



The Validity of Mobile Learning Management System (M-LMS) at University

Faiza Rini*, R. Mulyadi, Junaidi Surya, and Ahmad Louis

Department of Information System, Sekolah Tinggi Manajemen Informatika dan Komputer Nurdin Hamzah Jambi, Indonesia

This study aims to find out the results of expert validation on Mobile Learning Management System (M-LMS) in the subjects of Human and Computer Interaction at university. Mobile Learning Management System (M-LMS) is developed in order to create more dynamic communication between lecturers and students. Learning management system is a model and system that runs an administration which serves as an e-learning platform, which delivers and manages content, identifies, assesses, tracks progress, collects and presents data to monitor the learning process as a whole. The development procedure of this research uses Borg and Gall which is simplified into five stages as follow: (1) Conducting product analysis that will be developed, (2) Developing the initial product/prototype, (3) Expert validation and revision, (4) Small scale field trial and product revision, (5) Large-scale field trials and final products. The stage of expert validation on Borg and Gall method is done at the third stage, namely the stage of expert validation and revision. This study produces a valid mobile learning management system (M-LMS) software for the course of Human and Computer Interaction.

Keywords: Validity, Mobile Learning Management System, Human and Computer Interaction.

1. INTRODUCTION

With the advancement of the Information and Communication Technology (ICT), traditional “Brick and Mortar” and dictating teaching and online learning has been progressively replaced by the blended learning and mobile learning. It is inevitably that the technology advancement has dominated in all aspects of life such as the economic, politics, culture, art and even education globally. Mobile learning has become significantly improve the students’ ability to understand and solve problems, promoting users’ learning initiative [1, 2].

The face-to-face meeting that constrained by the time and space is ineffective and will be significantly reduced. The dynamics that needed is the creation of effective communication, facilitate easier communication between lecturers and students. This dynamism cannot be confined/limited by a particular space and time. This can be exemplified by the existence of various activities of the lecturers outside of learning or class, or the existence of the same course at different class, or the course that collide with other course in the same semester, in which it causes the lecturer cannot do the job properly. Thus, the lecturers cannot be blamed for the absent of the students

especially if the student could not attend traditional classes due to their own businesses. There are students that could not come to the classes for some reasons such as have to attend seminars, workshops, organizational and work needs.

In this study, to solve the issue of time constraints and high absenteeism rate of students, this study proposed a solution by implementing the mobile learning (M-learning) with the implementation of useful features. The M-learning allows the students and lecturers to access the online learning contents at anytime and anyplace, facilitate the distribution of the updated materials and information for teaching and learning.

Toward this shift of the educational system into digital university, mobile learning (M-LMS) has been introduced to the many Universities in Indonesia. The implementation of M-LMS in education settings implies the feasibility of learning tools as the supplemental tools in enhancing students’ academic performance.

Consensus on the instructional values of M-LMS is overwhelming. By creating a central consideration of browser-based mobile learning platform, the accessibility of information stores, delivery of information through peer collaboration, and online courses will be accelerated across the learning community. Peer learning can be

*Author to whom correspondence should be addressed.

conducted as simply as students elaborating and explaining a concept to others, clarifying it, and conceptualizing the learning materials [3]. Thus, it is necessary to develop M-LMS as a learning medium and tested its validity from the usability, information quality and interaction quality aspects.

2. THE MATERIAL AND METHOD

2.1. The Current Trends of M-LMS

Previous studies on mobile and ubiquitous learning practices have emphasized on the effectiveness of mobile learning [4, 5]. Perceived usefulness [6]; learners' attitudes [7]; the frequency of use of a mobile device for learning [8]; and learning/academic performance [9].

Student favorable and positive attitude towards new technology increase their intention to use the mobile learning for academic purpose. Users' perceived ease of use (PEOU), perceived usefulness (PU), and satisfaction of LMS also the factors that influence their high expectations and intentions to use LMS. With the potential benefits of m-learning such as mobility, ubiquitous supporting platform, m-learning can be summarised as being ubiquity, convenience, localisation and personalisation [10]. Thus, this study emphasized on the heuristic evaluation of the M-LMS from the usability, information quality and interaction quality perspectives.

This research will produce outcomes in the form of Mobile-based LMS and manual book for learning management system in Higher Education specifically for the subject of human and computer interaction (HCI). This research includes as research and development (R&D) which produce learning management system based on system management learning by established a college mobile learning (website), especially on the subject of human and computer interaction. The developed instrument is questionnaire.

Research Education and Development (R&D) is a process used to develop and validate educational products [11]. The steps/stages of this process are usually called R&D cycle, which consists of studying the research findings related to the product that will be developed, developing the product based on these findings, trials the product in the setting where it will be used, and revise it to fix the weaknesses in the stage of trials submission. The research stages proposed by Borg and Gall can be simplified into five main steps by keeping the essence that should be met in conducting the research. The five main steps are [12]:

- Conducting analysis of products that would be developed
- Develop the initial product/prototype
- Expert validation and revision
- Small-scale field trial and product revision
- Large-scale field trial and final products.

Expert validation stage on Borg and Gall method is conducted at the third stage, namely the stage of expert validation and revision. For the assessment or validation, it will be done on M-LMS validation, lecturers and students manual book validation.

In Research and development, the validation stage is an important part in measuring the feasibility of a developed product. The statistical procedure that shows popular logical validity is test contents validity based on item contents validity. One of the statistics that shows item contents validity is as proposed by Aiken. Aiken has formulated the Aiken's V formula for calculating the Content Validity Coefficient based on the results of research of experts panel as much as n people against an item of a mobile-based LMS development tool in terms of to what extent this item is able to represent the measured constants. In this case of representing the measured constants, it means the related item is relevant to its behavioral indicator, since the behavioral indicator is the operational translation of the attribute being measured. The assessment is done by giving a number between 1 (i.e., not highly representative or highly irrelevant) to 5 (i.e., very representative or highly relevant).

Reference [13] show Aiken's V Statistics can be formulated as follows:

$$V = \sum s / [n(c - 1)] \quad (1)$$

Information: $s = r - lo$, lo = the lowest validity score (in this case = 1), c = the highest validity score (in this case = 4), r = number given by an appraiser.

The results of Aiken calculations ranged from 0 to 1 and the numbers 0.6 can be interpreted to have quite significant coefficient. The value of V 0.6 and above is expressed in a valid category.

Learning Management System (LMS) application designed with the name m-lms.stmiknh can be used by the students and lecturers of STMIK Nurdin Hamzah with the following assumption:

- Permanent lecturers and registered students at STMIK Nurdin Hamzah
- Connect with the internet
- Has Notebook, HP, SmartPhone, Android and Laptop.

Some features of this LMS application include: Attendance, FAQ, Discussion, Course Contract, Semester Learning Program Plan, Syllabus, Module or Teaching Material, Discussion Forum, Tasks, Quiz, Reading Materials, Lecturer Profile.

The results of Aiken calculations ranged from 0 to 1 and the numbers 0.6 can be interpreted to have significant coefficient. The value of V 0.6 and above is expressed in a valid category [14].

The M-LMS, namely m-lms.stmiknh, support the institution that need help with instructional design, online course and program development and/or efforts to meet



Fig. 1. Lecturer and student's login.

quality and accessibility standards. It is accessible by the students and lecturers of STMIK Nurdin Hamzah with the following prerequisite:

- Permanent lecturers and registered students at STMIK Nurdin Hamzah
- Internet connectivity
- Computer, Laptop and Smartphone devices.

It was designed to support the online learning and Course Management and social constructionist pedagogical practices in which the students and lecturers collaborate to create the knowledge through online teaching and learning, collaboration and group work activities. It includes forum, assignment, quiz, course contract, syllabus, course materials online class schedule, reading materials, assessment tools and remedial.

Below are the instructions on how to access M-LMS:

- The M-LMS can be accessed through <http://m-lms.stmiknh.ac.id/view-home.html>.
- Both students and lecturers using the same platform.
- At the Home page (See Fig. 1), lecturers login by clicking "Lecturer" button while students login by clicking "college student" button.



Fig. 2. Registration button.



Fig. 3. Course data form (dashboard).

- For those lecturers that do not have the account created yet, they can click "register here" to register as shown in Figure 2.
- Only the lecturers are allowed to upload learning materials/lecture materials. Figure 3 shows the course form/dashboard, the M-LMS functionalities not only limited to creating and uploading online course, but also modified and utilized as the supplemental platform to suit the requirement of the user in fully synchronous and asynchronous online courses. The HCI course contains course contract, semester learning program plan (RPKPS) syllabus, teaching materials, discussion forum, lecture assignment, quiz, reading material, course schedule, exam schedule, score and remedial. A user manual will be validated by the experts. The user manual will be developed to help students and lecturers understand the interface, functionalities and activities flow.

3. RESULTS AND DISCUSSION

Three products have been assessed, namely; (a) M-LMS Application Products, (b) Lecturer Guidance Products, (c) Student Guidance Products.

3.1. The Validation Data on M-LMS

The validation conducted by M-LMS validators from several aspects: (1) Usability, (2) Information Quality, (3) Interaction Quality (see Table I). Previous study showed that 83 percent of teachers agreed to learn English language online. The validation is conducted by four experts of factors affecting the 'online learning environment.' Forty participants who have been teaching English completed the 125 items in questionnaire. The result of the study showed that average variance extracted for peer support was 0.66 and instructor support was 0.52 indicating adequate convergence. The construct reliability showed value of 0.83 for peer support and 0.70 for instructor support indicating the good construct validity [15].

The questionnaires have been given to them to be filled up. The average of the experts stated that 90% M-LMS can support HCI learning process at anytime and anywhere.

Table I. Expert validation data on M-LMS (validation is done by 4 experts).

No.	Aspect	Expert assessment				Aiken's <i>V</i>	Category
Usability							
1	M-LMS is very helpful in learning activities	5	3	4	5	0,813	Valid
2	M-LMS has an attractive display	4	4	4	5	0,875	Valid
3	M-LMS is effective to improve the quality of learning process	4	5	5	4	0,875	Valid
4	M-LMS can improve the quality of interaction and communication with lecturers	4	5	4	4	0,813	Valid
5	It is easy to use M-LMS in the courses that are currently attended	4	4	5	4	0,813	Valid
6	M-LMS makes easy to understand and doing lecture assignments	4	4	4	3	0,688	Valid
7	M-LMS facilitates students to get feedback from lecturer evaluation	4	5	4	5	0,875	Valid
8	M-LMS can be used to implement remediation and enrichment for students who need it	4	4	5	3	0,750	Valid
9	M-LMS makes easier for students to share lecture materials	4	4	3	4	0,688	Valid
10	M-LMS makes easier for students to access the subject course	4	4	3	4	0,688	Valid
11	M-LMS provides timely information	4	4	5	4	0,813	Valid
Information quality							
12	M-LMS provides information that easy to understand	4	3	4	4	0,688	Valid
13	M-LMS provides relevant information	4	4	4	5	0,813	Valid
14	M-LMS provides up to date information	4	4	5	5	0,875	Valid
15	M-LMS provides clear information	4	3	4	5	0,750	Valid
16	M-LMS provides information that easy to read and understand	2	4	5	4	0,688	Valid
17	M-LMS provides reliable information	4	5	4	4	0,813	Valid
18	M-LMS has a good reputation	4	2	5	4	0,688	Valid
Interaction quality							
19	M-LMS gives the impression of attracting interest and attention	4	4	5	4	0,813	Valid
20	M-LMS gives a sense of community	4	5	4	3	0,750	Valid
21	M-LMS makes it easy to provide input	4	3	4	3	0,625	Valid
22	M-LMS provides security for the learning transaction process	4	2	3	5	0,625	Valid
Average		3,95	3,86	4,23	4,14	0,764	Valid

In line with that, Ref. [16] show point out that the integrated learning in Nikagarua still a traditional learning and e-learning.

From the experts statement above, it is in line with the research designed that M-LMS can be used as a complement in learning, especially in learning HCI. The results of the validation is as follows.

From the Table I, the result of M-LMS validity test, it can be concluded that the aspect of Usability and Information Quality is Valid with Aiken's *V* value of 0.764. The results of Aiken calculations ranged from 0 to 1 and the number of 0.600 can be interpreted to have a high coefficient. *V* value $0.764 > 0.600$ is expressed in valid

category. Based on the suggestions given by the validators, the revision is conducted so that M-LMS is valid to be utilized as learning medium in the course of HCI.

3.2. The Validation Result of Lecturer Guidance/Manual

The assessment or validation made by validator on the guidance of the lecturer includes several aspects namely (1) Content, (2) Construction and (3) Language. Validation is done by five experts or validators. All validators also assess or validate entirely the developed product. The results of validator assessment of the Lecturer Guidance can be seen in the Table II.

Table II. Expert validation data on lecturer manual (validation is done by 5 experts).

No.	Rated aspect	Expert assessment					$\sum s$	Aiken's V	Information
		\overline{V} 1	\overline{V} 2	\overline{V} 3	\overline{V} 4	\overline{V} 5			
1	The use of language that easy to understand	4	4	3	3	5	14	0,700	Valid
2	The use of image in accordance with the contents of the image	5	4	5	4	3	16	0,800	Valid
3	The selected colors and pictures are interesting	4	5	3	4	3	14	0,700	Valid
4	The type and size of letters used accordingly	4	5	3	3	5	15	0,750	Valid
5	Clear table of contents	4	3	3	4	4	13	0,650	Valid
6	Compatibility of table of contents with the contents of manual	4	4	5	4	3	15	0,750	Valid
7	The guidebook/manual facilitates lecturers understanding	4	5	4	3	4	15	0,750	Valid
8	The indicators instruction of manual very helpful in understand the application	3	4	3	4	4	13	0,650	Valid
9	The manual/guidebook for lecturers is very appropriate (appropriate manual for lecturers)	4	4	4	3	4	14	0,700	Valid
10	Lecturer guidebook/manual is very useful	5	3	4	4	5	16	0,800	Valid
11	Typography of manual in fonts using is very precise	4	4	4	5	4	16	0,800	Valid
12	In using bold, underline, italic and capital in emphasize and distinguish the important part is very precise	4	4	5	3	3	14	0,700	Valid
13	The letters on the lecturer manual in accordance with higher education	4	4	4	5	3	15	0,750	Valid
14	Lecturer manuals facilitate understanding	4	4	5	5	3	16	0,800	Valid
15	Language used communicative	4	4	4	5	5	17	0,850	Valid
16	The language used motivates the learners/students to do the work	4	5	4	5	4	17	0,850	Valid
17	The language used is not ambiguous	5	4	4	4	3	15	0,750	Valid
18	The language used is a good and correct language according to Indonesian grammar rules	4	5	3	4	4	15	0,750	Valid
19	The information conveyed is clear	4	4	5	3	4	15	0,750	Valid
20	The order of sentences is very clear	4	4	3	3	4	13	0,650	Valid
21	The spelling used refers to the EYD	4	5	5	5	5	19	0,950	Valid
22	Consistent in using terms that describe the concepts	4	5	4	3	4	15	0,750	Valid
	Grand total	90	93	87	86	86	332	0,755	Valid

From Table II the validity test results of the Lecturer Guidebook/manual from the validator on the aspects of Content, Construction and Language are Valid with the Aiken's V value 0.755. The results of Aiken calculations ranged from 0 to 1 and the number of 0.600 can be interpreted to have a high enough coefficient. The value of V $0.755 > 0.600$ is expressed in a valid category. Based on the suggestions given by validator, then revision is made so valid Lecturer guidebook/manual is obtained and worthy to be tested.

3.3. The Validation Result of Lecturer Guidance/Manual

The assessment or validation made by validator on the guidance of the Student's includes several aspects namely (1) Content, (2) Construction and (3) Language. Validation is done by five experts or validators. All validators also assess or validate entirety the developed product. The results of validator assessment of the Student's Guidance can be seen in the Table III.

From Table III the validity test results of the Student's Guidebook/manual from the validator on the aspects of

Table III. Expert validation data on student's manual (validation is done by 5 experts).

No.	Aspect	Expert assessment					$\sum s$	Aiken's V	Information
		$\frac{V}{1}$	$\frac{V}{2}$	$\frac{V}{3}$	$\frac{V}{4}$	$\frac{V}{5}$			
Content aspect									
1	Use of language is easy to understand	5	5	4	4	4	17	0,850	Valid
2	Use of images in accordance with the contents of the image	4	5	5	4	4	17	0,850	Valid
3	The selected colors and images are interesting	4	4	3	3	4	13	0,650	Valid
4	The type and size of the letters used are appropriate	4	4	5	5	4	17	0,850	Valid
5	Table of contents clarity	4	4	4	4	4	15	0,750	Valid
6	Compatibility of writing the table of contents with the contents of the guidebook	4	4	5	4	4	16	0,800	Valid
Construction aspects									
7	Guidebook guidelines facilitate student understanding	4	4	4	3	4	14	0,700	Valid
8	Guidebook order with appropriate sub topics	4	4	4	4	3	14	0,700	Valid
9	Indicator guidebook guide makes it easy to understand applications	4	4	4	3	4	14	0,700	Valid
10	The guidebook for students is very appropriate	4	4	5	4	5	17	0,850	Valid
11	Student guide books are very useful	4	3	4	5	5	16	0,800	Valid
12	Typography guidebooks in the use of fonts are very appropriate	4	4	4	4	5	16	0,800	Valid
13	In using bold, underline, italic and capital in applying pressure and distinguishing important parts is very appropriate	4	5	5	5	5	19	0,950	Valid
14	The suitability of letters in the student manual is in accordance with higher education	4	5	5	5	4	18	0,900	Valid
15	The student guide book facilitates understanding	4	5	4	5	4	17	0,850	Valid
16	Typography guidebooks in the use of fonts are very appropriate	4	5	4	4	3	15	0,750	Valid
17	In using bold, underline, italic and capital in applying pressure and distinguishing important parts is very appropriate	5	5	5	4	4	18	0,900	Valid
Language aspects									
18	The language used is communicative	4	5	5	5	4	18	0,900	Valid
19	The language used motivates students to do work	4	5	5	4	3	16	0,800	Valid
20	The language used is not double meaning	4	4	4	3	4	14	0,700	Valid
21	The information conveyed is clear	4	4	5	5	5	18	0,900	Valid
22	The spelling used refers to EYD	4	5	4	4	4	16	0,800	Valid
	Grand total	90	97	97	91	90	355	0,807	Valid

Content, Construction and Language are Valid with the Aiken's V value 0.807. The results of Aiken calculations ranged from 0 to 1 and the number of 0.600 can be interpreted to have a high enough coefficient. The value of V $0.807 > 0.600$ is expressed in a valid category. Based on the suggestions given by validator, then revision is made

so valid students guidebook/manual is obtained and worthy to be tested.

4. CONCLUSION

The development of mobile learning management system received good score/value from validator. It can be shown

on the result of validity test of M-LMS to the aspect of Usability and Information Quality, is Valid with Aiken's V value 0,764. The results of Aiken calculations ranged from 0 to 1 and the number of 0.600 can be interpreted to have a high enough coefficient. The value of V 0.764 > 0.600 is expressed in a valid category. For lecturer guidebook/manual assessment based on Aiken's V calculation is 0.755. The results of Aiken calculations ranged from 0 to 1 and the number of 0.600 can be interpreted to have a high enough coefficient. The value of V 0.755 > 0.600 is expressed in a valid category. For the assessment of student guidebook/manual, the test results with Aiken's V is 0.807. The results of Aiken calculations ranged from 0 to 1 and the number of 0.600 can be interpreted to have a high enough coefficient. The value of V 0.807 > 0.600 is expressed in a valid category.

The limitation of development in this research is certainly one reason to develop the next M-LMS. Therefore, the advice given to the researchers and other developers in the future is to keep on doing research and development like this in order to find solutions for encountered learning challenges in learning. This research is expected to open the way for future M-LMS researchers and developers to complete and produce various applications that can be useful for the education in Indonesia generally and Jambi in particular.

References

- Kim, Y., 2018. The framework of cloud e-learning system for strengthening ICT competence of teachers in Nicaragua. *International Journal on Advanced Science, Engineering and Information Technology*, 8(1), ISSN: 2088-5334.
- Dekhane, S., Xu, X. and Tsoi, M.Y., 2013. Mobile app development to increase student engagement and problem solving skills. *Journal of Information Systems Education*, 24(4), pp.299–308.
- King, T., 2002. *Development of Student Skills in Reflective Writing*. Australia, Western Australia University, Organizational and Staff Development Services.
- Valk, J.-H., Rashid, A.T. and Elder, L., 2018. *Using Mobile Phones to Improve Educational Outcomes—An Analysis of Evidence from Asia*. Canada, Pan Asia Networking, IDRC.
- Wu, W.-H., et al., 2012. Review of trends from mobile learning studies: A meta-analysis. *Elsevier Computer and Education*, 59(2), pp.817–827.
- Muasaad Alrasheedi and Capretz, L.F., 2015. An empirical study of critical success factors of mobile learning platform from the perspective of instructors. *Procedia-Social and Behavioral Sciences*, 176, pp.211–219.
- Wittich, et al., 2016. Measuring participants' attitudes toward mobile device conference applications in continuing medical education: Validation of an instrument. *Journal of Continuing Education in the Health Professions*, 36(1), pp.69–73.
- Shao, D. and Seif, H., 2014. Mobile learning a new wave of learning: A survey among University of Dodoma students. *International Journal of Computer Applications*, 98(16), pp.1–4.
- Wang, M., Shen, R., Novak, D. and Pan, X., 2009. The impact of mobile learning on students' learning behaviours and performance: Report from a large blended classroom. *British Journal of Educational Technology*, 40(4), pp.673–695.
- Clarke, I., Flaherty, T. and Madison, J., 2003. Mobile portals: The development of M-commerce. in *Mobile Commerce: Technology, Theory and Applications*, edited by B. Mennecke and T. Strader, Hershey, PA, IRM Press. p.185.
- Gall, M.D., Gall, J.D. and Borg, W.R., 2002. *Educational Research: An Introduction*. ISBN: 0-321-08189-7.
- Tim, P., 2008. Metode Penelitian Pengembangan, Pusat Penelitian Kebijakan Dan Inovasi Pendidikan Badan Penelitian Dan Pengembangan Departemen Pendidikan Nasional.
- Azwar, Saifuddin, 2012. *Reliabilitas dan Validitas*. Yogyakarta, Pustaka Pelajar.
- Aiken, L.R., 1985. Three coefficients for analyzing the reliability and validity of ratings. *Educational and Psychological Measurement*, 45, pp.131–142.
- Patak, A.A., et al., 2016. Design and validation of online learning environment questionnaire. *International Journal on Advanced Science, Engineering and Information Technology*, 6(3), ISSN: 2088-5334.
- Kim, Y., 2018. The framework of cloud e-learning system for strengthening ICT competence of teachers in Nicaragua. *International Journal on Advanced Science Engineering and Information Technology*, 8(1), ISSN: 2088-5334.

Received: xx Xxxx xxxx. Accepted: xx Xxxx xxxx.