The Development of Learning Management System Using Edmodo

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Abstract. The development of Learning Management System (LMS) can be used as an online learning media by managing the teacher in delivering the material and giving a task. This study aims to: 1) to know the validity of learning devices using LMS with Edmodo, 2) know the student's response to LMS implementation using Edmodo, and 3) to know the difference of the learning outcome that is students who learned by using LMS with Edmodo and Direct Learning Model (DLM). This research method is quasi experimental by using control group pretest-posttest design. The population of the study was the student at SMKN 1 Sidoarjo. Research sample X TITL 1 class as control goup, and X TITL 2 class as experimental group. The researcher used scale rating to analyze the data validity and students' respon, and t-test was used to examine the difference of learning outcomes with significant 0.05. The result of the research shows: 1) the average learning device validity use Edmodo 88.14%, lesson plan validity is 92.45%, pretest-posttest validity is 89.15%, learning material validity is 84.64%, and affective and psychomotor-portfolio observation sheets validity is 86.33 included very good criteria or very suitable to be used for research; 2) the result of students’ response questionnaire after taught by using LMS with Edmodo 86.03% in very good category and students agreed that Edmodo can be used in learning; and 3) the learning outcome of LMS by using Edmodo with DLM are: a) there are significant difference of the student cognitive learning outcome which is taught by using Edmodo with the student who use DLM. The average of student learning outcome that is taught LMS using Edmodo is 81.69 compared to student with DLM outcome 76.39, b) there is difference of affective learning outcome that is taught LMS using Edmodo compared to student using DLM. The average of student learning outcome of affective that is taught LMS by using Edmodo is 83.50 compared students who use DLM 80.34, and c) there is difference of student psychomotor learning outcome that is taught with LMS using Edmodo compared student who use DLM. The average of student learning outcome that is taught with LMS using Edmodo is 85.60 compared to student who uses DLM 82.31.
1. Introduction
The learning process using internet media is different from the process of learning face to face with the teacher, so learning using internet media need to consider the risk, system, structure, schedule, and cost. One solution to overcome the risks in terms of cost is to use the Learning Management System (LMS). LMS has a scope of course material delivery, assessment, monitoring, and communication. LMS integrate material content, pedagogical and professional competence, science and technology with the expectation of quality and optimal learning outcomes.

To support LMS can use Edmodo. Edmodo is a communication medium and discussion between teachers and students efficiently, and the design is similar to facebook. Teachers can upload teaching materials, assignments, quizzes, and grades. Students can download teaching materials, assignments, quizzes, and send assignments. The use of Edmodo also facilitates interaction and discussion among fellow students about the topic that has been determined, and can be monitored by teachers. Teachers and students can access anytime and anywhere without dotage by distance, place, and time to obtain a source of information quickly and accurately.

Learning using LMS with Edmodo is expected to help the learning process of students, students are not easily bored in learning so that the learning outcomes are more optimal. Learning LMS using Edmodo also facilitate teachers in the delivery of subject matter because the subject matter can be packed more practically and become alternative media replacement paper.

The purpose of this research are: 1) to know the validity level of LMS learning design using Edmodo developed, 2) to know the student's response to learning by LMS using Edmodo, and 3) to know the difference of learning result of students with LMS using Edmodo compared to learning using Direct Learning Model (DLM).

Learning is a complex process that happens to everyone and lasts a lifetime, from the time they are babies to the grave later. One sign that a person has learned is a change of behavior within himself (Sadiman, 2005: 2). These behavioral changes concern both cognitive and psychomotor changes as well as values and attitudes (Musfiqon, 2012: 3). In learning there is certainly a process of learning, except to learn by self-taught. According to Rusman (2012: 1) learning is a system consisting of several components that are interconnected with each other. These components include objectives, materials, methods and evaluation. Internet is a giant library of the world, because in the internet there are billions of sources of information so that it can use the information in accordance with the needs.

LMS is a system that helps learning activities and manages e-Learning platform content content on e-Learning (Effendi and Zhuang, 2005: 85). LMS is a system that supports the implementation of electronic learning (e-Learning) by providing learning materials, learning process instructions undertaken by students, evaluation materials, and display the learning process (Prawiradilaga, 2004: 179).

LMS can serve as a software or software for learning, documentation, reports of a learning activity, online learning activities (connected to the internet), and online training materials (Ellis, 2009: 3). While Edmodo by Gatot (2013: 3) is a social media platform that is often described as facebook for school and can function more in accordance with needs. Edmodo is an app that appeals to teachers and students with social elements similar to facebook, but there is a greater value in online education applications. Edmodo makes it easier for teachers to monitor student interactions within the LMS because of the open course. Edmodo is almost like an easy facebook operation. This is different from learning with DLM.

Implementation of DLM in need of face-to-face directly between teacher and student, teacher explanation, question and answer, teacher-led training, follow-up training, evaluation, and continued with assignment. In such learning, the learning process tends to be more teacher-centered. In integrating LMS learning tools with Edmodo for optimum results, the result of learning device integration needs to be validated by the instructional design expert, the learning media expert, content expert, and evaluation expert. Likewise in learning with DLM, then the learning tool must also be validated. Response is any individual behavior that is a response to the stimulus. The human individual participates as the controller between the stimulus and the response so that which determines the form of individual response to the stimulus is the individual's own stimuli and factors
(Hamalik, 2011: 15). The responses are students' opinions of interest, feelings of happiness and present, and ease of understanding the components: 1) the material or the content of the lesson, 2) the teaching material format, 3) the pictures, 4) the activities in the student worksheet, 5) the learning atmosphere, and 6) the way teachers teach and the learning approaches used (Trianto, 2011: 242). Learning outcomes are the abilities possessed by students as a result of learning acts that can be observed from the student's performance. Learning outcomes are patterns of action, values, understandings, attitudes, appreciation and skills (Suprijono, 2009: 5). Learning outcomes consist of three domains, namely learning outcomes of cognitive, affective, and psychomotor.

2. Method

This research use research and development research type (R & D) referring Sugiyono (2015: 407) in developing LMS with Edmodo subjects Basic Elementary and Electronics class X. While research method using quasi experiment with experimental design non-equivalent control group pretest-posttest (Sugiono, 2015: 111). Fig. 1 shows the design of non-equivalent control group pretest-posttest.

\[ O_1 \rightarrow O_2 \]
\[ O_3 \rightarrow X \rightarrow O_4 \]

Fig. 1 Experimental Design

X : Treatment in experimental group with LMS using Edmodo
O1: Pretest at control group
O2: Postest control class after learning using DLM
O3: Pretest at experimental group
O4: Posttest at experimental group

The research population is students SMKN 1 Sidoarjo. Determination of research sample using stratified random sampling technique. The sample of the study was selected students of class X TITL 2 experimental group and class X TITL 1 control group. Determination of experimental group and control group is using drawing technique. Number of students in each class is 36 students.

The research was conducted in Audio Room of SMK Negeri 1 Sidoarjo East Java Indonesia in the even semester of academic year 2016/2017. Data collection techniques consist of: 1) validation sheet, to collect validation data of learning device, and student's response to learning by LMS using Edmodo, 2) pretest-posttest to collect initial capability data and cognitive domain learning outcomes, 3) observation to collect the results of learning affective sphere, and 4) observation & portfolio to collect data of psychomotor domain learning outcomes.

The research instruments consist of: 1) validation sheet, to know the result of learning device validation developed, 2) questionnaire of student response, to know the student response to learning by LMS using Edmodo, 3) item pretest-posttest to know the initial ability and learning result cognitive domain, 4) observation sheet to know the affective domain learning result, and 5) observation sheet and portfolio to know the psychomotor domain learning result.

Steps to develop learning tools and integrate on the LMS with Edmodo adapting R & D Sugiono's research (2015: 407), covering: 1) analyzing the potential and problems of students, educators and technicians, media, tool resources, and student learning outcomes and standards (4) validate product design, 5) revise the product design, 6) conduct limited product testing, 7) revise the product, 8) test the experimental class, and 9) collect and analyze data on evaluation results and student responses.

Experts design validation results and student responses are further analyzed. The learning outcomes of the experimental class cognitive sphere were compared with the cognitive classroom learning outcomes of control class students. For the learning result of the affective and psychomotor spheres of the experimental class and control class each compared to the Minimal Mastery Criteria (MCC) specified.

The researcher used scale rating to analyze the data validity refers to Table 1. Determination of percentage of learning device eligibility obtained from the validator results using the following formula.
\[ \text{Percentage} = \frac{\sum \text{answer validator}}{\sum \text{highest score validator}} \times 100\% \]

Table 1 Percentage of Rating Scale and Assessment Criteria

| No | Quality Assessment       | Percentage (%) |
|----|--------------------------|----------------|
| 1  | Very Valid / Very Worthy | > 81.5 – 100   |
| 2  | Valid / Worthy           | 62.5 – 81.5    |
| 3  | Less Valid / Less Worthy | 43.5 – 62.5    |
| 4  | Invalid / Ineligible     | 25.0 – 43.5    |

(Adapted from Widoyoko, 2012: 112)

The researcher used scale rating to analyze the data students’ response. The determination of the level of response categories of students to the LMS using Edmodo basic subjects of electricity and electronics refer to Table 2.

Table 2 Percentage of Rating Scale

| No | Quality Assessment | Percentage (%) |
|----|--------------------|----------------|
| 1  | Very good          | > 81.5 – 100   |
| 2  | Good               | 62.5 – 81.5    |
| 3  | Less good          | 43.5 – 62.5    |
| 4  | Not good           | 25.0 – 43.5    |

To test the difference of learning result of cognitive sphere of experiment and control group using independent t-test sample with significant level of 0.05. Before performing the test t-test requirements analysis, namely homogeneity and normality test. In addition, the students’ initial abilities of the experimental and control groups were not significantly different.

The first hypothesis of this study is the learning tool LMS with Edmodo developed in the category valid or feasible to use. Second hypothesis, student response to learning LMS with Edmodo in good category. While the third hypothesis is that there are significant differences in cognitive learning outcomes of students using LMS with Edmodo compared with student learning outcomes using DLM.

The indicators of success of this study are as follows: 1) validation of learning design in valid category or suitable to use if average percentage of rating result \( \geq 62.5 - 81.5\% \), 2) student response to LMS learning with Edmodo in good category if average of percentage of rating result \( \geq 62.5 - 81.5\% \), and 3) the significance level of t-test result 0.05 for the cognitive domain learning outcomes, mastery of affective and psychomotor learning achievement of students with MMC \( \geq 75\).
The learning device of LMS with Edmodo conducted validation is: 1) learning implementation plan, 2) subject matter, and 3) item pretest-posttest. Validated aspects of learning planning validated aspects include indicators, objectives, material selection, selection of learning resources, selection of learning media, learning model, learning scenario, assessment, and literature. While the aspects of the subject matter that is validated include the layout and layout, illustrations and material content, language, and literature.

In the subject matter of cognitive domain, the validated aspect is: a) the material, ie the conformity of the item with the indicator, the item according to the competence, the letters and the picture is well and neatly arranged, the difficulty level of the problem, b) the construction, clear and unambiguous, the main formulation of the item and the choice of answers is a necessary statement only, the item does not give a clue the answer key, the choice of homogeneous and logical answers, the picture is clear and functioning, the length of the answer is relatively the same, and c) the language, using the language according to Indonesian and communicative rules.

The validated aspect on the affective observation sheet, the psychomotor-portfolio observation sheet is the indicator linkage with the objectives, the conformity of the statement with the purpose, using the language according to Indonesian and communicative rules, and the appropriateness of the assessment rubric. A summary of the validation results of learning device is shown in Table 3.

| No | Learning Device                              | Average Rating Result (%) |
|----|----------------------------------------------|---------------------------|
| 1  | Lesson plan                                  | 92.45                     |
| 2  | Learning materials                           | 84.64                     |
| 3  | Pretest-Posttest                             | 89.15                     |
| 4  | Affective and psychomotor-portfolio observation sheets | 86.33                   |
|    | Average                                      | 88.14                     |

The average of learning device rate validation is 88.14%, then based on Table 1 is in very valid or very feasible category, so the learning device of LMS with Edmodo developed is very feasible to be tested in experimental group students. To find out student response in learning using LMS with Edmodo students were given questionnaire of student response after learning. The summary of student response to LMS with Edmodo from media, material, and access aspects is shown in Table 4.

| No | Response to Aspects | Average Rating Result (%) |
|----|---------------------|---------------------------|
| 1  | Media               | 84.30                     |
| 2  | Materials           | 86.86                     |
| 3  | Access Edmodo       | 86.94                     |
|    | Rerata              | 86.03                     |

The average result of the student's response rating is 86.03%, then based on Table 2 is in very good or very like category, it means that students have a very good response to LMS with Edmodo. The results of the affective learning outcome of the results of observations at the time students do practice tests. Aspects that are assessed obedience do practical work, responsibility creativity, honesty, and discipline, While the learning outcome psychomotor that is assessed is the skill of using the tools and materials, the attitude in work, the sequence of doing the job, the accuracy of data-analysis-conclusion, the speed of work, the compatibility of shape & size, and the compliance of reports. Initial ability (pretest) student of experiment group average 39.94. Histogram of students' pretest of experimental group showed Fig 3.
Fig. 3 Histogram Pretest Experiment Group
Pretest results of control group average 37.00. Histogram of students’ pretest of control group shown Fig. 4.

Fig. 4 Histogram Pretest Results Control Group
Learning outcome of experimental group average 81.69. Histogram result of student learning outcome (posttest) experiment group shown Fig. 5.

Fig. 5 Histogram posttest of Experimental Group
Learning outcome control group average 76.39. Histogram learning outcome control group shown Fig. 6.
To know the normality of pretest data and learning outcome data of experiment group and control group was done normality test. A summary of the results of normality test of pretest data and learning outcome data experimental group and control group is shown Table 5.

### TABLE 5 TEST OF NORMALITY

|                     | Kolmogorov-Smirnov \(D\) | \(df\) | \(Sig.\) |
|---------------------|---------------------------|--------|----------|
| Pretest experimental group | .143                      | 36     | .060     |
| Pretest control group   | .138                      | 36     | .080     |
| Posttest experimental group | .133                      | 36     | .106     |
| Posttest control group   | .128                      | 36     | .141     |

The significance of pretest and learning outcome data experimental group and control group sig. > 0.05 conducted normal data.

To find out homogeneity of pretest data and learning data experiment group and control group conducted homogeneity test. The summary of the homogeneity test of pretest data and learning outcome data experimental and control group shown Table 6.

### TABLE 6 TEST OF HOMOGENEITY OF VARIANCES

|                     | Levene Statistic | \(df1\) | \(df2\) | \(Sig.\) |
|---------------------|------------------|--------|--------|----------|
| Pretest data        | 1.798            | 1      | 70     | .184     |
| Posttest data       | .142             | 1      | 70     | .708     |

Value sig. > 0.05 conducted variant of pretest data and posttest data experimental group and control group is homogeneous.

Because of pretest data experimental group and control groups normal and homogeneous, the t-test can be performed to test for differences in the pretest of the experimental group and the control group to proceed. The summary of the pretest results of the experimental group and control group shown Table 7.

### TABLE 7 INDEPENDENT SAMPLES T-TEST PRETEST DATA

|                     | t-test for Equality of Means | \(t\) | \(df\) | \(Sig.\) (2-tailed) |
|---------------------|-----------------------------|------|------|-------------------|
| Pretest data        | Equal variances assumed     | 1.044| 70   | .300              |

Value of sig. 0.30 > 0.05, meaning there is no significant difference between pretest data of experimental group and control group.

Since there were no significant differences in pretest data between experimental and control groups, normal and homogeneous data, the t-test to determine learning outcome differences between the experimental and control group was conducted.
control groups could be continued. A summary of the t-test results of the experimental and control group learning outcome shown Table 8.

| Posttest data | Equal variances assumed | t  | df | Sig. (2-tailed) |
|---------------|-------------------------|----|----|----------------|
| t-test for Equality of Means | 2.716 | 70 | .008 |

The a value sig. 0.008 < 0.05, meaning there is a significant difference in the learning outcome of the experimental group and the control group.

Student learning outcome of affective domain of experimental was taught using LMS with Edmodo average 83.50 ≥75 or over MMC, as well as learning outcome of affective domain of control group which taught using DLM average 80.34 ≥75 or beyond MMC. The results show that the experiment group's higher learning outcomes are higher than the control group's learning outcomes.

Student learning outcomes psychomotor domain experimental groups who learn to use the LMS with Edmodo average 85.60 ≥75 or beyond MMC. While the results of student learning outcomes psychomotor domain control group that learn with DLM averages 82.31 ≥75 or beyond MMC. The learning outcomes psychomotor doamain of the experimental group were higher than the control group.

4. Discussion

The result of the student's response rating is in the category of very good or very fond of the LMS with Edmodo. This is because the media and materials that exist in the LMS with Edmodo more interesting, the present, the ease in understanding the components, and easy accessed. This will make students more interested, more happy against LMS with Edmodo.

There are significant differences in learning outcomes of the cognitive domain of the student group learning to use the LMS with Edmodo and higher than the student group learning using DLM. This can happen because the LMS with Edmodo can help students use technology and learn more independently than students who learn to use DLM. In addition, in the LMS with Edmodo the students' learning motivation also increases, not quickly bored, and the learning process is not bound by room, distance, time and place.

The learning outcomes The affective domain learning outcomes of the group of students learning to use the LMS with Edmodo were also higher than the group of students studying on DLM. This is because the learning using LMS with Edmodo students more independent and more utilizing technology, and more obedient in completing or performing tasks, more creative, more disciplined, and more responsible. In contrast to DLM, students are more dependent on teachers so that students' creativity, discipline, and responsibilities tend to be less developed.

The learning outcomes of the psychomotor domain of the group of students learning to use the LMS with Edmodo are better than the students' psychomotor learning outcomes learning on DLM. This is more because students who learn to use the LMS with Edmodo are more accustomed to practicum or practice. The material being studied is not new for the students as it has been supported by other subject matter that Edmodo has introduced and can support the practice activities, they are familiar and easily operate it in searching the supporting material for the practice.

5. Conclusion

Based on the results of the analysis, results of research and discussion, it can be concluded: 1) learning design developed (learning implementation plan, lesson material, evaluation of learning outcomes), and integrated in LMS with Edmodo in the category very valid or very suitable for use in basic learning electricity electronics, 2) student responses to learning using LMS with Edmodo in very good category, and 3) learning outcomes of the cognitive domain of the group of students who were taught using LMS with Edmodo higher and significantly different than the group of students who were taught using DLM. The learning result of the affective and psychomotor domains of the students group was taught using LMS with Edmodo higher than the learning using DLM.

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