Moodle mobile development in enjoyable learning in computer system subjects

S C Wibawa¹*, E Sulistiyo², N G A G E Martiningsih³, E Handoyo⁴ and A Johan⁵

¹,⁵ Educational of Information Technology Study Programme, Universitas Negeri Surabaya, Surabaya, Indonesia 60231
² Electrical Department, Universitas Negeri Surabaya, Surabaya, Indonesia 60231
³ Faculty of Agriculture, Universitas Mahasaraswati Denpasar, Bali, Indonesia
⁴ Civics Education Department, Universitas Negeri Semarang, Semarang, Indonesia

*setyachendra@unesa.ac.id

Abstract. The mobility of students in the world of education is displaced by social media which is a concern for educators to utilize, create or innovate in the world of Education. This study aims to utilize moodle mobile in the development of learning material as an online learning media that approaches social media platforms. The media application development method uses Waterfall, consisting of (1) requirements, (2) analysis, (3) system design, (4) Coding, (5) Testing system, (6) Acceptance Test. Sample testing on media experts, Acceptance Test uses a response assessment consisting of 5 aspects namely Perceived ease of use (PEOU), Perceived usefulness (PU), Perceived Enjoyment (PE), and Intention to use (INT). From the analysis of the Acceptance Test study for 130 students Perceived ease of use (PEOU) of 92.30%, Perceived usefulness (PU) of 86.34, Perceived Enjoyment (PE) of 88%, and Intention to use (INT) of 87, 10% Then from the two classes using independent T-Test two samples showed that the value of the T-test reached 0.046 where the value was below the significance value of 0.05, indicating that H0 was rejected and accepted H1, and so the result was a difference between learning outcomes using the method conventional and learning using Moodle Mobile.

1. Introduction
Computer architecture and operating system, which is considered as a key reference for undergraduate Engineering and computer science students [1]. This course will not only equip you with the skills to develop basic Java applications, but it will also introduce you to the areas of computer science that are essential for you to understand the internal processing during program execution [2].

The computer system material above seems to be fun if it can be learned using social media-based applications or similar displays with social media will be more interesting like Telegram, Facebook Line, Twitter or Instagram or Moodle [3]. However, this research is limited by using the Moodle application. PowerPoint slides are usually used as a teaching and learning media about computer systems or viewing YouTube video links, thus requiring variations in learning media [4]. Teachers or lecturers are required to be more creative in presenting the material. Changing times provide their own hands for teachers to look for ideas or methods in the teaching and learning process. Teachers/lecturers pay more attention to the need for teaching materials for students with the ease of information technology [5].

Various media and methods such as lecture methods, use of power points, discussions and questions used by lecturers apparently have not been able to facilitate students to study more seriously. This is
also implemented in research that produces valid learning tools and interactive practices based on Lectora Inspire learning media. From the research used to determine student responses to learning tools, and to determine student learning outcomes after using Lectora learning media. The results of this study prove that students are very satisfied with the learning media by reaching 85.9% while the percentage of graduation rates reaches 84.375% [6].

Application using online learning that has been done in making electronic portfolio based on mobile for cosmetology students found that students are more interested in creative learning media, as evidenced by the responses obtained by an average response on a scale of 3.31, out of a total scale of 5. One the advantages of online learning technology with smartphones namely as an audio-visual media can help improve understanding Applications using information technology that has been done in making mobile-based portfolio electronics for makeup students found that students are more interested in creative learning media, as evidenced by the response obtained an average response on a scale of 3.31, of the total scale 5. One advantage of smartphone technology namely as audio-visual media can help improve students' understanding to display learning materials in video form with more real [7].

People use social media tools for various reasons. The survey was also set to find out student perceptions of social media adoption [8].

This study compared the conventional teaching with the multimedia learning and also the online learning in terms of their implications on learner understanding and learner motivation through the use of pre-test/post-test, surveys and students’ comments [9].

2. Literature review

2.1. Moodle mobile
The article concludes by proposing strategies that can help institutions make more effective use of their LMS. The aim is to help institutions to identify effective strategies for supporting increased and cost-effective LMS usage [10].

Experience using and supporting Moodle Mobile to improve Moodle usage and LMS accessibility via mobile phones at Dar es Salaam University. It was revealed that was what students expected to use the Course Display and User List features to read course notes and to check for individual students, through analyzing the logs of the two selected programs [11].

2.2. Computer system
The research about the Role of Computer and Information Technology in the Education System will help teachers to know the integrated technologies that help in their classroom teaching. The paper discusses the various usage of computers which make effective learning as well as a teaching process [12].

2.3. Strategies to make LMS success
The use of LMS in an institution's academic system must be maximized in various ways. The following are some strategies that can be used to increase the use of LMS:

- Improving LMS usability, Usability is a measure that allows users to find LMS, easy to find, user-friendly, and easy to use [13].
- Developing and uploading quality learning material, Consequently, they allocate great value to the content that is well ordered, effectively presented, interactive, written clearly, with the right length, useful, flexible, and provides the right high level [14].
- Repairing support services, ongoing support services can support telephone, email, instant messaging, websites that contain information or video tutorials [15].
- Reviewing relevant policies, developing learning materials that discuss promotion consider the same way as conducting research [16].
3. Method
This research, the method used is the Waterfall method and using 10 validator media and content [21]. This method has 6 steps (1) feasibility study, (2) requirements, (3) System design, (4) Encoding, (5) Testing system, (6) Acceptance Test. Below in figure 1 below is a brief description of each stage.

Figure 1. Flow method waterfall [21].

Phase I: A Feasibility Study. Things involved in the first phase such as understanding what needs to be designed as well as what function, the goal is to design a Moodle Web-based application with Computer System material. At this stage, the requirements to be fulfilled by the software are listed and detailed.

Phase II: Requirements, the software, and hardware needed to complete the right project in this phase. The material to be included in this application must be supported by the display on a smartphone or the web and how to request materials and questions, what features are needed or used.

Phase III: System Design the program flow chart or software code published at a later stage, is a very important part, which depends on the two previous sections for proper implementation. The exact design of this installation completes execution in the next installation. If during the design phase, there are several requirements for the design code, the analysis phase is reviewed and the design phase is carried out according to the new resource set.
Phase IV: Coding based on the algorithm or flowchart encoding of the software is done. At this stage ideas and flowcharts of the app are physically manifested. Proper execution of the previous stages ensures the implementation of this stage becomes smooth and easy.

Phase V: Testing If the application coding is complete, the test code is now entered and written to the next. Test any deficiencies in the software designed and designed the device according to the specifications designed. Proper execution of this paper ensures students who are interested in the software that is created will be satisfied with the product. If there are deficiencies, the software development process must reverse the design. In the design, changes are implemented and then the coding and retest are done again.

Phase VI: Acceptance Software development in the waterfall model. Execution must be precise from all previous stages and ensure that the application meets the requirements provided and, most importantly, ensures students are satisfied. However, at this stage, it may be necessary to provide support to students regarding the devices that have been developed. If students need further improvement to be done on existing software, the development process must start again, right from the requirements. This research still limited to material experts who validate the media. This phase using User Acceptance Test response assessment consist of 5 aspects [22]: Perceived ease of use (PEOU), Perceived usefulness (PU), Perceived Enjoyment (PE), and Intention to use (INT). Perceived ease of use (PEOU), Perceived usefulness (PU), Perceived Enjoyment (PE), and Intention to use (INT).

4. Results and discussion
The product produced in this research is learning media by developing a moodle mobile [8,11,23]. The media will contain material about computer system learning [2-3]. This research uses Moodle-based M-Learning as a medium for learning. M-Learning is based on an android application so it must be installed on an android smartphone. This application has several features that support teaching and learning activities in class such as class features, materials, tests, etc.as figure 2.

Figure 2. Interface the Moodle mobile.
Table 1. Questions as an assessment of the application based on the user acceptance test [22].

| Indicator of the ARTP (ERG) | Items | Variable |
|-----------------------------|-------|----------|
| Ergonomy ERG1 | Applications can be downloaded easily |
| ERG2 | The application can be installed properly |
| ERG3 | The objects displayed on the smartphone screen can be observed clearly. |
| ERG4 | It can be run on an Android smartphone so it is comfortable to use because it can be learned anywhere and anytime. |
| ERG5 | The text displayed on the smartphone screen is not clear. |
| ERG6 | Videos displayed on the smartphone screen can be clearly observed. |
| ERG7 | The menu button on the moodle mobile application works fine. |

| Perceived ease of use (PEOU) | Items | Variable |
|-------------------------------|-------|----------|
| PEOU1 | Difficult to learn how to operate computer system material applications with Moodle Mobile |
| PEOU2 | Difficult to understand how to operate computer system material applications with Moodle Mobile |
| PEOU3 | Difficult to understand the explanation via video |
| PEOU4 | I find it difficult to choose the menu button on the computer system material application with moodle mobile |
| PEOU5 | Easily interact with computer system material applications with moodle mobile |
| PEOU6 | The sound can be heard clearly |
| PEOU7 | Easily read the information on a smartphone |
| PEOU8 | This system is easy to use |

| Perceived usefulness (PU) | Items | Variable |
|--------------------------|-------|----------|
| PU1 | This application helps me be more productive |
| PU2 | This application helps me be more effective |
| PU3 | This application is a waste of time when used |
| PU4 | I find it difficult to use this application |

| Perceived Enjoyment (PE) | Items | Variable |
|-------------------------|-------|----------|
| PE1 | This application is boring to use |
| PE2 | I like interacting with moodle mobile |
| PE3 | This application makes me confused |
| PE4 | This application makes learning computer systems more interesting |
| PE5 | This application is not interesting |
| PE6 | I am satisfied with this application |

| Intention to use (INT) | Items | Variable |
|-----------------------|-------|----------|
| INT1 | I want to have this application in school |
| INT2 | I want to use this application to study Computer Systems |
| INT3 | I would recommend to a friend to use moodle mobile |

Based on the assessment with the grid above, it can be analyzed that:

The Acceptance Test study for 130 students Perceived ease of use (PEOU) of 92.30%, Perceived usefulness (PU) of 86.34, Perceived Enjoyment (PE) of 88%, and Intention to use (INT) of 87, 10%

Then from the two classes using independent T-Test two samples showed that the value of the T-test reached 0.046 where the value was below the significance value of 0.05, indicating that H0 was rejected and accepted H1.

4.1. Independent T-Test two samples

After conducting the normality test and homogeneity test of the two classes, it was found that the learning outcomes data of the control class and the experimental class were normally distributed and homogeneous, then to test the hypothesis the Independent Two-Sample T-Test was conducted. The hypothesis to be tested is:

- H0: There is no difference in learning outcomes between students who use conventional learning media and Moodle Mobile learning media.
- H1: There are differences in learning outcomes between students who use conventional learning media and Moodle Mobile learning media.
The criterion in determining the results of a hypothesis test is if probability \(> 0.05\) then \(H_0\) is accepted, but if probability \(<0.05\) then \(H_0\) is rejected so accept \(H_1\). The results of testing the hypothesis using the Independent Two-Sample T-Test with the Minitab application can be seen in figure 3.

![Figure 3. The result of hypothesis testing.](image)

5. Conclusion

Overall, this study aims to find common ground on computer system materials that are generally students who have learning difficulties, so there are no reason students who have difficulty learning computer systems because the material can be used by students learning at any time. Finally, the result was a difference between learning outcomes using the method conventional and learning using Moodle Mobile.

References

[1] Ahmed E S A 2015 Principles of Computer Systems view (LAP LAMBERT Academic Publishing)
[2] Matravers J 2011 Introduction to computer systems architecture and programming (London: the University of London)
[3] Berger E and Corner M 2010 Computer Systems Principles (UMASS AMHERST, Department of Computer Science)
[4] Jones A M 2003 The use and abuse of PowerPoint in Teaching and Learning in the Life Sciences: A Personal Overview BEE-j
[5] Ghavifekr S and Rosdy W A W 2015 Teaching and learning with technology: Effectiveness of ICT integration in schools International Journal of Research in Education and Science (IJRES) 1(2) 175-191
[6] Wibawa S C 2017 The Design And Implementation Of An Educational Multimedia Interactive Operation System Using Lectora Inspire ELInvo (Electronics, Informatics, and Vocational Education) 2(1) 74-79
[7] Wibawa S C 2015 Students’ Creative e-Portfolios: Using Android Cell Phone Cameras for Inventive Beauty Photography International Conference on Advances in Education Technology (ICAET 2014)
[8] Liu Y 2010 Social media tools as a learning resource Journal of Educational Technology Development and Exchange 3(1) 101-114
[9] Li Y W 2016 Transforming Conventional Teaching Classroom to Learner-Centred Teaching Classroom Using Multimedia-Mediated Learning Module International Journal of Information and Education Technology 6(2)
[10] Mtebe J S 2015 Learning Management System success: Increasing Learning Management System usage in higher education in sub-Saharan Africa International Journal of Education and Development using Information and Communication Technology (IJEDICT) 11(2) 51-64
[11] Mtebe J S and Kondoro A W 2016 Using Mobile Moodle to Enhance Moodle LMS Accessibility and Usage at the University of Dar es Salaam IST-Africa 2016 Conference Proceedings
[12] Dabas N 2018 Role of Computer and Information Technology in Education System International Journal of Engineering and Techniques 4(1)
[13] Tarigan J 2011 Factors influencing users satisfaction on eLearning systems Jurnal Manajemen dan Kewirausahaan 13(2) 177–188
[14] Shee D Y and Wang Y S 2008 Multi-criteria evaluation of the web-based e-learning system: A methodology based on learner satisfaction and its applications Computers & Education 50 894–905
[15] Moskal P, Dziuban C and Hartman J 2013 Blended learning: A dangerous idea? The Internet and Higher Education 18 15–23
[16] Ngugi C N 2011 OER in Africa’s higher education institutions Distance Education 32(2) 277–287
[17] Dube S and Scott E 2014 An empirical study on the use of the Sakai Learning Management System In Proceedings of the e-Skills for Knowledge Production and Innovation Conference pp 101–107
[18] World Bank 2012 The Transformational Use of Information and Communication Technologies in Africa [online] retrieved from: http://siteresources.worldbank.org/EXTINFORMATIONANDCOMMUNICATIONANDTECHNOLOGIES/Resources/282822-1346223280837/Summary.pdf
[19] Wibawa S C 2018 Online test application development using framework CodeIgniter IOP Conf. Series: Materials Science and Engineering 296 (2018) 012041
[20] Wibawa S C, Cholifah R, Utami A W and Nurhidayat A I 2018 Creative Digital Worksheet Base on Mobile Learning In IOP Conference Series: Materials Science and Engineering 288(1) 012130
[21] McCormick M 2012 Waterfall vs. Agile Methodology (MPCS, Inc.)
[22] Davis F D 1989 Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology Source: MIS Quarterly 13(3) 319-34
[23] Anglano C, Canonico M and Guazzzone M 2017 Forensic Analysis of Telegram Messenger on Android Smartphones Digital Investigation 23 31–49