Design validation of the moodle-based mobile learning model in higher education

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Abstract. The rapid technical developments bring changes in the field of learning. The impact on technological development that is utilized as instructional media such as mobile learning (M-Learning). The purpose of this study is to produce an M-Learning based on Moodle that has passed the stage of expert validation. This study is part of a large study that lasted about three years. In the first year, research is limited to only the eighth stage of the Dick and Carey instructional design model, which is a formative evaluation for expert validation. Expert validation involved is material experts, media experts, and design learning experts. The technique of collecting data using questioner with data analysis done by the simple descriptive statistic. The subjects from the study are the students of Program Studi Pendidikan Guru Sekolah Dasar, Fakultas Ilmu Pendidikan, Universitas Negeri Jakarta. The results of research on the form of products that have been through the validation stage of experts and ready to be tested on the subject of research to be conducted in the second year of research. This research has implications of the discovery of a conceptual model of Moodle-based M-Learning design for learning in universities.

1. Introduction
The current curriculum requires the importance of the use of information and communication technology to the learning process both at the school and college level. The learning process will occur if there is an interaction between learning resources with learners who took place deliberately. Instructional media is part on the learning resources used by teachers. The demands of information and communication technology, making lecturers are required to be able to develop skills utilization of technology as a supporting medium during the learning process. One of the technologies that can be used by lecturers to design learning is through a smart phone.

Of the total population of Indonesia reaching 250 million people, digital marketing research institutions Emarketer estimates that by 2018 the number of users of smart phones in Indonesia more than 100 million people. With that amount, Indonesia will be the country with the fourth largest smart phone active users around the world after China, India, and America[1]. According to US Census Bureau data, in 2014, the number of mobile phone users has reached 281 million units spread from Sabang to Merauke, while the population of Indonesia in early 2014 reached 251 million people[2].

Smart phone users in Indonesia are also accompanied by Internet users. High smart phone active users in Indonesia are also accompanied by high active Internet users. Based on data in 2015, it was found that from the 72.7 million active internet users in Indonesia, 72 million are active users of social media, with 62 million users access social media using mobile phones[3].
The findings indicate if the use of the Internet is more active for social media than the interests of learning. Preliminary study found: 1) the number of smart phones owned by students as much as 74 pieces from 64 students so that there are 10 students who each has a smart phone of two pieces; 2) almost all (81.25%) students who use smart phones more than three hours; 3) (68.75%) students who frequently open Instagram applications than other application programs; 4) (71.88%) students use smart phones compared to other means of communication; 5) (62.5%) students use smart phones for the purposes of interacting in social media; and 6) (71.88%) students use LINE application > 3 hours compared to other applications for communication means. This fact led to the need for more mobile, diverse, and accessible mobile-based content/application development so that the Moodle-based model of M-Learning was chosen for unpaid and available for students.

Moodle is a learning media application program in the form on the web. Moodle can be opened either by computer or smart phones. If tailored to the title of this study, then the targeted is the Moodle in smart phones. Materials in the form of text, images, and videos are uploaded into Moodle making it easier for students to access anywhere, and it can be said that Moodle makes the form of learning change from personally in the classroom to distance learning.

M-Learning does not refer to the idea of "anytime, anywhere" but refers to "widespread," "current," and "when- required" computer skills for students."[4]. In other words, M-Learning assumes that students continue to move modern, and allow students to learn the right things, at the right time, and in the right places. This can increase the effectiveness of authentic learning tasks and giving students the ability to approach topics in real time.

M-Learning is a way to access the learning environment from a myriad of different devices in different locations. With mobile devices, learning can take place in "current" formats, such as lifelong learning and real-world applications, and students can more easily access and participate within the learning community. Thus, in designing and making the M-Learning consists of elements of teachers, students, learning activities and instructional mobile devices as well as communications infrastructure taking into account the design principles.

Several important elements of an M-Learning environment: teachers, students, learning activities and instructional mobile devices and communications infrastructure[5]. For that, it takes M-Learning applications that can be used by students and lecturers. Moodle was selected. If tailored to the title of this study, then targeted that is Moodle in smart phones. Materials in the form of text, images, and videos are uploaded into Moodle making it easier for students to access anywhere, and it can be said that Moodle makes the learning form change from personally in the classroom to distance learning.

Previous research is concerned about Moodle. This study examines the design and implementation processes of mobile learning systems in educational processes in colleges such as the advantages of using M-Learning, the core requirements for mobile learning tools and resources. The results showed a positive impact on the use of mobile learning in the Department of Applied Mathematics and Informatics[6].

Research conducted by Hugo Chun-hung Wong found Guangzhou's university students prefer to use mobile devices for learning outside rather than in the classroom[7]. In addition, assessment methods are crucial factors for using mobile devices to learn. Lastly, reading and searching are the most performed of the M-Learning activities. These findings can help teachers to design M-Learning activities for learning and motivating students' learning attitudes and practices.

Second, the research is not conducted in Indonesia so that the characteristic of students who use the smart phone as a medium of learning is different from Indonesia. Therefore, the purpose of this research is to produce mobile learning design in higher education in Indonesia, which is only implemented until development stage. The development stage signifies that the study ends when Moodle-based M-Learning is made in accordance with the design that has been designed.

2. Method
The research method is based on the theoretical framework of design and development research (DDR). The model used is the design model of learning from Dick and Carey[8] by combining the concept of a pedagogic model RASE[9]. The instrument of research in this research that is a questionnaire.
Questionnaires were given to 64 students who taught the subjects "Development of Learners” and expert validation by material’s, media, and design instructional. The questionnaire contains for the use of mobile phones between students while the expert validation to ask the feasibility of the product. The product in this research is mobile learning based on Moodle titled Mobile Learning Ku. This app program can be downloaded on the Play Store page. Since this study was only until the first year of full research so that until the stage of product development. The research is done in the Elementary School Teacher Education of Jakarta State University. Quantitative data analysis techniques use simple descriptive statistics. There are as many as six experts involved in the assessment of the product consists of two design learning experts, two material experts, and two media experts. The research procedure that is done is.

Figure 1. Moodle Based M-Learning Procedural Model

Figure 1 shows if a learning activity needs to be done systematically, systematically and intact. The first step is taken from the concept of Dick and Carey’s learning design model: Identify Instructional Goals, Conduct Instructional Analysis, Identify Entry Behaviors and Learner Characteristics, Write Performance Objectives, and Develop Criterion-Referenced Test Items. These steps are taken in preparation for the preparation of a lesson plan. The next step is to plan the implementation of learning. The description of the lesson plan consists of a series of learning scenarios during M-Learning activities. It then developed a Moodle-based M-Learning application program.
3. Result and Discussion

The product developed for this research is named Mobile LearningKu. Mobile LearningKu application is evaluated by three experts: media experts, material experts, and instructional design experts.

3.1. Model Feasibility

The initial product of Moodle-based M-Learning model after it has been developed is called prototype 1. Prototype 1 needs to be tested to find deficiencies or weaknesses in the product. In this stage of evaluation, it is a formative evaluation. However, in this study because only until the expert validation stage, then the repair is only done once after the revision of the expert. The first time is the first draft result based on expert judgment.

3.1.1. Validation of design instructional experts

Overall, the average scores obtained from two expert design designers were 4.68. If viewed based on eligibility criteria, then in general, Mobile Learning Ku application program from the aspects of instructional design has been assessed with very good category. As for suggestions and improvements from the instructional design experts, the operational verbs used in the basic competence formulas do not use the word hook. Replaced by the term linking because the word hooking is not operational as well as making a competency map before the lesson plan by outlining any topics that involve on-line learning so that it looks more likely towards on-line or personally learning.

3.1.2. Material expert validation

Moodle-based M-Learning applications were then given both material experts for grading. Data obtained through questionnaires that include assessment of the quality in the material include the suitability of the material with the indicator of learning, the adequacy of the scope of the material to achieve the indicator of learning, the depth of the material, the accuracy of the material, the material content demands (organizational structure / sequence of content), attractiveness of the material content in motivating users, and the degree of material difficulty. Overall, the average scores obtained from two expert materials experts amounted to 4.5.

As for suggestions and improvements from the material experts whom the topic of Human Development Theory is quite difficult for students because of the large and dense material so that the learning experience given to students needs to be enriched to be more meaningful; add material about children with special needs at the end of the meeting to introduce to students the development of children different from children in general. The input results of both materials experts are combined with two other design learning experts to avoid different assessments of the three experts. When found the difference assessment will be clarified again so that will produce a Moodle-based M-Learning media product, which is the result of assessment of the three experts.

3.1.3. Media expert validation

Data were obtained through questionnaires of both media experts by asking a few questions about effective and efficient media selection, reliable, maintainable, reusable, and visual aspects, compatibility, shortcut / icon, reusable, and visual. Based on the results of the questionnaire, the average score obtained from both media experts is 4.76.

The three results of the assessment by experts indicate if the Mobile LearningKu application has been through the assessment process and can be used in the mobile learning model in the classroom. Mobile devices enhance anytime and anywhere learning, providing access to learning resources, even outside the school. This flexibility makes it possible for adult learners to minimize their unproductive time, which may enhance their work-education balance [10]. The results of the assessment by two instructional design experts on Mobile Learning Ku application have an average value of 4.68 including into the category very well. Similarly, when the Mobile Learning Ku application is assessed by two media experts have an average value of 4.76 and material experts of 4.5 that fall into the category very well.

Based on the assessment of expert validation, the application is ready to be tested to the students. Survey conducted by CourseSmart (quoted by Yu) a service provider eTextbooks and digital exercise.
Mobile LearningKu uses Moodle for its operational system. By using Moodle, students have the opportunity to access learning materials because they interact with teachers and friends and can accept homework assignments [12]. With the plug-in available in Moodle provides an opportunity for students to be free to control their own learning process. To that end, the Moodle-based Mobile Learning procedural model made in this research explains before designing the Moodle-based Mobile LearningKu application program should incorporate the instructional design principles outlined in the lesson plans. Based on the learning plan, the application program is created. Moodle features like 1) can open learning materials even when offline; 2) receive instant notifications for messages and other activities; 3) find and contact other people's contacts in the course at Moodle; 4) upload images, audio, video, and other files from personal mobile devices; 5) open a lesson plan; 6) working on quizzes, posting posts on forums, and 7) can access exam scores [12].

In the application of mobile learning, lecturers and students have their respective roles. Lecturers act as facilitators that guide during learning activities while students play a role in constructing knowledge, becoming independent students, and as problem solvers. Studies conducted by Sarrab [13] found that awareness of the existence of mobile learning and high acceptance levels can lead to positive behavior in students so that it proves that the use of mobile learning is an interesting thing as a learning tool. Mobile learning can help solve learning problems that occur in traditional learning but do not serve to replace the existence of traditional learning because of different learning mechanisms that can overcome limitations in different learning processes [13]. The results of this study are also supported by Connolly (cited Susana, Juanjo, Eva, and Ana) found that learning did not differ significantly when presented via on-line and face-to-face Many people believe that the availability of materials on-line makes it easier to update materials better, and learners are logically more organized. However, never educators consider Moodle as mobile learning more valid than face-to-face learning or as a face-to-face substitute [14].

Research conducted by Gupta and Goyal [15] shows that students use mobile learning, but its use is limited and data transfer. The learning process does not happen in it. The students feel that the library has enough information for the learning process. This is to find out if mobile learning is the right choice if using the Internet, teachers, classrooms, libraries, personal computers, and electricity is not easily available. Gupta and Goyal [15] stated that mobile learning would be more successful for smaller towns. Mobile learning cannot be used professionally but needs to be incorporated by using on-line, print, and on-line learning. Mobile learning is a great speed for educators in ensuring that this learning model has value-added or learner-centered.

4. Conclusion
A Moodle-based mobile learning model adapted from Brown's learning model with customized online and personally learning. A instructional model has a component of learning objectives, learning conditions, resources (materials and tools), and evaluation of learning. Inside Moodle allows students to enter the "digital classroom" as they can access on-line learning materials. The advantages of Moodle, among others, can create instructional materials, quizzes, discussion forums on-line. Moodle does not impose any style in a lesson, but if it is associated with learning styles, Moodle indirectly makes the mode of learning visible.

Students are actively building new knowledge as a result of interaction with their environment. Through Moodle, students are invited to read, see, hear, feel, and touch learning materials in Moodle. Students not only learn the web, follow the lecture but interact with information sources that provide a lot of information so that students will bridge the old knowledge with new knowledge resulting in a more recent experience in mental structure.

Students re-explain information obtained from the Internet, lectures, and books to friends using their language. Development of groups or social groups that share knowledge to create a culture of sharing...
the work with sharing knowledge. More empathic in accepting subjectivity, trying to hear and answer questions about the aim of understanding different angles while being separately interpreted when one attempts to find the purpose and reality to defend the ideas it possesses by using logic to locate the weakness of opposing ideas.

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6. References
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