

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/339220111>

The Utilization of Mobile Learning in Junior High School Physics Science Learning in Rural Area of Sikka, East Nusa Tenggara, Indonesia

Conference Paper · January 2020

DOI: 10.2991/assehr.k.200129.057

CITATIONS

0

READS

54

3 authors, including:



Dwi Sulisworo

Ahmad Dahlan University

163 PUBLICATIONS 550 CITATIONS

[SEE PROFILE](#)

Some of the authors of this publication are also working on these related projects:



Developing character based education at frontier area of Indonesia [View project](#)



Eco-tourism for improving prosperity and maintaining sustainable development [View project](#)

The Utilization of Mobile Learning in Junior High School Physics Science Learning in Rural Area of Sikka, East Nusa Tenggara, Indonesia

Dwi Sulisworo^{1*}, Dian Artha Kusumaningtyas², Trikinasih Handayani³

^{1,2} Physics Education Department, Ahmad Dahlan University, Indonesia

³ Biology Education Department, Ahmad Dahlan University, Indonesia

^{1*} sulisworo@gmail.com, ² dian_uad@yahoo.com, ³ trikinasih@pbio.uad.ac.id

Abstract: People are the widely used mobile technology for their activities in various sectors. This technology also is widely considered for use in education; included in science learning. On the other hand, almost all people in many regions in Indonesia are connected through the internet network. However, the use of mobile technology for learning is still the islands around the Flores area. This study aims to determine how high school students respond after attending mobile learning. This research is a quantitative descriptive study with a sample of 58 students from three different schools at Sikka of East Nusa Tenggara in Indonesia. Students are involved in mobile learning in material physics within two weeks. Learning active ies include reading learning subjects, practicing questions, discussion in forums, posting ideas, quizzes, and final examinations. During this learning, the teacher used Edmodo, like a learning management system. Students filled the questionnaire measuring their response to the use of technology. The USE questionnaire was used to measure this response. The results of this study indicate that students in this region have the right level of acceptance of mobile learning. As a follow-up, it needs to be promoted by local government policies on schools for this mobile learning.

Keywords: *mobile learning, physics learning, rural area*

INTRODUCTION

In many countries, especially in developing countries, including Indonesia, the penetration of ICT use is still an important issue. Various policies from the government are implemented to be able to capture this opportunity in the effort to achieve new competencies in this 21st-century era (Barak, Nissim, & Ben-Zvi, 2011; Farisi, 2016). The territory of Indonesia in the form of islands is a challenge to improve the quality of education distribution between regions (Kabir, & Kadage, 2017; Sulisworo, & Toifur, 2016). Online learning by utilizing ICT is an opportunity for that. However, several obstacles need to be considered in the aspects of teachers and students related to ICT literacy and the level of acceptance of this technology in learning (Sulisworo, Nasir, & Maryani, 2017; Sulisworo, Yunita, & Komalasari, 2017).

The use of ICT in learning can be implemented in various ways. The usage of this technology in learning is such as the learning management system, content management system, data acquisition and analysis, learning apparatus, and simulation (Bozanta, 2017; Furberg, 2016; Gómez-rey, Barbera, & Fernández-navarro, 2017; Sulisworo, Yunita, & Komalasari, 2017). The role of the teacher in learning will change, along with adjustments to technology and their optimal use. Learning becomes student-centered. Teachers become a learning facilitator to encourage students to reach their competencies. Teacher are not the primary source of knowledge any more (Arends, & Kilcher, 2010; Alzahrani, & Laxman, 2016; Owate, Williams, & Nnanna, 2014).

Online learning is one strategy that is widely applied by educators today. With online learning, there is a possibility of sharing between teachers in various regions and also interactions between students that are not limited to space and time. However, there has not

been much research in Indonesia that reveals how the impact of the application of online learning to both teachers and students; especially for remote areas (Sulisworo, Ahdiani, & Lirag, 2017). There is an assumption that the application of online learning in remote areas still cannot be made with various reasons and constraints. This research is part of a multi-year study (2017-2020) that seeks to build teacher and student confidence in this technology, and test the effectiveness of the application of ICT-based learning with a variety of learning strategies. The focus of this research is mainly on remote island areas in Indonesia. This article describes and explains how junior high school students in remote areas utilize online learning in the field of physics. The result of this study will support education policymakers to equalize the quality of education using online learning.

METHODS

Research Context

The research was an ex post facto research with quantitative descriptive analysis. The subject is the eighth-grade students of the junior high school in Maumere (a remote area in Eastern of Indonesia). The sampling technique was purposive sampling, i.e., the student who voluntary joint the research and the smartphone. The number of samples is 34 students from 4 different schools. The dependent variable was the student's experience perception in online learning. The perception covered four aspects based on USE questionnaire.

Instruments

Students were previously jointed training on the use of learning management systems (Edmodo) and attended online learning in Heat and Temperature subjects. At the end of learning, students are filled out with a USE questionnaire measuring the aspects of Usefulness, Easy to use, Easy to learn, and Satisfaction.

The data of student's perception was collected using USE questionnaire, which measured whether the implementation of online learning was well organized and appropriate to learning expectations. The Likert's scale was used at this questionnaire (using 1 to 4 scales). The questionnaire is a consistency of four aspects, i.e., Usefulness (5 items), Easy of use (5 items), Easy of learning (4 items), and Satisfaction (5 items). This questionnaire was adapted from Lund (2001) while the platform was evaluated using the ISO 9126 standard questionnaire. These data was analyzed using descriptive quantitative approach.

Learning Phases

Based on the Heat and Temperature as learning subject, this one was divided into smaller learning objects. There will be several learning cycles for every learning object. The cycles of learning include apperception, polling to check the prior knowledge, providing reading resources, directed discussion, quiz, feedback and appreciation, and overall evaluation. Table 1 shows the relationship between the activities on the cycles and features on the menu in the Edmodo.

Table 1. Menu in the Edmodo for learning activity support

<i>No.</i>	<i>Activities</i>	<i>Menu</i>	<i>Type</i>
1	Apperception	Post	Text
2	Measuring prior knowledge	Polling	Multiple Choice
3	Providing reading resources	Post	Attachment (pdf), Link
4	Directed discussion	Post	Text
5	Measuring reading materials comprehension	Quiz	T / F, Matching, Multiple choices, Essays
6	Feedback and	Post	Text
7	Overall evaluation	Quiz	T / F, Matching, multiple choices, Essays

RESULTS AND DISCUSSIONS

Results

In online learning, students take 97 students. Not all students fill out a questionnaire. The number of questionnaires collected was 34. The questionnaire data were tabulated to find out the average value and standard deviation for each item statement and categorized based on aspects of the USE questionnaire. The results of this tabulation are shown in Table 2 to table 5.

Usefulness. The usefulness app consists of 5 items. This item measures the response to effectiveness, productivity, usefulness, learning control, and ease of completing activities. The results of this response are shown in Table 2.

Table 2. Usefulness

Items	Mean	STD
It helps to be more effective.	3.1176	0.5294
It helps me to be more productive.	2.9706	0.5137
It is useful.	3.0294	0.6636
It gives me more control over the activities in my life.	3.0588	0.5912
It makes the things I want to accomplish easier to get done.	3.1176	0.4706
Average	3.0588	

Easy to Use. The ease to use aspect consists of 5 items that measure the response to simplicity, simplicity, user-friendliness, concise steps, and instruction-free use. The results of the res pound are shown in Table 3.

Table 3. Easy of Use

Items	Mean	STD
It is easy to use.	2.8824	0.5823
It is simple to use.	2.9412	0.6390
It is user-friendly.	2.6471	0.8001
It requires the few steps possible to accomplish what I want to do with it.	2.7647	0.5970
I can use it without written instructions.	2.4412	0.7353
Average	2.7353	

Easy to learn. The aspect of ease to learn consists of 4 items that measure the response to learning speed, ease of remembering, learning ease, and speed for skillful. The results of the res pound are shown in Table 4.

Table 4. Ease of Learning

Items	Mean	STD
I learned to use it quickly.	3.0882	0.5069
I easily remember how to use it.	2.7647	0.7300
It is easy to learn to use it.	3.0588	0.5391
I quickly became skillful with it.	2.9706	0.6636
Average	2.9706	

Satisfaction. This factor consists of 5 items that measure the response to satisfaction in general, willingness to provide recommendations, fun feeling, flexibility, and comfort in learning. The results of the res pound are shown in Table 5.

Table 5. Satisfaction

Items	Mean	STD
I am satisfied with it.	3.1765	0.3812
I would recommend it to a friend.	3.1176	0.4033
It is fun to use.	3.2059	0.4715
It works the way I want it to work.	2.8824	0.6758
It is pleasant to use.	3.0588	0.6835
Average	3.0882	

Discussions

Usefulness. In the aspect of Usefulness, it is found that the overall perception of students is 3.0588 out of 4. This result means that students in all schools feel the benefits of online learning. Distribution of perceptual distribution tends to be good (lowest 0.47 and highest 0.66). Of the five items in the usefulness aspect, students give the lowest response to whether this learning makes it more productive (2.97). While for the other items, the response was obtained with a score above 3.0. Students have not felt an increase in learning productivity due to the relatively short duration of learning with not too much material. This short time has made no perceived increase in productivity. However, for learning effectiveness, students give a high response. In learning, this can be seen at the post level, and the interaction is quite high between students and also with the teacher. The intensive interaction on online learning is one of successfull indicators (Costley, 2016; Croxton, 2014).

Easy to Use. In the aspect of ease to use, the overall perception of students is 2.7353 out of 4. This score is the lowest from 4 aspects. This finding means that students in all schools do not quite feel the ease of use of the LMS when interacting online. Indeed, in this study, Edmodo has chosen to use social media platforms to fit the habits of students. Students learn the features that exist in a relatively short time, and the teacher arranged to learn at specific hours only (5 cycles of learning) is not enough to build a feeling of ease in use. Of the items, the lowest score is on the problem of response to the use of an application without instructions (2.44). The response that students need written instruction tends to accumulate (STD = 0.74). A reasonably positive response is the ease of use in learning (2.94). With the overall results in the aspect of ease to use, it implies that this application and the learning carried out are relatively easy to use. With

more hours of use, students will be more accustomed to being involved in interactions that make it easier for them to learn. The ability of teacher to arrange the online community using existing features or menus affect the students' higher online learning esteem (Dunlap, & Lowenthal, 2014; Yuan, & Kim, 2014).

Easy to learn. In aspects of easy to learn, we obtained that the overall perception of students is 2.9706 out of 4. This score is the best h second from 4 aspects. This finding means that students in all schools are relatively quite feeling the ease in online learning. The level of fluency in posting on forums, sending assignments, discussions, which is relatively high, can be an indicator of this aspect. Refer to the existing items, the lowest score on the response given the ease of learning (2.76) and this response also had the highest standard deviation. A reasonably positive response is that students feel they can follow learning quickly, including the use of existing features (3.09). With the overall results on aspects of ease to learn, it implies that this application and the learning have been relatively easy to learn; including natural d to engage active learning. The learning phases designed by teacher influence the students' learning interaction (Gray, & DiLoreto, 2016; Greenhow, & Lewin, 2016; Richardson, Koehler, Besser, Caskurlu, Lim, & Mueller, 2015).

Satisfaction. On the aspect of satisfaction, we obtained that the overall perception of students is 3.0882 out of scale 4. This value is a high score of 4 aspects exist. This result means that students in all schools relative satisfaction in online learning and the use of learning applications. Online learning is a new strategy for students. This learning also gives students the willingness to express their social interactions. The level of posts that are sometimes beyond the great discussion material is still permitted by the teacher insofar as it does not disturb the smooth learning. This teacher policy is one of the drivers of student motivation to continue to move online. From the items, the lowest score is in the response that what students want to do can be done in the system. Edmodo feature is indeed designed with simple features (Sulisworo et al., 2017; Sulisworo, & Permprayoon, 2018). This simplicity that is precisely for specific students is less comfortable. On the other hand, during learning, not all of the menus are explored to make learning more dynamic and active. With the overall results on aspects of satisfaction, it means that this application and the learning that is done already provide high satisfaction for students.

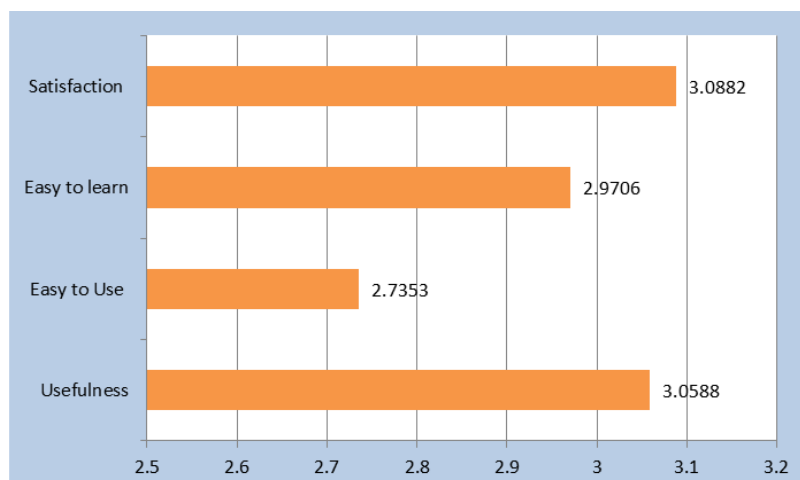


Figure 1. The Result of student responses

From table 1 to table 4 can be summarized as in Figure 1. Sequentially from the highest response given to aspects of Satisfaction (3.08), Usefulness (3.05), Ease to learn (2.97), and Ease to use (2.73). From these results, online learning does provide many new opportunities in learning, especially for students in remote areas. Activities that encourage more student-centered learning are critical to the success of online learning. The role of the teacher remains essential to provide direction so that learning can achieve competence. More varied activities (not just embedding material and assignments, downloading/ uploading material) are critical to this learning. This new opportunity in online learning needs to be supported by the preparation of good learning designs by teachers to take various opportunities in online learning (Wu, Wu, Chen, Kao, Lin, & Huang, 2012). Teachers can develop new competency demands on learning by utilizing this strategy (Aina, 2013; Kožuh, Jeremić, Sarjaš, Bele, Devedžić, & Debevc, 2015; Lee, 2014; Yuan, & Kim, 2014). Intensive interaction and social presence from various studies are factors for student involvement in online learning; and students do not leave the online learning community (Dunlap, & Lowenthal, 2014; Kožuh et al., 2015; Richardson et al., 2015; Zyad, 2016). Daily behavior of students who interact a lot in various social media influences the selection of LMS; as the results in this study (Sulisworo et al., 2017; Sulisworo, & Permprayoon, 2018). Organizing online learning with styles such as social media or at the same time using social media applications will increase the effectiveness of learning (Greenhow, & Lewin, 2016; Poquet, Kovanović, de Vries, Hennis, Joksimović, Gašević, & Dawson, 2018).

CONCLUSIONS

The results of this study indicate that in the four aspects analyzed, students in remote areas showed a positive response. That is, in general, these students can be involved in online learning well. There were no obstacles in studying the application, the use of the application, the learning interactions, and other aspects in online learning. With the support of internet infrastructure, penetration of digital technology and also student literacy, excellent online learning has become a reasonable basis in promoting equal distribution of quality education through online learning. The role shifting of teachers implies the new skills in managing learning. It needs to be given particular emphasis so that online learning can work well. The education policy that facilitates the implementation of online learning in schools is a follow-up study of this study. This policy has become a driving force for applying the results of this research in rural area of Indonesia.

ACKNOWLEDGMENTS

This research was funded by the Ministry of Research, Technology and the Higher Education of Republic of Indonesia through Fundamental Research Grant Year 2019.

REFERENCES

- Aina, J. K. (2013). Effective teaching and learning in science education through Information and Communication Technology [ICT]. *IOSR Journal of Research and Method in Education*, 2(5), 43-47.
- Alzahrani, H., & Laxman, K. (2016). A Critical Review of Meta-analysis Studies on Mobile Learning. *Technology, Instruction, Cognition & Learning*, 10(3), 245-258.
- Arends, D., & Kilcher, A. (2010). *Teaching for student learning: Becoming an accomplished teacher*. Routledge.

- Barak, M., Nissim, Y., & Ben-Zvi, D. (2011). [Chais] Aptness between Teaching Roles and Teaching Strategies in ICT-Integrated Science Lessons. *Interdisciplinary Journal of E-Learning and Learning Objects*, 7(1), 305-322.
- Bozanta, A., & Mardikyan, S. (2017). The effects of social media use on collaborative learning: A case of Turkey. *Turkish Online Journal of Distance Education*, 18(1), 96-110.
- Costley, J. (2016). The effects of instructor control on critical thinking and social presence: Variations within three online asynchronous learning environments. *Journal of Educators Online*, 13(1), 109-171.
- Croxton, R. A. (2014). The role of interactivity in student satisfaction and persistence in online learning. *Journal of Online Learning and Teaching*, 10(2), 314-325.
- Dunlap, J. C., & Lowenthal, P. R. (2014). The power of presence: Our quest for the right mix of social presence in online courses. *Real life distance education: Case studies in practice*, 41-66.
- Farisi, M. I. (2016). Developing the 21st-Century Social Studies Skills through Technology Integration. *Turkish Online Journal of Distance Education*, 17(1), 16-30.
- Furberg, A. (2016). Teacher support in computer-supported lab work: Bridging the gap between lab experiments and students' conceptual understanding. *International Journal of Computer-Supported Collaborative Learning*, 11(1), 89-113.
- Gómez-Rey, P., Barbera, E., & Fernández-Navarro, F. (2017). Student Voices on the Roles of Instructors in Asynchronous Learning Environments in the 21st Century. *International Review of Research in Open and Distributed Learning*, 18(2), 234-251.
- Gray, J. A., & DiLoreto, M. (2016). The effects of student engagement, student satisfaction, and perceived learning in online learning environments. *International Journal of Educational Leadership Preparation*, 11(1), n1.
- Greenhow, C., & Lewin, C. (2016). Social media and education: Reconceptualizing the boundaries of formal and informal learning. *Learning, media and technology*, 41(1), 6-30.
- Kabir, F. S., & Kadage, A. T. (2017). ICTs and Educational Development: The Utilization of Mobile Phones in Distance Education in Nigeria. *Turkish Online Journal of Distance Education*, 18(1), 63-76.
- Kožuh, I., Jeremić, Z., Sarjaš, A., Bele, J. L., Devedžić, V., & Debevc, M. (2015). Social presence and interaction in learning environments: The effect on student success. *Journal of Educational Technology & Society*, 18(1), 223-236.
- Lee, S. M. (2014). The relationships between higher order thinking skills, cognitive density, and social presence in online learning. *The Internet and Higher Education*, 21, 41-52.
- Lund, A. M. (2001). Measuring usability with the use questionnaire¹². *Usability interface*, 8(2), 3-6.
- Owate, I. O., Williams, C., & Nnanna, L. A. (2014). Information and Communication Technology (ICT) Support Systems for Teaching and Learning Physics in Selected Secondary Schools in Eleme Local Government Area. *Education*, 4(4), 79-87.
- Poquet, O., Kovanović, V., de Vries, P., Hennis, T., Joksimović, S., Gašević, D., & Dawson, S. (2018). Social presence in massive open online courses. *International Review of Research in Open and Distributed Learning*, 19(3), 43-68.
- Richardson, J. C., Koehler, A. A., Besser, E. D., Caskurlu, S., Lim, J., & Mueller, C. M. (2015). Conceptualizing and investigating instructor presence in online learning environments. *The International Review of Research in Open and Distributed*

Learning, 16(3), 256-297.

- Sulisworo, D., & Permpayoon, K. (2018). What is the Better Social Media for Mathematics Learning? A Case Study at A Rural School in Yogyakarta, Indonesia. *International Journal on Emerging Mathematics Education, 2(1)*, 39-48.
- Sulisworo, D., & Toifur, M. (2016). The role of mobile learning on the learning environment shifting at high school in Indonesia. *International journal of mobile leaning and organisation, 10(3)*, 159-170.
- Sulisworo, D., Ahdiani, U., & Lirag, E. S. (2017, October). Physics teachers' beliefs on ICT integration at secondary school in Indonesia and Philippines. In *4th Asia Pacific Education Conference (AECON 2017)*. Atlantis Press.
- Sulisworo, D., Nasir, R., & Maryani, I. (2017). Identification of teachers' problems in Indonesia on facing global community. *International Journal of Research Studies in Education, 6(2)*, 81-90.
- Sulisworo, D., Yunita, L., & Komalasari, A. (2017). Which Mobile Learning is More Suitable on Physics Learning in Indonesian High School?. *International Journal of Recent Contributions from Engineering, Science & IT (iJES), 5(1)*, 97-104.
- Wu, W. H., Wu, Y. C. J., Chen, C. Y., Kao, H. Y., Lin, C. H., & Huang, S. H. (2012). Review of trends from mobile learning studies: A meta-analysis. *Computers & Education, 59(2)*, 817-827.
- Yuan, J., & Kim, C. (2014). Guidelines for facilitating the development of learning communities in online courses. *Journal of Computer Assisted Learning, 30(3)*, 220-232.
- Zyad, H. (2016). Integrating Computers in the Classroom: Barriers and Teachers' Attitudes. *International Journal of Instruction, 9(1)*, 65-78.