The development of teaching materials using the Edmodo application in data presentation materials

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Abstract. This research is motivated by a reality that the teacher had not developed a learning tool especially for the use of Edmodo application teaching materials in the school. Then, this study aims to develop valid, practical, and effective teaching materials using Edmodo application on data presentation material in elementary school grade IV. The development of these teaching materials refers to the model proposed by Thiagarajan that uses define, design, develop, and disseminate stages. For that reason, this research is done in three stages; define, design, and develop on a very limited scale. It can be concluded from the result of the study that the overall validation value is 80. It can be said as the very valid category. Furthermore, the results of the trial to see its practicality of teaching materials stated to be very practical. This can be seen from the results of the teachers’ and students’ responses. Furthermore, the results of its effectiveness using the t-test can be obtained $t_{count}=12.03$ and $t_{table}(0.05)(16)=2.12$ at the significance level $\alpha=0.05$. Thus, the condition in which $t_{count}>t_{table}$ shows that the teaching materials are declared to be effective.

1. Introduction

The progress in Science and Technology, especially information technology has a lot of positive impacts on the advancement of the world of education today [1]. The biggest impact of technology is the development of the internet among children [2]. About 12% of children who are five years old have known the internet, and as many as 45% of these children claim to know the internet from their parents, and about 51% of them use the internet at home and 51% of children this accesses the internet in a private room such as a room [3]. This is dangerous for children because children still need guidance in using the internet and control by their parents. Edmodo is an application that can be used in learning in the form of flam that is easy to use [4]. One of the special needs in learning is teaching materials. Learning materials are all material forms used by educators in the learning process [5]. Teaching materials in the form of Edmodo or e-learning applications can provide new things for students [6] e-learning teaching materials can help teachers in teaching heterogeneous students because it can provide convenience in understanding what is learned [7].

Edmodo application is a Facebook learning media. It can be said that the Edmodo application is Facebook’s education [8]. Edmodo can be used as a learning communication platform to support the students' learning at the individual, group and whole class levels, both inside and outside classmate. Edmodo is a safe online learning environment and it is free from advertising, games and other distractions that can be used to communicate between educators with students both lessons, homework, and collaborating with classmates [9]. Edmodo aims to help teachers utilize social networking facilities in accordance with the conditions of learning in the classroom [10]. Edmodo is a
social media for the teachers and students or lecturers and students which function is to share ideas on agenda files so Edmodo allows it to be applied as a learning medium [11]. Edmodo application is highly recommended for the teachers to do learning because it is free and safe to use [12].

E-learning teaching materials are selected because they have advantages over other types of teaching materials. The first advantage is that e-learning teaching materials can integrate text with mobile media such as animation and video. The combination is very useful for students because teaching materials are presented in full with a more complete media combination than printed teaching materials [13]. So that, the students become easier to understand because the mobile media is able to describe the real environment. Therefore, e-learning teaching materials can be utilized in a flexible manner. Site or web is a "living text" that can be used flexibly as a pedagogical resource in an independent program that focuses on intelligence [14]. The utilization of e-learning teaching materials for learning can improve the quality of student learning. As many as 78.5% of students can improve the quality of learning by using e-learning teaching materials [15].

The advantages of the Edmodo application are (1) providing an environment where learning and teaching can produce excitement for the students, (2) the students become more independent in learning, (3) improve the ability of the students to learn even outside of school, (4) the students can overcoming new material even though it is difficult, (5) parents can find out directly how their children's learning progresses in school directly [16]. (1) The use of language programs that still use English so that it is sometimes difficult for teachers and students in learning, (2) the unavailability of online syntax directly on Edmodo applications [17]. With the many advantages offered by the Edmodo application, the shortcomings contained in the application will not affect the learning process because it can be overcome by reading and teaching it to students in elementary school.

2. Method
The model that was carried out in this development research was the stages that were presented, namely the stages of define, design, develop, and disseminate [18]. The dissemination stage was not done by the writer because the school that used the Edmodo application was only one school in West Sumatra. Thus, the development methods that the researchers do include defining, designing and developing. The subjects of this research were IVC grade students of Al-Azhar Private Elementary School Bukittinggi and teacher grade IV C. The type of data in this study was validity data in the form of filling out validation sheets by validators to determine the validity level of teaching materials developed and practical test data in the form of the teacher’s and students’ response questionnaire The practicality test was carried out to find out and collect in the form of practicality data of developed teaching materials.

3. Result and Discussion
The results of the research were described in accordance with the development model which includes 3 stages: define, design, and develop stage. These three stages answered the questions in the formulation of the problem of validity and practicality of the developed teaching materials.

1. Stage I (Define)
This stage includes 5 stages as followed:
1.1 The purpose of conducting front-end analysis was to determine the fundamental problems faced by the classroom teachers in learning. After observing at SDS AL-Azhar Bukittinggi, 3 problems that the researchers found in learning were teaching method was still going on with the lecture method, even though the teacher had used the Edmodo application, the teacher only maximized the student's book during the learning so that the use of Edmodo application was only used for assignments.

1.2 Student analysis was carried out to examine the characteristics of the students including elementary who were in the process of development. The development process was certainly different from the age range they had. The IV grade students were students in the age range
7-11 years, the thinking process activities in this stage begin to resemble the way of thinking of adults because the ability that has developed in things were abstract.

1.3 Curriculum analysis was carried out to determine the main concepts of learning material in elementary school grade IV, especially on the data presentation material. Then to support the analysis of this concept, the researchers considered the Permen 24 year 2016 curriculum book. The curriculum analysis aimed to determine the suitability of core standard, standard competences, indicators, learning objectives, and the scope of material in learning to develop teaching materials.

1.4 Task analysis was carried out as the purpose to define the skills that studied in teaching materials. The skills that analyzed in this task analysis were measuring, weighing, and presenting bar charts and also completing individual or group assignments on teaching materials.

1.5 Formulation of Learning Objectives were useful to summarize the results of curriculum analysis and task analysis to determine learning objectives. The learning objectives were used as the basis for designing mathematics teaching materials on the data presentation material. Based on curriculum analysis and task analysis, several learning objectives were formulated according to the indicators. After analyzing the standard competencies to the next indicators, the researcher analyzed them to define the indicators to the learning objectives. The learning objectives found in the teacher's book were specific. Thus, the learning objectives were analyzed as a whole by the researchers.

2. Stage II (Design)
The design of the mathematics teaching materials for data presentation material for grade IV SD was conducted based on the analysis result in the stage I. The description of the design for mathematics teaching materials was as followed:

1) The teaching materials were designed in the form of a module by following the guide to make modules

2) The teaching materials were adjusted to the indicators and learning objectives that had been analyzed. In addition, the teaching materials were obtained from reliable sources.

3. Stage III (Develop)
The design of the teaching materials developed was done in this stage. The teaching materials were validated by 3 validators. The results of first validation stage stated that the teaching materials: 1) did not give real examples in teaching materials 2) there were limited key answers in the students’ task, 3) command sentence on the teacher's instructions was unclear, 4) teaching materials used good standard Indonesian language, 5) to improve the material presentation to make the students to be not confused, and 6) the instructions in teaching materials must be clear. Moreover, the practicality test was carried out twice in which this two practicality trial tests involved 17 students. At this stage, the results of the validity test and practicality test were described as followed:

a. The validity test results were 55 to 90 which could be categorized as the very high category. Then, the average of overall validation in the aspect of the content feasibility was 80 with a very valid category.

b. The result of the practicality test based on the teacher’s response to the questionnaire was 89.28% in the category very practical. The result of the practicality test based on the students’ response to the questionnaire was 90.73 in the very practical category.

Therefore, the development of mathematics teaching materials using Edmodo application with the model tested in the SDC Al-Azhar Bukittinggi for IVC class with a total of 17 students that using Thiagarajan (1974) concept had been successfully implemented in this study. The results of development research were elaborated further related to its validity and practicality. For more details,
it could be described as followed:

1. The teaching material validation test results

   The development of teaching materials was said to be valid if it met certain criteria. This could be meant that a test was said to be valid if the test could measure what was being measured. Then, the scoring could reach 80 for teaching materials and it was categorized as very valid based on the results of the teaching material validation done by the validator. This score could be described for each validity item in which the validator 1 for feasibility aspects scored 18, the validator 2 for aspects of language scored 9, aspects of presentation scored 22, the graphical aspect scored 18, and the validator 3 in aspects technical scored 13. In conclusion, the total number of validators 1, 2 and 3 were 80 with very valid categories.

   Based on the results of the validation data above, it can be concluded that the instructional material developed was in accordance with the demands of the curriculum, the presentation of the material was in accordance with the indicators formulated and the development of the students. In addition, the contents of teaching materials in the use of language used simple and clear sentences. By the result, these teaching materials were easily understood by the students. Then, the developed teaching materials were designed with attractive colors so that the students were motivated to follow the learning well. To conclude, the instructional material developed had been declared to be very valid and can be used in the learning process, especially in the data presentation material.

2. The learning material practicality test results

   The instructional material developed was said to be practical if it can facilitate the teacher in teaching and is easily understood by the students. The practicality means easy to carry out, examine, and equipped with clear instructions to facilitate the teachers and students in the use of teaching materials. To see the practicality of the teaching materials, it was tested for the students and teachers in grade IV C SDS Al-Azhar Bukittinggi. For more details, it can be seen as followed:

   a. The questionnaire analysis result of the teacher’s response and students’ response related to the practical use of teaching materials using Edmodo application in data presentation materials.

   The results of the recapitulation analysis of the teacher’s and students’ response to the questionnaire related to the practicality of teaching materials were 89.28% and 90.73% in the very practical categories. Based on the recapitulation results obtained, it can be concluded that the teaching materials using the Edmodo application in the data presentation material were stated to be very practical to be used by the students in elementary school grade IV. This means that the students were very helpful in understanding the material in the learning process. The following was a graph of the analysis results of the teacher’s and students’ responses to the questionnaire related to the practicality test on data presentation material using the Edmodo application.

![The Teaching Materials Practicality Questionnaire Respond](image)

*Figure 1. The teaching materials practicality questionnaire respond (The teacher’s response was 89,28%, students’ response 90,73 %)*
b. The teaching material effectiveness test result

Based on the result of the pre-test and post-test, there were differences in the learning outcomes before and after using Edmodo application in the teaching materials. The total score of pre-test in the experimental class was 863 in the average score 50.76. While the total score of post-test was 1407 in the average score 82.76. The comparison of these two can be seen in the table.

| Group experiment | Score | Pre-test | Post-test | Pre-test | Post-test | D  | \(D^2\) |
|------------------|-------|----------|-----------|----------|-----------|----|-------|
|                  |       | 863      | 1407      | 50.76    | 82.76     | -544| 19340 |

2= the score range of pre-test and post-test

The data were obtained from the students’ learning outcomes before and after treatment. The hypothesis testing was carried out using the t-test technique with the following formula:

\[
t = \frac{M_D}{SE_{M_D}}
\]

\[
t = \frac{-32}{2.66}
\]

\[
t = -12.03 \text{ with } t_{table} = 2.12.
\]

Thus, it can be seen that at the real level (\(\alpha\)) 0.05, t-count was greater than t-table (0.05) (16) (12.03>) which means that \(H_0\) was rejected and \(H_1\) was accepted. In conclusion, there were significant differences in learning outcomes before and after using the Edmodo application in the teaching material for elementary school students grade IV.

4. Conclusion

Based on the results of data validation by the validator, it can be concluded that the instructional material developed was in accordance with the demands of the curriculum, the presentation of the material was also in accordance with the indicators formulated and the development of the students. In fact, it can be easily understood by the students. Then, the teaching materials are designed with attractive colors to motivate the students to follow the learning well. Thus, it can be concluded that the instructional material developed has been declared very valid and can be used in the learning process, especially in mathematics learning on data presentation material for elementary school students grade IV. Based on the results of the recapitulation data, it can be concluded that the instructional materials using the Edmodo application are stated to be very practical to be used by the students in elementary school grade IV. This means that the students are very helpful in understanding the material in the mathematics learning process.

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