaysia, 06010, Sintok, Kedah, Malaysia

²School of Technology Management & Logistics, Universiti Utara Malaysia, 06010, Sintok, Kedah, Malaysia

Corresponding author: angle_agi@yahoo.com

Received: 25/12/ 2016 **Revised:** 24/02/2017 **Accepted:** 25/04/2017 **Published:** 27/06/2017

ABSTRACT

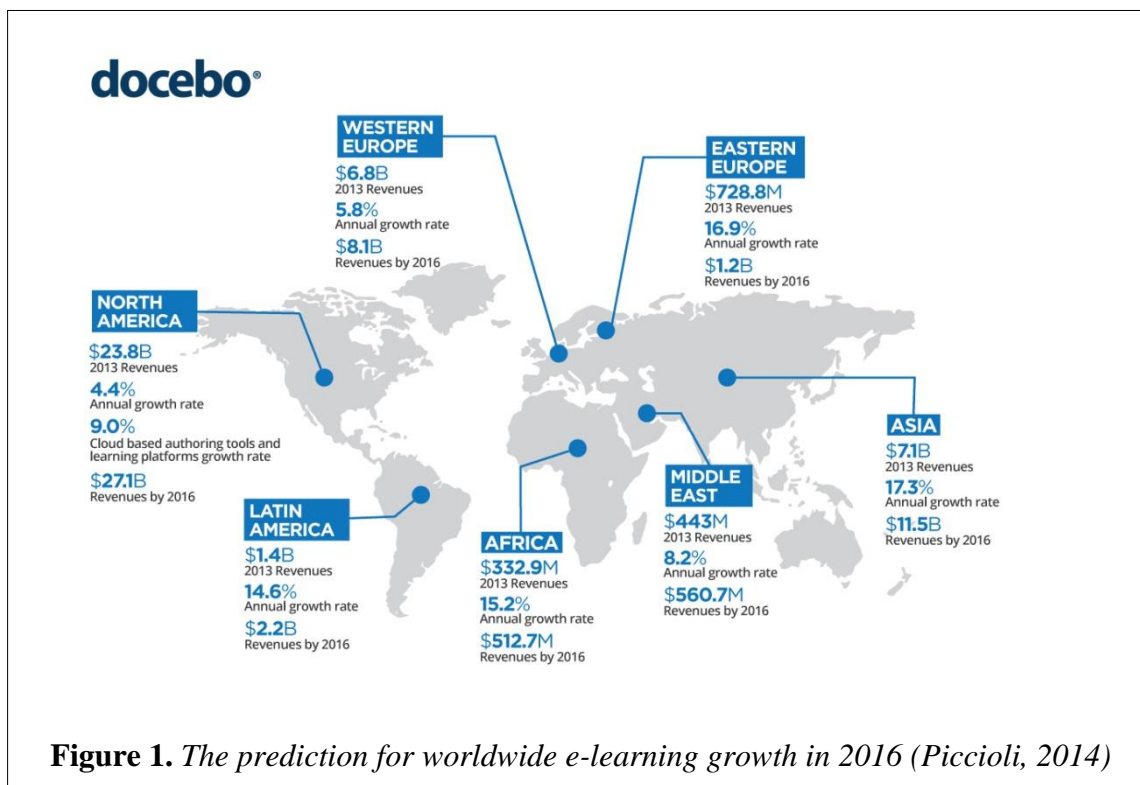
The aim of this paper is to discuss how Learning Management System (LMS) is productive for students in higher education and their perception toward the LMS usage in their learning process. In detail, this paper clarifies the effectiveness of the LMS in higher education for the students and aid to realize the students' perception on using the LMS for their learning process. There is some analysis regard the students' perception on applying the LMS for their learning purpose. This paper approach the students thoughts and acceptance of LMS in higher education. The finding of this paper explores the origin, type, function and the advantage and disadvantage of LMS in higher education which may lead to know the students' judgement about the LMS. This paper shows that how administration and instructors able to motivate the students in higher education to utilize the LMS usage in their learning process and expand the LMS application in secondary education. This paper provides some empirical evidence based on previous studies that LMS is a system which more suitable to be used in higher education to determine the students' involvement; and students' opinion regards the LMS usage in their learning process.

Keywords: Learning management system (lms), lms advantage and disadvantage, students, lms perception among students

INTRODUCTION

Electronic learning (e-learning) is a fundamental system in electronic technology that aid to develop the information and comprehension of the users. The quantity and quality of the research regard the e-learning have expanded drastically during the past decade. E-learning is a medium that gives a great deal of data and information to the users. According to Pappas (2015), e-learning is one of the system that continually increase the number of individual, corporate and institution where they start to recognize the convenience of using the LMS.

In addition, the e-learning also have shown the amazing growth rates in worldwide where India (15%), China (52%), Malaysia (41%), Romania (38%), Poland (28%), Czech Republic (27%), Brazil (26%), Indonesia (25%), Colombia (20%) and Ukraine (20%). Based on Pappas (2015) statistic the result shows the growth rate of e-learning has a high level of demand in worldwide where indicate how each country adopts e-learning and the revenue opportunity. In 2011, the worldwide market for self-paced e-learning reached \$35.6 billion and estimate the 5 year compound annual growth rate would be around 7.6 % and revenue will reach \$51.5 billion by 2016 (Piccioli, 2014). Continuously, it is obvious that the users intend to purchase the online learning tool in 2015 is really high and it is expect will be increased in 2016.



Furthermore, e-learning can be recorded as a leading technology that effectively able to develop from time to time, particularly in the Information, Communication, and Technology (ICT). At the early stage, e-learning is more highlight on spreading the data around the world. However, in this 21st century the e-learning is more concern on the development of information through the coordinated effort between the students via social network (Asia e-University, 2010). To put it plainly, e-learning is really beneficial to the online users. This e-

learning technology is not only advantageous to the users, but as well as to the nature because it is able to spare the cost, time and space in the learning process. This shows that, the e-learning is environment friendly. Besides, the students, lecturers and administration department are the three major groups of people who directly involve in using this e-learning or LMS.

LITERATURE REVIEW

Learning Management System (LMS)

Learning Management System (LMS) is a software application or web-based technology used to plan, implement and access a specific learning process. Again, LMS is a tool that increases the effectiveness of training in industrial area where can reduce the time spend on training and developed for learning purpose. The core objective of the LMS is to enhance the learning process. Currently, the LMS are being utilized across many different industries where they use it to improve the organization productivity. Over the previous decade, maybe there is no other essential tool as LMS have been adopted or used in higher education.

According to Pappas (2015), the LMS is the most fundamental tool of e-learning professionals. During the pass five years the annual compound growth rate of LMS is 25.2% where the highest proportion of revenue contribution is expected to be generated in North America. In other word, the LMS business sector is relied upon to worth roughly 4 billion dollars in 2015 and over 7 billion dollars in 2018 (Pappas, 2015). This shows that, the requirement on LMS is going to have a huge evolution in future.

LMS is one of the e-learning system which acts like most proper system to be used in each and every association and organization. LMS has earned the popularity and wide adoption as the most overwhelming educational technology that utilized as a part of learning in the higher education field such as college and university around the worldwide. In other word, the LMS also can refer as a system that used as replacement of the traditional classrooms. This LMS system is the core instructional resource that frequently used in learning area where it is widely used in higher education institutions.

In addition, the LMS also can serve as the “missing link” that will connect the contemporary instruction changes with effective and innovative employment of technology (Philipo & Krongard, 2012). As mentioned before, LMS plays the most important role in higher education that able to empower instructors to guide and manage students’ achievement more effective by reviewing the learning experience. As well, the LMS is a system which designed to connect and support the knowledge transfer between the instructors and students (Kokensparger, 2013; Naveh, Tubin, Pliskin, 2010; Moses, Wan Ali, Eric Krauses, 2014).

In general, the LMS plays an important role throughout the teaching and learning process which can create a large impact on instructors and students (Garcia-Solorzano, *et al.*, 2012). Besides, most of the web-based interaction in learning environment is largely uses the LMS because the combination of formal and informal learning that can motivate and empowered the user to learn what they interest (Absouchedid & Eid, 2004; Shepherd, 2011). Due to that, the LMS system should implement in the education department to enhance the integration between the instructor and student.

Continuously, the LMS system is developed or obtain in the higher educational institution to help the students to have their own particular space for online studies (Meishar-Tal, Kurtz & Pieterse, 2012). In other word, the LMS is typically executed on a huge scale over a whole institution and adopted by instructors who use them to support the course management and student learning (McGill & Klobas, 2008). Therefore, utilizing the LMS effectively in teaching and learning become an important challenge.

Type of open source in LMS

According to Adzharuddin and Ling (2013), there are four basic types of e-learning system such as a Learning Management System (LMS), Learning Content Management System (LCMS), Learning Design System (LDS) and Learning Support System (LSS). However, all this system has a similar name, but ultimately it is different from each other. Each system has their unique design and different platform. Anyhow, this paper only focus on Learning Management System (LMS). LMS is a contrast from other because it's a platform for managing the users' experience as they interact with e-learning content.

There are various types of LMS system that widely using among the students in higher education institutions. There are several open source LMS can be listed such as Moodle, Blackboard, Sakai, ATutor, ILIAS, OLAT, Latitude learning, eFront, Dokeos, Schoology, Canvas, ELMSLN, Google Classroom, Kornukopia, Myicourse, Neo LMS, Open SWAD, OpenClass and Open edx LMS which is the top open sources used in higher education (Pappas,2015; Medved, 2015; Riddell, 2013). However, among all this type the top open source LMS that commonly use in higher education for 2016 are Moodle, Canvas, Blackboard, Sakai, Brightspace, Edmodo and Schoology (Fenton, 2016).

Without a doubt, Moodle is the most popular open source LMS in the education sector which is free. Moodle is mainly aimed at the education market, likewise it designed to be compatible, flexible and way to modify. According to Medved (2015) and Pappas (2015), Moodle is really helpful to get the online documents for help and pre-build the courses which might save us from developing own content. Although, some time Moodle might need a third party to be hired to customize the platform due to the complexity and difficulty for a lay person to learn and set up the system.

Furthermore, the Canvas also another open source LMS that popular in higher education in 2016. As stated by Medved (2015), "the Canvas has 15,000,000 users in worldwide and organizations that use it include Champlain College and Michigan Tech University". Canvas also can be said as the best learning platforms that offer some unique Web 2.0 features. This Canvas system is really easy for students and instructors to navigate the well-designed site. Moreover, this system has the ability to convey the information intuitively and easy to use the format. The cons are the system can be a bit confusing and difficult to find some instructional material on how to use the platform.

Other than Moodle and Canvas, Blackboard is another open source LMS that very well known in e-learning community. According to Fenton (2016), Blackboard is the dominant in the learning space. Blackboard is a system that well developed for data integration with Student Information System (SIS) that has a huge list of features and various. The disadvantage of this Blackboard system is the slow development of its features that has been

developed over the years; that is now lacking in quality because of the many changes that have occurred in technology.

Continuously, the Sakai and Brightspace is the open source LMS that might be a competitor to the Blackboard Fenton (2016). Sakai is an open source that slightly different from Moodle in a few key elements. Sakai is more aimed at academic institutions as opposed to corporate training. Sakai also integrate with Google Docs, and have few tools alike wiki, online testing, presentation slides and the ability to use Dropbox as well.

Besides that, the Edmodo and Schoology is another online learning system in the education system where it is blurring the boundaries between education and social networking (Davies, 2013). Generally, both these systems are more concern and cater to K-12 rather than higher education. The advantages of using these open source are to make the user more friendly to the technology and easy to collaborate between the students and instructor. The disadvantages of using these systems are the difficulty to upload the students' task and the confusion due to the less clarity on the features.

The LMS function

Understanding the use of LMS alike the function of the system and the appropriate using method is the only way that can help to expand the growth of LMS continuously. There are three main functions should perform by any LMS such as systematizing and presenting training content, creating assignments to solidify and test knowledge and evaluate progress (Rietsema, 2016). In simple word, this LMS software application is normally applied to plan, deliver, publish and place self-paced online courses.

According Sharma (2015), most of the LMS systems are web based and utilized as a part of education in different institutions and companies to enhance the classroom teaching, learning methodology and company records. Besides, the LMS also allows to track the course completions, current status or performance of employees that might useful to evaluate the performance and competency management (CommLabIndia, 2016). There will be the same function in education level too, only the users are different where a manager and employee are in companies and instructor and students in institutions.

Adding to the previous statement, Monsakul (2007) and Srichanyachon (2014), state it clear that there are several common features in LMS that use in every learning process. All the features can be listed as Course info/Syllabus, Course document, Announcements, Discussion Board, External links, E-mail, Chatroom, Students profiles, Who's online, Technical support, Assignments, Log off and Grade. Each and every element in this LMS is mainly helping the user to navigate their weekly lesson, facilitate the learner-content interaction and utilizing the synchronous and asynchronous communication tool.

Advantage and disadvantage of LMS

Implementing a new software or system into an organization or educational institution always has its pros and cons. Likewise, implementing the LMS in the higher education able to add the level of efficiency and create some drawback. Understanding the advantages and disadvantage of the LMS system help the administrator, instructor and student to determine their role and perceive the benefit from the system.

Advantage of LMS

When it comes to advantage, there are a lot of benefits occur from using the LMS in higher education. LMS is fairly easy to use and can be easily customized to suit the learning process. Firstly, LMS is a system that easily can adapt and reuse the materials over time where it can be upgraded based on the current changes. It means that if any, changes are necessary to alter the content material, it is a simple matter of editing the material.

According to Armstrong (2013), LMS is an online learning system that boost the students' self-motivation and help them to manage their own time to study which indirectly raise the level of self-discipline among the students. Adding to that, LMS is a system that offers a centralized sourced of learning (Parker, 2014; Sharma, 2015). This means the system has multiple users who have equal right where all the users are able to access all the information at any given time through the same manner.

According to Alias and Zainuddin (2005), the advantage from LMS can be more specific on lecturers and students. The possible benefit that LMS brings to the instructors can categories as time saving, organization of lecture materials, provision of good and effective ways to evaluate students, enhancement of interaction between lectures and students by linking to the LMS and the provision of extra resources for lectures. While the advantage of using the LMS to the students can be listed as the provision of easy access to the subject material, enhancement of students' abilities to use technology, the increment in the interaction between students and the lectures and the provision of more educational resources.

Table 1.

Summary of the advantages of the LMS.

LMS pros	Source
Flexibility; High level collaboration between students and faculty; can enhance the institutional structures / practices; can involve the learner; reusable and extendable, thus reducing costs and redundancy; increase the enrollment; able to track and record learner performance data; can streamline instruction time	Center for Educational Innovation and Development, 2012; Commlabindia, 2016
Centralized learning; tracking and reporting features; evaluation capabilities; easy upgrades; simplified learning process	Parker, 2014; Srichanyachon (2014),
Flexibility; mobility; low cost; made for you; global reach	Acp computer, 2013
Streamlined training process; ability to deliver engaging & motivating training; technology leverage; centralized learning; tracking & reporting features; evaluation capabilities; easy upgrade; simplified learning process; reduced cost & time saved; interactive environment, anytime & anywhere learning	Sharma, 2015; Thanekar, 2013

Simple, consistent & structure; integrate with student; Mott, 2010
 private & secure; simple & inexpensive to train & support;
 tight tool integration; supports sophisticated content
 structuring

Disadvantage of LMS

Beyond that, every advantage sure have its own disadvantage such like LMS. There are several disadvantages also occurring in educational level. As mention above, LMS is a system that mainly customize for learning process, but it tends to be more course centered rather than student centered. Other than that, the LMS system is an online education that more related to the technology which may tend to create a problem such alike the disruption in internet connection.

According to Armstrong (2013), the LMS cannot offer the human interaction as per the traditional learning. This is because, the LMS cannot cope the large amount of the user interaction at the same time in the discussions. Besides, some users prefer the traditional learning since they want the real life human interaction compared to the virtual interaction. Adding to that, the weak computer and information literacy skill and lack of the information management skill is another challenge in LMS because it is not suitable for certain type of learners (Mobbs, 2003). Whereas, this lack among the user may create a limited understanding between the instructor and student.

Besides that, there are a lot of issues need to face by the LMS users. According to Bickford (2013), the LMS does not fulfill the user requirement where most of the users' complaint regards the LMS access, the outdated features, confusing navigation and the cost for the development. All these issues indirectly influence the user thought about the LMS and reduce the LMS usage. However Angelis (2014), suggest some solution for the LMS problem such as add more concern on the first contact (create complicated ID), verification (user logging ID), segmentation (restrict some section) and integrity (easy modification of the content).

Table 2.

Summary of the disadvantages of the LMS.

LMS cons	Source
Tendency to focus on technology and not students; staff, faculty & students need more training; limited assessment and content delivery methods; customer support challenging; system failure; challenging for LMS to replicate the on-campus environment; problem on ownership and responsibility; infrastructure costs	Center for Educational Innovation and Development, 2012
Technology dependant; material incompatibility; unsuitable for certain types of training & learners; reliant of the quality of the content; expensive; reliant on human support; social/economic disadvantage; no match for face-to-face teaching; too reliant on IT skills; disabilities; inflexible; pedagogically unsound	Mobbs, 2003
Limited control; learning approach; isolation; compatibility issues; computer literacy	Acp computer, 2013

As widely implemented, time-bound; teacher, rather than student centric; courses walled off from each other & wider web, negating the potential of the network effect; limited opportunity for students to “own” & manage their learning experiences within & across courses; rigid, non-modular tools; interoperability challenges & difficulties

Students’ perception and LMS effectiveness

As discuss above, LMS is an important system that especially design for the learning process. Due to that, most of the organization and higher education institution are widely using the LMS to training and educating the users. The implementing LMS in learning environment can help the instructor to observe the students’ participation and assess their performance through online. Anyhow, it is necessary to understand the students’ interest and perception using the LMS for their learning process. This is because, students are one of the prime user for the LMS.

Based on a research in 2014, it is uncovered that 83.5% of students have utilized LMS whereas the rest 16.5% of them only heard about the system (Emelyanova & Voronina, 2014). This statistics shows that most of the students are aware of the LMS usage. Although, there are several research states that students are now moving toward the web 2.0 for their learning purpose (Meishar-Tal, Kurtz & Pieterse, 2012; Gutschmidt, 2012; Mahmood & Jr, 2011). This is because the advanced features and attractive tools on the web 2.0 is better than LMS. This can be a threat to the LMS in the future.

Furthermore, a study state that the quality is a main factor that plays an important factor that contribute to the LMS effectiveness in Open University Malaysia (Rahman, Ghazali & Ismail, 2010). Besides that, the instructor, student, LMS design, learning materials and external support also another vital factor to make the LMS most effective among the students (Zanjani, Nykvist & Geva, 2013). Based on this, can deduce that the features and the users of the LMS is the main elements that able to increase the effectiveness and students perception on LMS.

Additionally, the structured and well-organized LMS always has good impact on the students. Most of the students are facing a lot of problems in using the LMS such like network problem, misleading icon, out-dated features and integration problem. Overcoming this obstacle can build-up the LMS effectiveness among the students for their learning purpose. Besides, can assume that the effective LMS directly can influence the students' satisfaction level where it will have positive perception toward the LMS system.

According to Cavus, Uzunboyly and Ibrahim (2006), the LMS can be effective among the user if can enhance by the collaborative learning tool. This also state that, the LMS function in the teaching and learning such like to deliver the lecture notes and interaction between the instructor and students need to be sufficient to be successful among the user. This is a fundamental point to change the students perception on using the LMS. The table in below list down the summary of the few studies.

Table 3.

List of several research that conduct based the students' perception and effectiveness toward LMS.

Aim of study	Students' perception	Author & Year
Determine the students' reaction and fulfilment toward the old and new LMS	The students satisfy using the LMS based its quality and the proper information delivery	Eom, 2014
To understand the instructors' and students' perception on LMS to build a productive learning environment	Instructor and student have different perception toward LMS where instructor feels LMS is interesting for student; but students did not find it useful for their academic progress	Emelyanova & Voronina, 2014
To present the view, attitude and perspective of students using LMS along with face-to-face learning	The student agree that LMS as a useful tool to improve their english learning but they still concern of the face-to face learning	Srichanyachon, 2014
Explore the students' perception using LMS and understand the issues occur during using LMS	The lack of interaction such alike does not fully utilize the interactive feature in LMS can affect the students' perception	Goh, Hong & Gunawan, 2013
Evaluate the students' perceptions toward e-LMS in pharmacy education	The students consider LMS is convenient , easy to use and enhance their academic performance but sometimes the network connection and lag time block their frequent LMS usage	Mohame Azmi <i>et. al.</i> , 2012
Analyse the students' perception using Facebook as LMS	Students prefer to use Facebook as LMS due to the dynamic structure and special features that different from LMS	Meishar-Tal, Kurtz & Pieterse, 2012;
To integrate the mobile technology and device with LMS to create new trend for the learning environment	The students have a positive opinion toward the new trend in their learning environment where they enjoy to use the LMS via mobile phone	Gutschmidt, 2012 Cavus, 2011
Examine student use and satisfaction with LMS	Students are satisfy with LMS however the computer literacy is a factor that give minor affect on enhance the student satisfaction	Naveh, Tubin & Pliskin, 2010
Examine the students' attitude toward LMS use and actual experience at residential campus and commuter campus	The students in commuter campus more satisfy compare to residential campus because they able to interact with their instructor through LMS rather than face-to-face (the design of the LMS influence students' perception)	Lonn, Teasley & Krumm, 2009
To discover the relationship between students' perception toward a LMS system and the actual use of the system	The lack of internet access might affect the students' perception toward LMS	Liyanagunawardena, 2008

RECOMMENDATION AND CONCLUSION

Recommendation

As mention earlier, Learning Management System (LMS) is a system that's especially build for the learning environment. Based on the review this system highly use in organization and higher education institutions. However, the LMS is still not yet utilize fully in the education field. Whereas, some foreign country has been starting applying the LMS in secondary level education and some not for an example Malaysia. In future, all the education will be technology base. Due to that, the students should have an exposure about the LMS so it can be familiar to them in future.

CONCLUSION

In the nutshell, this paper discuss the students' perception and LMS effectiveness toward using the LMS in higher education. At the top, the paper discusses the origin of the LMS and continued by discussing the type of LMS. There are several types used in the higher education institution. However, the Moodle open source LMS is on the top of all due to the preference of the user and the features. Besides that, the LMS function and feature also discussed above. In the end, the students' perception and LMS effectiveness of using the LMS too discussed based on several past researches. Adding to that, the students' persecution toward LMS will increase and effective if the administration pay more attention on the system.

ACKNOWLEDGMENT

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

REFERENCES

- Advantages and Disadvantages of e-Learning*. (2013). *Acpcomputer.edu.sg*. Retrieved 12 March 2016, from <http://www.acpcomputer.edu.sg/index.php/advantages-and-disadvantages-of-e-learning/>
- Adzharuddin, N., & Ling. (2013). Learning Management System (LMS) among University Students: Does It Work? *IJEEEE*. doi:10.7763/ijeeee.2013.v3.233
- Alias, N., & Zainuddin, A. (2005). Innovation for Better Teaching and Learning: Adopting the Learning Management System. *Journal Of Instructional Technology*, 2(2), 27-40.
- Angelis, D., (2014). *LMS Security: Problems and Solutions - eLearning Industry*. *eLearning Industry*. Retrieved 12 March 2016, from <http://elearningindustry.com/lms-security-problems-solutions>
- Armstrong, S. (2013). *Advantages and Disadvantages of Online Learning - eLearning Industry*. *eLearning Industry*. Retrieved 12 March 2016, from <http://elearningindustry.com/advantages-and-disadvantages-of-online-learning>

- Asia e-University. Dasar e-Pembelajaran Negara (DePAN) untuk Institusi Pengajian Tinggi. (2010). *Kementerian Pengajian Tinggi Malaysia*, 12-14. Retrieved from <https://meipta.files.wordpress.com/2011/06/dasar-e-pendidikan-negara.pdf>
- Bickford, A. (2013). 12 Common Complaints about Learning Management Systems (LMS). *Connect Thinking*. Retrieved from <http://connectthinking.com.au/12-common-complaints-about-learning-management-systems-lms/>
- Cavus, N. (2011). Investigating mobile devices and LMS integration in higher education: Student perspectives. *Procedia Computer Science*, 3, 1469-1474. <http://dx.doi.org/10.1016/j.procs.2011.01.033>
- Cavus, Uzunboyulu, & Ibrahim. (2006). Center for Educational Innovation and Development. 2012. *ITLS6520 - Advantages and Disadvantages to an LMS*. Presentation.
- Davies, R. (2013). *Schoology or Edmodo? Choosing the Best LMS for your iPad Classroom*. *Fractus Learning*. Retrieved 13 March 2016, from <http://www.fractuslearning.com/2013/07/15/schoology-edmodo-lms-ipad/>
- Emelyanova, N. & Voronina, E. (2014). Introducing a Learning Management System at a Russian University: Students' and Teachers' Perception, *The International Review of Research in Open and Distance Learning*, 15(1).
- Eom, S. (2014). Understanding e-Learners' Satisfaction with Learning Management Systems. *IEEE Technical Committee on Learning Technology*, 16(2/3), 10-13.
- Fenton, W. (2016). *The Best Learning Management Systems (LMS) for 2016*. *PCMAG*. Retrieved 13 March 2016, from <http://www.pcmag.com/article2/0,2817,2488347,00.asp>
- Garcia-Solorzano, D., Cobo, G., Santamaria, E., Moran, J. A., Melenchon, J., & Monzo, C. (2012). Evaluation of a Learning Management System focused on activities. In *Proceedings of the 2012 IEEE Global Engineering Education Conference (EDUCON)*.
- Goh, W., Hong, J., & Gunawan, W. (2013). Exploring Students' Perceptions of Learning Management System: An Empirical Study Based on TAM. *IEEE International Conference on Teaching, Assessment and Learning for Engineering (TALE)*, 367-372.
- Gutschmidt, A. M. (2012). A Case Study Investigating the Use of Facebook as a Learning Management System in Higher Education, Doctoral dissertation, North Carolina State University. (ERIC Document Reproduction Service No. 3538269).
- Kokensparger, B. (2013). *Using Compositional Writing Samples to Explore Student Usage Patterns in a Learning Management System* (Phd). University of Nebraska.
- Learning Management System (LMS): Characteristics, Functions and Benefits*. (2016). *Commlabindia.com*. Retrieved 10 March 2016, from <http://www.commlabindia.com/resources/article/lms.php>
- Liyanagunawardena, T. (2008). Measuring Student Perception and Actual Usage of Online Learning Management System. *Communications of The IBIMA*, 4, 165-168.
- Lonn, S., Teasley, S., & Krumm, A. (2009). *Investigating Undergraduates' Perceptions and Use of a Learning Management System: A Tale of Two Campuses*. Presentation, San Diego, California.
- Mahmood, K. & Jr J. (2011). Adoption of Web 2.0 in US academic libraries: a survey of ARL library websites. *Program: Electronic library and information system*, 45 (4), 365-375. DOI 10.1108/00330331111182085.
- McGill, T., & Klobas, J. (2009). A task-technology fit view of learning management system impact. *Computers & Education*, 52(2), 496-508. <http://dx.doi.org/10.1016/j.compedu.2008.10.002>

- Medved, J. (2015). *Best Free Learning Management Systems (LMS)*. *Academyofmine.com*. Retrieved 12 March 2016, from <http://www.academyofmine.com/12-best-free-learning-management-systems-lms/>
- Medved, J. (2015). The Top 8 Free/Open Source LMSs. *Capterra Training Technology Blog*. Retrieved from <http://blog.capterra.com/top-8-freeopen-source-lmss/>
- Meishar-Tal H., Kurtz G. & Pieterse E. (2012). Facebook Groups as LMS: A Case Study, *The International Review of Research in Open and Distance Learning*, 13(4).
- Mobbs, R. (2003). *Disadvantage of e-learning*. *Le.ac.uk*. Retrieved 12 March 2016, from <https://www.le.ac.uk/users/rjm1/etutor/elearning/disadvofelearning.html>
- Mohamed Azmi, H., Zeehan, S., Fahad, S., Maryam, F., & Hisham, A. (2012). Assessment of Students' Perceptions towards E-Learning Management System (E-Lms) In a Malaysian Pharmacy School: A Descriptive Study. *Malaysian Journal of Public Health Medicine*, 12(1), 14-20.
- Monsakul, J. (2007). Learning Management Systems in Higher Education: A Review from Faculty Perspective. In *Fourth International Conference on eLearning for Knowledge-Based Society*, (pp. 8.1-8.7). Bangkok, Thailand: International Journal of Computer Integrated Manufacturing. Retrieved from http://www.ijcim.th.org/SpecialEditions/v15nSP3/P08eLearningAP_LMSinHigherEducation.pdf
- Moses, P., Wan Ali, W., & Eric Krauss, S. (2014). Cause Analysis of Learning Management System: Role of Moderator in Improving Students' Performance. *Research and Practice in Technology Enhanced Learning*, 9(1), 83-105.
- Mott, J. (2010). *Envisioning the Post-LMS Era: The Open Learning Network*. *EDUCAUSEreview*. Retrieved 10 March 2016, from <http://er.educause.edu/articles/2010/3/envisioning-the-postlms-era-the-open-learning-network>
- Naveh, G., Tubin, D., & Pliskin, N. (2010). Student LMS use and satisfaction in academic institutions: The organizational perspective. *Internet and Higher Education*, 13(3), 127-133. doi:10.1016/j.iheduc.2010.02.004
- Pappas, C. (2015). *The Top 8 Open Source Learning Management Systems - eLearning Industry*. *ELearning Industry*. Retrieved 10 March 2016, from <http://elearningindustry.com/top-open-source-learning-management-systems>
- Pappas, C. (2015). *The Top eLearning Statistics and Facts for 2015 You Need To Know - eLearning Industry*. *ELearning Industry*. Retrieved 10 March 2016, from <http://elearningindustry.com/elearning-statistics-and-facts-for-2015>
- Parker, B. (2014). *Top 5 Benefits of Using a Learning Management System*. *ELearning Brothers*. Retrieved 12 March 2016, from <http://elearningbrothers.com/top-5-benefits-of-using-a-learning-management-system/>
- Phillipo, J., & Krongard, S. (2012). Learning Management System (LMS): The Missing Link and Great Enabler. *Massachusetts ASCD Perspectives*. Retrieved from http://ease.celt.org/resources/1/CELT_LMS_Article.pdf
- Piccioli, V. (2014). *Global E-Learning market infographic - Docebo*. *Docebo*. Retrieved 9 March 2016, from <https://www.docebo.com/2014/02/19/global-e-learning-market-infographic/>
- Rahman, Ghazali & Ismail. (2010). *12 learning management system providers and what they bring to classrooms*. *Education Dive*. Retrieved 11 March 2016, from <http://www.educationdive.com/news/12-learning-management-system-providers-and-what-they-bring-to-classrooms/97613/>

- Rietsema, D. (2016). *What is a Learning Management System (LMS)?*. *HR Payroll Systems*. Retrieved 13 March 2016, from <http://www.hrpayrollsystems.net/learning-management-system/>
- Sharma, A. (2015). *Discovering Learning Management Systems: Basic Functions and Benefits - eLearning Industry*. *ELearning Industry*. Retrieved 11 March 2016, from <http://elearningindustry.com/discovering-learning-management-systems-basic-functions-benefits>
- Srichanyachon, N. (2014). EFL Learners' Perceptions of using LMS. *Journal of Educational Technology*, 13(4), 30-35.
- Thanekar, P. (2013). *10 Advantages of Leveraging LMS for Blended Learning*. *The Upside Learning Blog*. Retrieved 14 March 2016, from <https://www.upsidelearning.com/blog/index.php/2013/04/30/10-advantages-of-leveraging-lms-for-blended-learning/>
- Zanjani, Nastaran, Nykvist, Shaun S., & Shlomo, Geva. (2013). What makes an LMS effective: a synthesis of current literature. In *Proceedings of CSEDU 2013 – 5th International Conference on Computer Supported Education*, SciTePress, Aachen, Germany, pp. 574-579.