

Development Strategy of Inquiry Based Mobile Learning on General Chemistry Classroom

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Abstract: This SWOT study was carried out to analyse internal factor (strength and weaknesses) and external factor (opportunities and threats) that influence inquiry based mobile learning on general chemistry classroom in IKIP Mataram. Data collected by interview and open questionnaire that disseminate to student, lecture, and information technology staff of Mathematics and Science Education Faculty. Based on the research, it was concluding that: strength: there is 90 % students using mobile technology on android smartphone, free campus Wi-Fi with 80 % of access frequency, classroom facility support, online campus library, some of chemistry education lecture have experience on inquiry based learning and internet based learning application on chemistry classroom. Weaknesses: online classroom of inquiry based mobile learning and android application was not yet available in IKIP Mataram and campus internet network must be enhanced for this purpose. Opportunities: internet based learning is one of national curriculum development direction caused opportunity for obtain central government support, mobile learning development product may be used and accessed by IKIP Mataram students and lecture, flexible and suitable class that may create on mobile learning model was students and lecture prospects. Threats: students and lectures was not habitual yet on mobile learning model application, online-offline model for effective and efficient mobile learning application was not formulated yet, mobile learning effectiveness on helping students to reach concept understanding and chemistry literacy was need to learned by research. Based on the result of this study, it is concluded that inquiry based mobile learning is needed to developed and help students to reach concept understanding and chemistry literacy enhancement on general chemistry classroom in IKIP Mataram.

1 INTRODUCTION

There are several reasons why people use information technology. Someone believe that using information systems technology can help them in gaining more benefits and performance at work. Mobile technology helps one can easily access information, anywhere, anytime, and choose any desired device. One can easily join with technology or information systems and innovate. This has a strong effect on young students to use mobile devices for academic purposes (Cabanban, 2013).

The results of (Hanafi and Samsudin, 2012) show that students are very fond of the interactivity, accessibility, and convenience of mobile learning. Mobile learning system can be applied easily and cheaply as a complement on learning process. In applying mobile learning motivation factors need to be considered as interactive and interesting. However, the main objective of the mobile learning

environment should be educational than entertainment (Calimag et al., 2014).

Hanafi and Samsudin (2012) have conducted a survey involving 56 respondents. The results show that respondents are highly receptive to the ease of interaction, access, and great fun using mobile learning system but students are sometimes quite frustrated with internet connectivity issues. Overall, the mobile learning system can be utilized as a cheap but powerful learning tool in completing the student learning process. Hanafi and Samsudin (2012) suggest the need to research the effect of mobile learning both in technological and pedagogical perspectives. Future research should focus on these issues to help realize a digital learning environment that complements the conventional learning approach.

Buckner and Kim (2013) has studied the integration of technology and pedagogy in the implementation of ICT projects in developing

countries. This research designs are an educational innovation that leverages mobile technology in learning. Researchers implement question-based mobile applications for students with management applications for teachers, and thus allow students to make multiple choice questions on mobile during learning and share these questions with their classmates and teachers. The sample of this study using seven studies are two in California, and each in Indonesia, India, Argentina, South Korea and Tanzania. The reason for choosing these countries, the main purpose is to understand the advantages and disadvantages of mobile learning models in countries that have a variety of contexts and backgrounds. The recommendations derived from the research are naturally human asking the question of the real world, doing that is an important way to learn. There needs to be a transition from dictating information to learning that involves students in learning and solving problems. Mobile learning technologies can empower students to learn independently and actively plan their own learning. Then, what are the characteristics of mobile learning technologies that should be developed?

The development of mobile learning technology must be in line with the development of science curriculum in the world. Trend in science education policy emphasizes the importance of science literacy as a transferable outcome (Fives et al., 2014).

The development of science and technology products emerged continuously in modern society. Therefore, understanding the facts of science and the relationship between science, technology, and society is very useful. The ability to explore initial knowledge by connecting science issues and science ideas as reflections is called Literacy Science (PISA, 2015). The level of individual science literacy has a significant impact on the development of society, economic growth and socio-political stability (Laugksch, 2000).

The major challenge of science literacy at the national and international levels facing humans is providing adequate water and food, disease control, adequate energy generation and climate change adaptation (UNEP, 2012). Many issues arise at the local level. On these issues, individuals may face it with practical decisions. For example, regarding the availability of food, health, the use of new materials and technologies, and energy efficiency. This challenge requires innovative solutions in scientific thinking and scientific discovery. Society needs cadres of science educators as well as research and innovation of science and technology. It is important to respond to the economic, social and

environmental challenges facing the world. To explore the initial knowledge of society, each researcher requires a great deal of science knowledge and science literacy with an in-depth understanding of the nature of science, the limits and consequences of the application of science.

Literacy of science is increasingly needed today so that we can live in the midst of modern society (New Zealand Curriculum, 2013). For all these reasons, scientific literacy is considered a key to competence (Rychen and Salganik, 2003). The science literacy assessment framework includes aspects of context, competence, knowledge, and attitudes (William, 2010). Science literacy includes three competencies: explaining the phenomenon of science, evaluation and designing scientific inquiry, data interpretation and scientific evidence (PISA, 2015, Schwartz et al., 2006b, Tsaparlis, 2000).

The result of PISA assessment (2013), Indonesian student science literacy is ranked 64 out of 65 participating countries. To achieve the goal of one's chemical education literacy, the chemical curriculum has recently undergone an increasing change in many countries, in maintaining and improving the subject of the science curriculum (Celik, 2014). The Indonesian government considers it necessary to set the 2013 curriculum to realize a science-literational society. However, for the time being the 2013 curriculum is dismissed in many schools because many teachers and students are not ready with the implementation of this curriculum. Various breakthroughs made by the government to achieve the hope of the implementation of the 2013 curriculum evenly distributed throughout the school in 2019. Teacher training and education students need to be prepared. Continuous study is required to prepare human resources who capable on science literacy and o transfer these capabilities through science learning to support and accelerate government's target achieving.

Therefore, a mobile learning environment must be oriented to inquiry learning. It should be take place in chemistry science courses in college of education so that students have experience of mobile learning implementation. Mobile learning is not only to increase interest and become entertainment but also able to help students to experience science inquiry and achieve the ability of good science literacy.

2 METHODS

This research was conducted in Chemistry Education Department of IKIP Mataram. This research used qualitative research methods that produce descriptive data in the form of written or oral words from people and behavior that can be observed (Taylor et al., 2005)

The data was obtained from the participants who know the condition and situation of the research object such as lecturer, head of department, student, and staff of campus communication and information center. Interview informants are determined by snowball sampling technique where data extracting starts from key informants. Data were collected by interview, documentation and observation techniques. Documentation is done by using an open questionnaire.

In determining valid and feasible data to be used, data triangulation is performed. (Affudin and Saebani, 2009) describe triangulation as a cross-section of information obtained from the source so only valid data is achieved as research results. Triangulation used in this study is triangulation of data sources and triangulation of data collection techniques. The valid data was analyzed by interactive model data analysis technique. (Sugiyono, 2005) explains first stage of interactive model is data collection (collecting data as much as possible). Further data is reduced (data reduction) to determine data to be used or discarded. The last stage is the conclusion. The results of data analysis are the strengths, weaknesses, opportunities and threats that should be considered for success the development of inquiry-based mobile learning strategy in IKIP Mataram chemical education course.

3 DISCUSSION

The strengths for development of inquiry-based mobile learning strategy success in chemistry education department of IKIP Mataram is 90% of students using mobile technology on android smartphone. Based on observations made in April 2017, 95 people from 107 of science and mathematics faculty students using android smartphone. According to data obtained from communication and information center of IKIP Mataram, internet access in science and mathematics education faculty reaches 80% of the total number of Wi-Fi users. Percentage of Wi-Fi usage in science

and mathematics education faculty of IKIP Mataram in first semester of 2017 is presented in Figure 1.

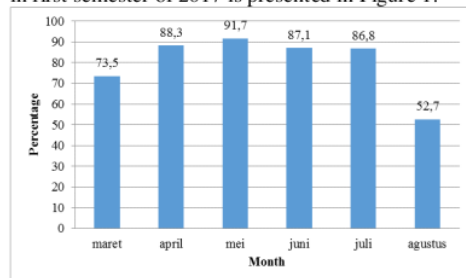


Figure 1: Diagram of Internet Access Percentage in science and mathematics education faculty of IKIP Mataram in 2017.

Increased internet access occurs because in the month of April to July, lectures are normal and many students are visit campus. While the decline in August occurred because the month entered the exam and end of the semester. This indicates that the students use the internet and do Wi-Fi access during their daily activities on campus.

The support of classroom facilities has also been sufficient to implement mobile learning in chemistry department of IKIP Mataram. In addition to the availability of classrooms with audio visual media. Wi-Fi access can also be done in classrooms. IKIP Mataram has also provided an online library that allows students to access the information and references available.

The last but not least in the effort to succeed the implementation of inquiry-based mobile learning is the experience of faculty or lecturers. At least there are 3 lecturers of chemistry education department of IKIP Mataram have experienced on apply inquiry-based learning and 2 lecturers have experience to apply internet-based learning in chemistry class.

The weakness found in the application of mobile learning is the unavailability of online classroom for the learning model. Therefore, it is still necessary to develop inquiry-based mobile learning model that is equipped with learning websites, online discussion room, online teaching materials, virtual lab applications, interactive android based learning materials, online evaluation rooms, which can be accessed by mobile wherever and whenever. So the applications must be developed using responsive applications for android or mobile phone applications.

In addition, the weak internet network providing in campus, make the access becomes very slow for users when many users access the Internet network.

So for the successful implementation of mobile learning, Wi-Fi network service capacity should be improved.

The opportunity that makes this inquiry-based mobile learning model potential to be developed is the fact that international-based learning is one of national curriculum development directions. Therefore, it is possible to obtain central government support.

Mobile learning development products must be allowed to be used and accessed by students and lecturers of IKIP Mataram. That way can be obtained suggestions that will greatly assist the completion of the product according to the needs of learning. The results of the interviews showed that colleagues (lecturers) and all respondent students showed interest in the presence of convenient and flexible mobile learning classroom.

But the threat of successful application of mobile learning in science and mathematics education faculty of IKIP Mataram are students and lecturers have not been accustomed in undergoing the application of inquiry-based mobile learning model. So it takes time to see how successful this model can be applied, how maximal the learning process that can be undertaken by students and lecturers. No formulation has been available on online-offline classroom learning steps for effective and efficient mobile learning implementation. However, this must be initiated in order to achieve the goal of providing innovative learning experiences for students and develop them to gain an understanding of the concepts and literacy of science. That way the prospective teacher will be ready and able to adapt to face the development of science curriculum in the future. The effective and efficient learning formulation to assist students gain an understanding of science concepts and literacy through inquiry based mobile learning application should be determined through a series of studies.

4 CONCLUSIONS

Based on the research, it was concluding that the strength of inquiry based mobile learning development in IKIP Mataram were there is 90 % students using mobile technology on android smartphone, free campus Wi-Fi with 80 % of access frequency, classroom facility support, online campus library, some of chemistry education lecture have experience on inquiry based learning and internet based learning application on chemistry classroom. The weaknesses of this development were online

classroom of inquiry based mobile learning and android application was not yet available in IKIP Mataram and campus internet network must be enhanced for this purpose. This learning development has opportunities were internet based learning is one of national curriculum development direction caused opportunity to obtain central government support, mobile learning development product may be used and accessed by IKIP Mataram students and lecture, flexible and suitable class that may create on mobile learning model was students and lecture prospects. The threats of this learning development were students and lectures was not habitual yet on mobile learning model application, online-offline model for effective and efficient mobile learning application was not formulated yet, mobile learning effectiveness on helping students to reach concept understanding and chemistry literacy was need to learned by research. Based on the result of this study, it must conclude that inquiry based mobile learning was need to developed and help students reach concept understanding and chemistry literacy enhancement on general chemistry class in IKIP Mataram.

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