

Edmodo Based e-Learning Development on Science Lesson in 7th Grade

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ABSTRACT

This research aims to produce Edmodo-based e-learning that is feasible and effective to improve science learning outcomes. This research uses a modified Borg & Gall (1983) model. Data collection tools are in the form of questionnaire and test. Data analysis technique used is descriptive analysis. The results showed that the average validation score (1) of the media expert was 4.6 (very valid); (2) peers were 4.5 (very valid); (3) the material expert was 4.5 (very valid); (4) user limited test group is 3.8 (valid); (5) implementation group is 4.1 (valid). To test the effectiveness of e-learning and interactive learning media in improving learning outcomes in Natural Science learning for 7th graders. Based on the pretest results, it obtained an average value of 5.80, then on the posttest results showed an average increase to 75.60. Based on the results of research, it can be concluded that Edmodo-based e-learning developed is feasible and effective to be used in Natural Science learning.

Keywords : E-Learning, Edmodo, Natural Science

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INTRODUCTION

By the rapid development of information and communication technology at this time will greatly affect people's lives in all fields. The influence of these technologies will provide unfavorable influence for people who are less able to put themselves in society life, but also can be a positive influence for people who can use the information and communication technology wisely. The development of information technology and communications has influenced the field of education, where education is a two-way communication and information between educators and learners. Implementation of information and communication technology in education can be a means of communication between educators and learners who are not limited by time and space. This can be applied with the use of gadgets for on-line learning, as expressed by Wentling in Arkorful and Abaidoo: "To them, the e-learning depends on computers and networks, but it is likely it will progress into the comprising of a variety of channels such as wireless and satellite, and technologies such as cellular phones (Wentling et al., 2000)."

The reality at the moment shows that learning process is still dominated by face-to-face activities, as well as learning activities in schools in general. The learning activities which centered on the learner can be conducted by integrated learning with information and communication technology.

E-learning is a learning which can take place anytime and everywhere so it does not have to be in one dimension of time and space, it can mean anytime. The same thing is expressed by Rudy in Al-Rahmi et al. "As outlined by (Rudy, 2007), some of the advantages are: constraints, ability to ask questions without shyness and access of materials from anywhere. In the last decade, universities have allocated tremendous resources for the development and implementation of online learning (Rudy, 2007)". E-learning is the use of information and communication technology that give contribution to change in the learning activity. Learners are no longer listening to the material description of the teacher who seemed boring at in class.

Nowadays, one of social network based learning management system designed for easy-to-run learning by teacher and learner is Edmodo. Edmodo is easier to use because of that service available in it is more useful in learning, teachers do not need to build the web. With edmodo we can communicate, exchanging ideas or discuss, sharing teaching materials, assign tasks, submit assignment, conduct assessment, and follow various online communities. On this site parents can also join and communicate with their sons and daughters, teachers and parents of another learner.

Mastery of edmodo by teaching staff and their use in learning is very important because edmodo can be very helpful for teachers in managing learning easily i.e. spread out the teaching materials, working on questions and provide topics for discussion in the forum.

Edmodo is an educational technology company offering a communication, collaboration, and coaching platform to K-12 schools and teachers. The Edmodo network enables teachers to share content, distribute quizzes, assignments, and manage communication with students, colleagues, and parents. Edmodo is very teacher-centric in their design and philosophy: students and parents can only join Edmodo if invited to do so by a teacher. Teachers and students spend large amounts of time on the platform, both in and out of the classroom. Edmodo is a learning management system for schools and school districts & for college purpose. It's free to use, but also offers premium services. It Provides a free platform for teachers, Students & for parents (Wikipedia, <https://en.wikipedia.org/wiki/Edmodo>)

Mastering Information and Communication Technology is one of the competencies of teachers in the field of professional competence. According to Law No. 14 of 2005 on teachers and lecturers, it states that teachers must master 4 competencies, namely pedagogic competence, personality competence, social competence and professional competence. So this Edmodo based e-learning can be used as a development of professional competence of teachers.

Science learning is learning natural events in the form of observation activities, expressing a problem, collecting information, associating and communicating. By using edmodo, students are not only able to collect the information but also associate their knowledge in natural events. Science learning must be student-centered in accordance with Permendikbud No. 13 on Learning in Elementary and Secondary Education in 2014. It has implications for learning science in schools that must contain the nature of science which consist of three aspects, namely scientific products, scientific processes, and scientific attitudes. Scientific products are facts, principles, laws, theories, etc., which are the conclusion of a series of results of scientific processes. The scientific process is a process of inquiry that carried out to solve the problems while the scientific attitude is the beliefs, values, opinions, and other aspects of affection inherent in the individual which actualization is shown in the way of thinking, acting, and behaving (Rusmana, 2016)

In classroom learning, according to the demands of the 2013 curriculum, learning is carried out with scientific emphasis. Scientific activities are reflected in the 5 M activities (observing, asking questions, collecting information, associating and communicating). Science learning is Student-centered, it meaning that the full role are students. The teachers functions are as a designer, motivator, mediator and inspirator of learners. Sanjaya in Alawiyah (2013) revealed that there are four roles of teacher in curriculum development, namely as implementers, adapters, developers, and researchers. Both students role and teacher's functions can be applied in edmodo easily.

As stated by Wlodkowski in El-Seoud (2014), "learners learn more using computer-based instruction in comparison to traditional classroom methods". In the other words, learning in classroom must also be fun for students. Interesting and enjoyable learning becomes one of the alternatives for teachers to improve their quality in educating students and increasing achievement for students. The success of the learning process is strongly influenced by the teacher's understanding of the nature. In addition to increasing enthusiasm for learning, interesting and fun learning also trigger a teacher to be more creative and innovative in creating learning that can attract students' attention in delivering subject matter. One way to attract students' attention is by online learning by using student gadgets. With online learning by gadgets, students will feel challenged to use gadgets for learning. One of the media designed for online learning is Edmodo. Edmodo is very easy to use by both beginners and professional teachers. The teachers only need to use it without design in the web displays which finally increase the interest of students to study science.

METHOD

The research method used is research and development (R&D, a method used to produce a particular product, and test the effectiveness of the product. The product refer to the development of Edmodo e-learning media and interactive Android-based learning media on the Natural Science of the 7th grader. The development model uses the Borg & Gall model, which cycle as consists of 10 stages (Borg and Gall, 1989), namely: (1) research and information collection, (2) planning, (3) developing initial product, (4) initial field test, (5) initial revision of product, (6) main field test, (7) operational

revision of products, (8) operational field test, (9) final revision of products, (10) dissemination and implementation. In the research, the development procedure is modified so that the development procedure through six stages, namely the requirement analysis stage, design stage, development stage, validation stage, limited user test stage and the implementation stage. Requirement analysis stage is conducted by giving questionnaire to learners. The design stage is conducted by making the draft of an Android-based interactive learning media for textbooks companion, develop learning materials and Teaching Program Plan. Development stage is conducted by making Edmodo e-learning media and developing interactive learning media with Adobe Flash professional 6. Validation stage is conducted by validating the media to the validator. The limited user trial stage is conducted by preliminary media trials to small groups of learners to gain response to the media. Implementation stage is conducted by applying media in teaching and learning process in class.

Subjects in the research amounted to 29 students, which consists of 9 students at the time of the trial class and 20 students at the time of implementation class. Data collection tools are in the form of validation questionnaire, student response questionnaire and test question. The types of data in this research are both quantitative and qualitative data. Quantitative data are validation score given by the validator, student response questionnaire and test result. Qualitative data are in the form of comments and suggestions provided by validators (on the validation sheet) and students (on a student response questionnaire). The data analysis technique of module validation result is using average analysis of score with the following formula:

$$\text{Average score} = \frac{\text{Total score on assessed aspects}}{\text{Total Aspects assessed}}$$

Criteria of media validity is based on average score analysis

Table 1. Validity Criteria for Validated Data Analysis

Score	Validity Criteria
4.21 – 5.00	Very Valid
3.40 – 4.20	Valid
2.60 – 3.40	Quite Valid
1.81 – 2.60	Invalid (revised)
1.00 – 1.80	Very Invalid (total revision)

Reliability analysis of student questionnaire with SPSS, with the following criteria :

Table 2. Category of Reliability Coefficient

Relative Coefficient	Reliability Level
0.0 - 0.20	Less Reliable
> 0.20 - 0.40	Somewhat Reliable
> 0.40 - 0.60	Quite Reliable
> 0.60 - 0.80	Reliable
> 0.80 - 1.00	Very Reliable

(Source: Triton Prawira Budi, 2006: 248)

T Test is conducted to determine the difference between the pretest and posttest results to find out the effectiveness of using Edmodo-based e-learning media.

RESULTS AND DISCUSSION

Results

This research and development resulted in Edmodo based e-learning learning media and interactive android based learning media. The medium was developed with Borg & Gall's research and development model. In the interactive learning media based on android consists of opening page that contains the title of interactive learning media, Interactive media usage guidelines, basic competencies and indicators, Learning materials, Video, Quiz and Bibliography. This interactive learning media is

intended as a companion media textbook that will be used by students in answering the questions contained in the student worksheets that are distributed through e-learning media Edmodo.

There are 5 learning activities contained in this e-learning, namely learning activities 1 (environmental concept), learning activities 2 (components in the ecosystem), learning activities 3 (interaction between ecosystem components), learning activities 4 (food chain and webs), and learning activities 5 (the interaction of living things with the environment). Before being tested to learners, media is validated first by media experts, peers and material experts.

Media validation results by media experts show that the total score given by media experts is 158 with a mean score of 4.6, so the media can be categorized as very valid. Aspects of assessment conducted by media experts include aspects of appearance, interactive aspects and aspects of expediency. The display aspect gets a score of 88 with a mean of 4.6 with very valid criteria. The interactive aspect gets the number 38 with a mean of 4.8 with very valid criteria. Comments and suggestions from media experts are adding a list of referrals to interactive android based learning media.

The result of media validation by colleagues shows that the total score given by the media expert is 141 with a mean score of 4.5, so the media can be categorized as very valid. The aspects of peer assessment include aspects of content and linguistic aspects. The content aspect scores 96 with a mean of 4.6 with very valid criteria. Aspects of language get a score of 45 with a mean of 4.5 with very valid criteria. Peer reviewers' comments and suggestions are to add learning objectives to the Teaching Program Plan.

Media validation results by media experts show that the total score given by media experts is 158 with a mean score of 4.6, so the media can be categorized as very valid. The aspects of the assessment by the material expert include the content aspects and linguistic aspects. The content aspect scores 92 with a mean of 4.4 with very valid criteria. Aspects of language get score 46 with average 4.6 with very valid criteria. Comments and suggestions from the material specialists are changing the form / plan of the teaching program according to the latest ministerial regulations, which are recommended for the 2013 curriculum.

After the media was declared valid by media experts, peers and material experts then the media tested in limited first. Prior to the first meeting of Creative Living Environment with Environments, the students in small classes have installed Edmodo apps on their respective Android which can be downloaded for free in the Play Store, interactive learning media applications can be downloaded via learners's Edmodo accounts and word processing applications on their respective gadgets. Students are given the task of reading Edmodo's usage instructions and instructions on using interactive learning applications.

At each learning meeting with e-learning Edmodo, students are given the task to work on Worksheets that can be downloaded by learners through e-learning Edmodo, doing the work of Worksheets by using word processor contained in the gadget with reference interactive learning media and collect the task through media e-learning Edmodo in groups, where one group consists of two learners . And at the 5th meeting, learners conducted experimental activities of detergent effect on fish, where practicum instructions downloaded through Edmodo, done and collected through Edmodo as well. This meeting collected not only the work of the learner but also the image of litmus paper dipped into a liquid containing soap. The last learning activity is in the form of material evaluation using Edmodo e-learning media, where learners carry out daily tests daily. Learners work on 25 multiple choice questions done within 80 minutes

The trial results showed that the number of small class total score given by learners is 73, 1 with a mean score of 3.8, so that the media can be considered valid. Aspects of assessment conducted by learners include aspects of instructional media, material aspects, and aspects of benefits. Aspects of instructional media get score 29.9 with average of 3.7 with valid criterion. The material aspect scores 23.9 with a 4.0 rating with valid criteria. The benefit aspect scores 19.3 with an average of 3.9 with valid criteria. Comments and suggestions from small classes is the application of learning media can be enlarged and scaled down like a game that occurred on gadgets. Due to the limited knowledge of the author and the time, this suggestion can not apply to interactive learning media that already exist.

The activities in the implementation class were no different from the small classes, the activities were conducted for 5 (five) meetings by working on the student worksheets downloaded from Edmodo media. Learners work on LKS by reading the 2013 student curriculum book and interactive learning media that has been downloaded and installed in the gadget learners.

The result of small class test shows that the total score given by the learner is 7.8 with mean score 4.1, so media can be categorized valid. Aspects of assessment conducted by learners in the implementation class include aspects of learning media, material aspects, and benefits aspects. Aspects of learning media get a score of 32.8 with a mean of 4.1 with valid criteria. The material aspect scores 24.9 with a mean of 4.1 with valid criteria. Aspects of the benefits of getting a score of 20.0 with a mean of 4.0 with valid criteria

It can be concluded that Edmodo-based e-learning research result is feasible to be used in science lesson 7th grade of junior high school. This media is expected to be used as a medium for main textbooks for learners and teachers in learning.

Based on the SPSS analysis results, a reliable implementation class questionnaire of 0.750 for 19 items. This price is greater than the reliable table price of 0.6 . So it can be concluded that the results of the implementation class questionnaire is reliable. The results of reliable analysis with SPSS are as follows:

**Table 1. Results of Reliable Questionnaire Analysis
Reliability Statistics**

Cronbach's Alpha	N of Items
.750	19

Based on the result of SPSS analysis, the result of pretest learners got the average value 5,80, then in posttest result can be known there is average increase become 75,60.

Table 2. Analysis result of T-tes

	Group	N	Mean	Std. Deviation	Std. Error Mean
Value	Pre-test	20	58.00	6,928	1,549
	Posttest	20	75.60	11.816	2,642

Based on the above results, media experts categorize "**Very Valid**", material experts categorize "**Very Valid**", peers categorize "**Very Valid**", limited users (small groups) categorize "**Valid**", and end product users (implementations) categorize "**Valid**". It can be concluded that Edmodo-based e-learning research result is feasible to be used in science lesson 7th grade of junior high school. This media is expected to be used as a medium for main textbooks for learners and teachers in learning.

Based on SPSS analysis result, pretest result can be known from 20 students got average value 5,80, then at result of posttest can be known there is average increase become 75,60. So from the data can be concluded that the use of e-learning media can effectively improve student learning achievement.

Discussion

E-learning is the application of information technology in learning. The application of information technology includes covering the use of internet, the use of word processing application and interactive learning media that must be mastered by students as revealed by Rossi in Arkorful and Abaidoo. "E-learning as a concept covers a range of applications, learning methods and processes (Rossi, 2009)".

By using learning media based on android e-learning, which on average owned by learners, teaching and learning process will take place anytime and anywhere.

This will provide more benefits over gadgets that are owned by learners. Gadgets are not only used as a communication tool but can be utilized for the learning process. In this research, e-learning proved to be effective in helping learners in learning. From the observation of the implementation of e-learning in learning can be taken several notes, among others:

First, the e-learning media generated in this development is proven to help learners in learning independently. Learners can learn independently by reopening the archive of work of LKS that have been collected via Edmodo. This is in accordance with the opinion of Alsalem in Arkorful and Abaidoo. "The environment for e-learning also aids learners or students to depend on themselves for

the reason that the instructors are no longer the solitary knowledge source. They instead become advisors and guides (Alsalem, 2004)".

Second, interactive learning media generated in this development can help learners. This learning medium is a summary material that is installed in android gadget. So that learners can learn whenever and wherever, because in general gadgets are more practically brought anywhere from carrying textbooks.

Third, with Edmodo e-learning media that is conducted in groups, allows learners can discuss with friends more effectively. So the problems that exist in the learning will be solved more quickly. This is in accordance with Zeitoun's opinion in Arkorful and Abaidoo. "... the online model is divided into the individual and collaborative learning, where the collaborative learning is also consist of the synchronous and asynchronous learning (Zeitoun, 2008)".

Fourth, by learning e-learning learners can express their opinions without having to feel wrong and ashamed as in learning in the classroom. In e-learning learning, learners do not deal directly with friends and teachers, so learners can exercise express their opinions without fear of wrong and embarrassment to friends and teachers. Similarly, it was raised by Zeitoun in Arkorful and Abaidoo. "E-learning also aids in the preparation of the society to globally communicate and to dialogue with others (Zeitoun, 2008)".

In every lesson, it always starts with apperception. One example of doing apperception is by reminding students about the material that they have learned before because it sometimes still has relation with the next material. The next activity is observing something that has been prepared by the teacher or something in the school environment related to the learning material. Students express what they catch with the five senses about the object being observed. In this activity, the teacher does not limit observations by students.

From the observations, students develop these observations into a problem that will be studied. All problems will be addressed by students, and the teacher only accommodate and ultimately sort them out. Problems which are appropriate with the subject matter are prioritized to be studied and those which are not in accordance with the material will be saved and discussed in the right time.

This activity aims to make students familiar with the scientific attitude, with an observation around the lives of students. Students can provide a solution that must be considered for solving a problem. The problem becomes the subject of discussion in class and it will be discussed by students in groups with the students' handbook literatures or other available materials on the internet. The discussion sets up in groups in order to make students learn how to express their opinions in front of people, respect differences of opinion among students and find the best solution in solving problems.

The results of group discussions will be uploaded on online learning so all the groups can review and respond to the results of the other group discussions. The teacher's assignment is only as a resource. In the end, the teacher only summarizes the results of student works as notes for learning materials.

CONCLUSIONS AND SUGGESTIONS

Conclusion

The conclusion that can be drawn from the development of e-learning based on Edmodo, the first is related to the feasibility and effectiveness of media generated in this development. In terms of eligibility, as described above, the two products devoted to the development of Edmodo-based e-learning learning media and interactive learning media are judged well by the assessment of media experts, materials experts, peers and the assessment of learners. Problems in the early use of Edmodo e-learning media in the form of difficulty in using the application either in downloading and to upload the questions and answers LKS. This happens because learners are lazy to read Edmodo usage instructions that have been uploaded. This problem can be overcome by the accompaniment of how to do LKS by researchers in the class.

The second conclusion that can be drawn from the above discussion is that the information technology approach can be applied to the development of media in science learning for junior high school. The development of Edmodo's e-learning teaching materials on science subjects for junior high schools in this research has also received a positive assessment both from learning media experts, science teachers, and junior high school students.

Suggestion

From the research results there are also some good suggestions related to the application of learning materials based on Edmodo e-learning interactive learning media on science subjects and suggestions related to further development. In applying the teaching materials at the classroom level, a persuasive explanation to the students on the importance of reading the implementation instructions. These instructions aim to the students to be accustomed to read and understanding the procedure is a needed skill in a learning process. Teachers should be more patient in managing learning and directing learners to focus on e-learning learning.

Edmodo-based e-learning and interactive learning media is recommended to be implemented institutionally especially in SMP Negeri 2 Krian because with this kind of teaching educate learners to learn more independently and accustomed to using information technology. This research recommends further research for different materials and places, especially for IPA materials related to formulas and calculations.

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