

Development of E-Learning Material Based on Edmodo in Geography learning

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Abstract—The purpose of research is first, to know readiness of student and teacher to e-learning. Second, to identify the needs of students to teaching materials based Edmodo e-learning. Third, developing e-learning materials based Edmodo. Fourth, examine the effectiveness of e-learning teaching materials based Edmodo. Research using Borg and Gall model and experiment using pretest posttest control group design. The sample is selected using cluster technique. Data were collected using questionnaires and tests. The result of the research is first, readiness of e-learning students and teachers in ready state. Second, students need instructional materials based Edmodo e-learning combined with conventional learning and are equipped with electronic teaching materials. Third, developed edmodo edited e-learning materials that have been validated by experts and tested. Edmodo based e-learning teaching materials on effective geography learning improve student learning out-comes.

Keywords—*e-learning; teaching materials; development*

I. INTRODUCTION

"The declaration of Cebu resulted in the decision that to make ASEAN a free trade area covering all components of economic activity ranging from goods, labor (skilled), investment, capital, to services" [1]. Skilled workers can be cultivated through education; it is necessary to improve the quality of human resources with high competitiveness.

Learning activities are influenced by several factors that affect student learning outcomes [2]. The teaching materials according to the National for Vocational Education Research Ltd. in teaching materials are all forms of materials used to assist teachers in carrying out teaching and learning activities. Teaching materials are used to assist in carrying out learning activities, by in the process of learning is needed by teachers including in the process of learning geography. E-learning is a system to improve the quality of learning by working in the utilization of space and time to the maximum with computer media such as tablets, mobile phones, or other devices connected to the internet and accessible to learners in accordance with their needs [3].

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Rusman states that e-learning materials are good for learning because they have advantages that are not owned by paper media or other media [4]. The second advantage, e-learning teaching materials can be used fleksibel. The flexibility of e-learning materials displayed in the web can be utilized without being tied to place and time. The third advantage, the use of teaching materials e-learning can improve the quality of student learning. Mamentu and Ezekiel in his research says, as many as 78.5% of students can improve the quality of learning by using e-learning materials [5].

E-learning in the development and its success is determined by the positive attitude of society in general, corporate leaders, learners, and education personnel in particular on computer technology and internet [3]. Learning using e-learning requires readiness by looking at some of these factors in line with Mercado's opinion, states, "In order to reduce the risk of failure and the success of the e-learning process, a tool for measuring the readiness along the critical factors in implementing an e-learning environment is proposed." [6].

Measurement of e-learning readiness is a tool to look at factors in the e-learning environment that will be applied with the goal of reducing the risk of failure and increasing success in the application of e-learning [6]. Khan provides eight factors consisting of issues relating to environmental aspects of e-learning, namely psychological readiness, sociological readiness, environmental preparedness, human resources readiness, financial readiness, technical skills readiness, equipment readiness and content readiness [7].

According to Pirani the institution must provide adequate technical support for e-learning activities, instructors and students must have the technical skills to use e-learning tools. The basic requirements for online learning are access to a reliable internet connection and computer [8].

The basic requirements for online learning are access to a reliable internet connection and computer. Teachers and students must also possess the basic technology skills of computer skills, online skills, and computer literacy to be ready in e-learning [9]. Readiness is strengthened by self-employment, self-motivation, mature reading and writing skills, and a proactive learning approach, as well as a positive attitude about the general learning experience [10]. Student

attitudes toward e-learning are measured by the dimensions of learning habits, abilities, motivation and time management behavior [6].

E-learning uses the latest technology that delivery can be used web basis. One of the web that can be used in e-learning learning is edmodo. In addition to being accessible via the web, edmodo can also be accessed via apps that are downloaded in the play store. According to Hourdequin states that edmodo is mobile learning used to present the content of the lesson, providing a useful tool for students and teachers to interact online outside the classroom, anywhere and anytime [11].

This research uses edmodo because it can support e-learning teaching materials. Edmodo can facilitate teachers and students to interact, exchange assignments and outcomes, and deliver tasks and instructional materials in electronic form. Time limitations in learning can make edmodo an alternative in delivering material outside the classroom but remain in the subject of the material learned in the school. Fujimoto also revealed free edmodo app allows learners to access learning resources to be stored wherever they are and whenever they like [12]. In addition, the selection of edmodo application is based on students' preferences in accessing social networks. It looks similar to Facebook and twitter but edmodo is used for education so it is not so complicated used in the process of transfer of knowledge. Remote sensing material on learning of geography is one of the materials selected in this development study because remote sensing material requires technology to support learning.

The development of edmodo based e-learning materials on remote sensing materials is presented in the form of a development that contains electronic media and online learning. Electronic media such as e-module, power point, and remote sensing video and conveyed through edmodo application.

The purpose of this research is 1) to know e-learning readiness of students and teachers; 2) to know the student's need for edmodo based e-learning teaching materials; 3) developing edmodo based e-learning teaching materials; 4) to know the effectiveness of edmodo based e-learning teaching materials.

II. RESEARCH METHOD

The research method that be used is research and development method (R & D) which has been modified by the researcher by eliminating the stage of making product design because result of requirement analysis of student and teacher have enough to directly make product. Stages of research as follows:

The first stage is to see the potential and existing problems by gathering information. The information is related to the readiness and needs of students to run e-learning. Selected 33 students with cluster sampling technique and 1 teacher to represent the population in High School Unity of Teacher Republic Indonesia 1 in the city of Pematang. The instrument used is open and closed questionnaire in the form of questionnaire e-learning readiness and questionnaire needs to know the criteria of product development.

The second stage is making the product. Products are created by creating edmodo and electronic media accounts such as e-modules, PowerPoints, and videos.

The third stage is a product that is made validated by an expert. Selected two experts namely material experts and media experts. The material expert is one competent lecturer in remote sensing material. Media experts selected one that is a leader in the field of learning media. Validation results are used to improve the product so that the developed product has been tested.

The fourth stage is testing the teaching materials that have been developed by looking at the students' perceptions through product testing and effectiveness through experiments with pretest posttest control group design techniques.

Technique of data analysis in development research that is questionnaire of e-learning readiness and questionnaire needs to be analyzed by percentage answer choice. Questionnaire e-learning readiness and expert judgment using Likert scale and in interpretation by calculating the average of the score answers and technique mode. Experimental results were analyzed using statistical analysis.

Measurement tool e-learning readiness using measurements from Mercado which includes technology readiness, technological skills, and attitudes of students to e-learning [6]. Further measurement results are interpreted. Measurement results can be categorized in four classes: very often, often, occasionally, and never [13].

TABLE I. INTERPRETATION OF E-LEARNING READINESS [13]

Average Score	Interpretation of e-learning readiness
3,26 – 4,00	very often
2,51 – 3,25	often
1,76 – 2,50	sometimes
1,01 – 1,75	never

Expert validation results are interpreted by five classes. According Sugiyono classification assessment can be categorized as follows [14]:

TABLE II. INTERPRETATION OF EXPERT VALIDITY [14]

Average Score	Interpretation of expert validity
4,20 – 5,00	very good
3,40 – 4,19	good
2,60 – 3,39	adequate
1,80 – 2,59	dificient
1,00 – 1,79	very dificient

III. RESULTS AND DISCUSSION

A. Results

1) *Readiness of e-learning uses measurement guidelines from Mercado* [6]:

a) *Readiness e-learning of students*: The readiness of e-learning students on components of technological readiness are wrong in computer access, internet connectivity errors, and tools used in e-learning.

TABLE III. READINESS OF STUDENT TECHNOLOGY ACCESS

Computer access	Do	Do not
Computer	58%	38%
Internet connectivity	61%	39%
Tool	71%	29%

On computer access can be interpreted that students already have computers or smartphones, have access to computers in schools and other learning places, but still some students do not have it and most students also have no software on computers and printers installed in the computer. Percentage of internet connectivity i.e. 61% answered Yes and 39% answered No. This means that there are still students who do not have Internet connectivity

Percentage of tools in access technology i.e. 71% answered Yes and 29% answered No. Twenty-six students have computer access at school or internet cafe with internet connection and 21 students have computer access with search engine and internet browser, while the rest do not have both.

Students' readiness in technology skills is measured through basic computer skills, internet skills, application skills, training, and social support. The e-learning attitude of the students on the attitudes toward e-learning components includes students' beliefs, e-learning skills, motivation, time management, and usability.

TABLE IV. READINESS OF STUDENT TECHNOLOGY SKILLS

Technology skill	Do	Do not
Basic computer skill	43%	57%
Internet skill	74%	26%
Application skill	50%	50%
practices	36%	64%
Social support	81%	19%

Percentage of component of basic computer skill that is 43% answer Yes and 57% answer No. Twenty-two students know the function of computer peripheral components, 14 students know how to open documents, and 7 students know how to solve hardware or software problems. Percentage of internet or online skills 74% answered Yes and 26% answered No. Already many students who have e-mail, know how to login on the internet, search and download, know how to use web browser, know how to solve common mistakes when using the internet. As for the skills to send e-mail with attach files and access the library online there are still many students who do not have those skills.

Percentage of software application skills 50% answered Yes and 50% answered No. Student software application skills can be interpreted that some students already know PDF files and know how to download, familiar with word processor, and know how to compile files, and can use excel while some students again cannot in that case. Most students have never attended a seminar related to online learning.

Percentage of exercise that is 36% answered Yes and 64% answered No. Nineteen students have previous skills about e-learning while 14 other students do not have those skills. The percentage of social support that is 81% answered yes and 19% said no. Most of the students of 33 students who have received social support include parents, teachers and friends and schools

who encourage to use the internet, using electronic devices to learn.

The e-learning attitude of the students on the attitudes toward e-learning components includes students' beliefs, e-learning skills, motivation, time management, and usability.

TABLE V. STUDENT ATTITUDES TOWARD E-LEARNING

Attitudes toward e-learning	Value mode	Interpretations
Study habits	22	Sometimes
e-learning abilities	15	Sometimes
motivations	22	Sometimes
Time Management	23	Sometimes
useful	21	Sometimes

The result of student attitude analysis toward e-learning on learning habit component, e-learning ability, motivation, time management, and usability that is overall value interpreted in category sometimes. This means that the attitude shown by the students is only limited to sometimes in the habit of learning such as doing the task, self-study, the ability to analyze the material, learn new technology, and refrain from interference. The ability of e-learning students in communicating with others using online technology capabilities still fall into the category sometimes.

Student responsibilities for learning, communication with teachers and time flexibility also still show attitudes in the category sometimes. Student motivation towards e-learning to follow online classes and do home tasks is still in the category sometimes. In the category of time management, the students' attitude in taking the time and effort for the online classes, and the timeliness of doing the tasks are still in the category sometimes. In terms of usability effectiveness and efficiency of online classes are still in the category sometimes.

b) E-learning readiness of teachers: The e-learning readiness of teachers on access technology components includes computer readiness, Internet connectivity readiness, and tools.

TABLE VI. READINESS OF TEACHERS TECHNOLOGY ACCESS

Computer access	Do	Do not
Computer	100%	0%
Internet connectivity	50%	50%
Tool	100%	0%

This means that teachers' access to technological readiness already has reliable computer access in schools or other learning areas with built-in software and printers. Teachers also have internet access at schools or internet cafes and computers with search engines and internet browsers. Teacher internet connectivity is not 100% owned. Teachers only have computer access with internet connection but do not have home connection.

The e-learning readiness of teachers in the technological skills component includes basic computer skills, internet skills, application skills, and practice.

TABLE VII. READINESS OF TEACHERS TECHNOLOGY SKILLS

Technology skill	Do	Do not
Basic computer skill	67%	33%
Internet skill	88%	13%
Application skill	80%	20%
practices	0%	100%

This means the teacher knows about the basic functions of computer hardware components, knows how to save or open documents, but the teacher cannot solve hardware or software problems. The skills of teachers on internet skills can be interpreted that the teacher already has an e-mail address at once can send e-mails by attaching files, using the web browser conveniently and know how to solve common mistakes while using the internet. But teachers have no skills in accessing the online library. In the application skills the teacher knows the PDF file, can download and see it, know with word processor, know how to use excel, but the teacher cannot use file compiler. Skills on the exercise component are interpreted that teachers do not yet have the capability of e-learning, have never attended seminars and online classes.

Teacher attitudes are assessed through attitudes toward teaching styles, e-learning skills, motivation, time management, and usability.

TABLE VIII. TEACHER ATTITUDES TOWARD E-LEARNING

Attitudes toward e-learning	Value mode	Interpretations
Style of teaching	3,00	Often
e-learning abilities	3,00	Often
Motivations	3,00	Often
Time Management	3,00	Often
useful	2,00	Sometimes

Teachers' attitude towards e-learning shows that the teaching style, e-learning ability, motivation, and time management are good enough, seen from the value obtained that the questions asked by teacher answers are frequent. Teachers' attitudes on usage indicate a lack of attitude

2) *The result of student's needs analysis:* Results of student needs analysis of e-learning based on edmodo are as follows:

TABLE IX. PERCENTAGE OF STUDENT NEEDS ANALYSIS ON EDMODO BASED E-LEARNING

Statement	Do	Do not
Traditional learning	70%	30%
Learning using computers and internet	67%	33%
Search material on the internet	85%	15%
Utilization of internet in learning	70%	30%
Edmodo function	38%	62%
Use of edmodo app	77%	23%
Electronic teaching materials	73%	27%

The first statement item, 23 students are happy with the traditional lesson with the reasons of traditional learning more clear, memorable, understandable and can get more knowledge. Ten students do not like traditional lessons because traditional learning creates a sense of boredom, easy to forget and makes students easily drowsy.

The second statement point, 22 students are happy with the lessons that use computers and internet because it is more relaxed, fun, easy, cool to be easily understood and with the Internet easier to find their own material to get more information. While the other 11 students answered no because learning with computers and the internet is confusing, boring, many obstacles and disorders, too fast and there are still students who have not been able to use the internet and prefer to write in books.

The third statement point, 28 students love to find material on the internet because searching the material on the internet easier, efficient, complete, add insight and easy to understand. While the 5 students are not because searching for material on the internet is confusing, has no mobile phone to facilitate the search and does not have internet access.

Item fourth statement, 23 students agree if learning is done by using the internet because it is easier, complete, add insight, easy to remember and help in lesson, and can save paper. While 10 students answered no because not all students have a computer or smartphone. Item fifth statement, only 13 students who understand about edmodo function and 21 students do not understand what edmodo function. Students do not understand edmodo function because they are not familiar with edmodo application and it is difficult to understand it.

Item sixth statement, Students agree with the use of edmodo application for learning because learning with edmodo is very interesting will be easier, faster, fun, and learning using edmodo unlimited time so that the subject matter can be accessed outside school. Students who disagree give an excuse because not all students have a computer or a mobile phone and if they still need internet quota.

The requirement on the component of electronic teaching materials is 73% students answer yes and 27% answer no. This means that 73% of students enjoy using electronic materials instead of printed materials, students have used electronic modules, power points, video, and other props because it is easier, fun, no need to write, easy under and not afraid of tearing. Students who are not happy to use electronic materials provide reasons for preferring with printed materials, easy to understand and less expensive. Percentage 73% of students require electronic materials and are willing to create electronic materials to support remote sensing chapter learning.

3) *Product description:* Research on developing edmodo e-learning teaching materials to produce high school / MA geography teaching materials for class X (ten) remote sensing material. E-learning materials based on edmodo that is electronic module (e-module), power point and video. The edmodo teacher account is fitirigurgeo.

4) *The results of product design validation by experts*

a) *The result of materials expert validations:* The result of product validation test by the material expert that is the content of the material content gets an average value of 3.82 means the content of the material is good. Presentation in the material gets an average value of 4.20 means very good. Based on expert assessment of developed product material can be tested

b) *The result of media expert validations:* The result of product validation test by media expert that is content feasibility got average score 4,33 mean very good, edmodo learning design get value 4,14 mean edmodo good application for learning and feasibility of kegrafikan get 3,77 meaning good but there are some which should be fixed. Based on the assessment of media experts developed products can be tested after the revised.

5) *Product test result:* The results of product trials that have been developed seen from the students' perceptions of the use of edmodo based e-learning materials are as follows:

TABLE X. STUDENT ASSESSMENT OF ELECTRONIC TEACHING MATERIALS

Assessment	Value mode	Interpretations
E-modul	24	Often
Power Point	24	Often
Video	14	Often

The e-module teaching material is good. E-modules can enhance learning desires, draws, drawings in easily understood e-modules as well as the corresponding basic competence. Power point teaching materials are good, the contents of the power point is in accordance with the competence to be achieved, increase the desire to read, the material is interesting and easy to understand.

Remote sensing videos are good enough. Infromasi in the video is understandable, in accordance with the basic competencies to be achieved, and interesting. Pictures, sounds, writing, layouts, and titles in the video are also good. However, the video is still difficult to open using mobile phones.

TABLE XI. STUDENT PERCEPTIONS OF EDMODO-BASED E-LEARNING CONVENIENCE

Component	Do	Do not
E-learning	62%	38%
Edmodo	75%	25%

The percentage of students' perceptions of e-learning related to the convenience of using e-learning can be interpreted that 62% of students feel comfortable learning to use computers rather than traditional learning. Through e-learning teaching materials students can learn more and get a fun learning experience, can be understood in accordance with the speed of learning of each student. While 38% of students answered not mostly because there is no computer availability anytime for students.

The percentage of student responses to edmodo related to the convenience of using edmodo can be interpreted that 75% of students are comfortable with edmodo. Students feel that edmodo is a social application that provides an opportunity to interact with teachers through online classes. Through online classes shy students feel comfortable interacting with teachers through edmodo.

Hypothesis test is done to know the significant level and see whether there is difference of learning result of student (posttest) in experiment class and control class. Hypothesis test is done by using t test.

Result of hypothesis test of experiment class and control class with significant level 5% obtained value $t_{count} = 20,9353$ and $t_{table} = 2,000$. So, $t_{count} > t_{table}$. Then H_0 is rejected, which means there are differences in student learning outcomes using e-learning materials based on edmodo who do not use edmodo-based e-learning materials.

The result data of the mean value of the control class showed that the average value of pretest control group was 47.81 and the experimental class was 43.27. The control group's posttest score was 53.37 and the experimental class was 67.23. This means that the control group's posttest score increased by 6% of the pretest value, and the posttest of the experimental group increased by 21% of the pretest value.

B. Discussion

Development of edmodo based e-learning materials such as e-module, power point, and video. In requirement analysis, students feel still need conventional learning or lecture but still need supporting materials or additional material from electronic media or internet and online learning through edmodo. The results are in line with the theory that e-learning can not completely replace conventional learning activities in the classroom, but e-learning can be a partner or complementary with conventional learning in the classroom.

The result of the experiment shows that there is a correlation between e-learning readiness and the result of development of edmodo based e-learning materials, the result of the test shows that the students' weariness level in using e-learning based on edmodo is still high it is sinkron with the result of readiness of students which is still enough especially low on computer access, and attitudes toward e-learning. This is in line with the theory that the success of e-learning is determined by the positive attitude of students, teachers, and leaders, especially on computer technology and the Internet. Where the basic requirements for online learning are reliable internet connection and computer access.

So if the readiness of e-learning students show attitude is not ready in access internet and computer connection then the success in e-learning is also not so maximal. Although the learning result using edmodo based learning e-learning materials on learning geography is not maximal but still improves student learning outcomes.

IV. CONCLUSIONS

The conclusion of the research result are: first, the readiness result of e-learning of student and teacher can be concluded that readiness of student indicate that on skill of technology and basic computer skill student have enough ready in e-learning. Second, the result of learning needs of e-learning study based on edmodo in this study that students still need learning by lecture method but can freely choose material on internet or other electronic media and online learning using edmodo. Third, the result of the development of e-learning materials based on edmodo in the form of e-module electronic materials, power point and video, and online class on edmodo with fitrigurugeo teacher's account. The teaching materials are developed after the development stage. Teaching materials can be downloaded on teacher's account. Teaching materials have

been validated by experts and tested. Fourth, edmodo edu-based e-learning materials are effective in improving student learning outcomes.

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