Effect of Edmodo to improve number sense

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Abstract. The aim of this research for knowing the improvement of student's number sense by using Edmodo. This type of research used the experimental method with the pretest-posttest control group design the group. This study uses the quasi-experiment method with a tutorial model conducted on class VII students one of junior high school in Bandung City. The instrument used in this research in a test. The test is used to know the improvement student’s number sense. Data analysis technique of quantitative used N-gain and independent t-test. Based on the results of the research show that there is no difference of number sense improvement from students who get Edmodo and conventional learning and the improvement both are included in the low number sense improvement. According to the results of the research can be concluded that the use of Edmodo not appropriate to improve number sense.

1. Introduction

One of basic science is mathematics, both its applied aspect and its reasoning aspect, has an important role in the development of science and technology [1]. The development of highly advanced technology in the modern era and globalization allows various activities to be carried out quickly and efficiently [2]. In education, there are many formal, informal and non-formal education that can use information technology to access all knowledge [3]. E-learning has great opportunities in the education world to make students' understanding better [4] and make able to create an active, creative and not boring [5]. One of e-learning is Edmodo.

Edmodo as a potential tool [6] is an application that can be used on both mobile devices and in the web environment to create an online community of practice, a free [7,8], and secure platform [9] that can be used to help students, teachers, parents, schools and the environment in learning designed by Jeff O’Hara and Nick Borg in 2008. According to The American Association of School Librarians in 2011, Edmodo was included in 25 best learning platforms [10] and also listed in 'Top 200 Tools for Education 2018' [11]. Students can access various features in Edmodo applications such as quizzes, assignments, polls, grade books, libraries, award badges, and parent code [12]. Edmodo is chosen because it is less known and less used even though it provides an easy platform than a popular social network, Facebook [13].

The use of Edmodo application in mathematics learning Edmodo can help the learning process inside and outside the classroom [14] because students can access the Edmodo application at any time [15] and students can learn independently about the material [16]. Math is an important medium for the student with critical, logical, analytic, and creative thinking ability [17], also with cooperation ability to contribute to the various life fields [18]. Mathematical skill in daily life activity considered important, because every single daily activity needs math which is about the number and its calculation. Because of it, need a perfect numeral concept mastery to support continuity of daily activity [19].
Solving mathematical problems in everyday life requires an understanding of the concepts and operations of numbers. Number sense is fundamental [20] and important skills to solve mathematical problems, solving mathematical problems without the ability to recognize numbers and operations will only make students burdened and dislike mathematics, this statement in tune with number sense also to handle numerical problems or daily-life situations which include the number [21]. Adequate processing of numbers is logically a basic skill to be able to manipulate numerical information in mathematical tasks. Therefore, it is necessary to develop number sense [22].

According to the results of an interview at one of the junior high schools in Bandung, students have difficulty in learning mathematics because they are not fluent in understanding the basis of mathematics, one of which is the ability to recognize and understand the characteristics and operations of numbers. This fact is reinforced by the results of research that states the number sense of students is still classified as very low [23].

Based on the description above, the purpose of this study is to know the improvement of number sense when using Edmodo for junior high school.

2. Experimental methods
The research design used in this study is quasi-experiment. The sampling technique used is purposive sampling technique. The types of data used are quantitative data. Quantitative data is obtained from pre-test as well as post-test results. This study is conducted in SMP Negeri 2 Cileunyi with the population of all students of 2019/2020 class 7 consisting of ten classes. As for the sample, it takes two classes, namely class 7E as experiment class which uses Edmodo and class 7G as control class which uses conventional learning. The number of students in class 7E is 37 students and 7G is also 41 students. This research compares the improvement of number sense with n-gain analysis and independent t-test from class which using Edmodo dan class which using conventional learning. The acquisition of the average value of N-gain that has been obtained is then interpreted based on table 1.

Table 1. Interpretation of N-gain (g).

| N-Gain (g) | Interpretation |
|------------|----------------|
| g > 0.7    | High           |
| 0.3 < g ≤ 0.7 | Middle         |
| g ≤ 0.7    | Low            |

3. Results and discussion
3.1. Result
Data analysis uses student pretest dan posttest data about number sense. Table 2 shows pretest and posttest data from Edmodo class and conventional learning class.

Table 2. Descriptive statistic of pretest and posttest.

| Class               | Test  | Min | Max | Mean  | SD  |
|---------------------|-------|-----|-----|-------|-----|
| Edmodo              | Pretest| 4   | 36  | 18.22 | 6.47|
|                     | Postest| 11  | 43  | 25.08 | 8.62|
| Conventional learning| Pretest| 3   | 34  | 14.76 | 6.25|
|                     | Postest| 4   | 52  | 19.35 | 11.83|

Table 2 shows information in the class that uses Edmodo is the average pretest score of 18.22 with a minimum score of 4 and a maximum of 36, while the average posttest score is 25.08 with a minimum score of 11 and maximum 43. If compared, the posttest average score 25.08 is higher than the average pretest score 18.22 with a difference of 6.46. While the information on conventional classes such as the average pretest score of 14.76 with a minimum score of 3 and a maximum of 34, while the average
The posttest score of 19.35 with a minimum score of 4 and a maximum of 52. When compared, the average posttest score 19.35 higher than the average pretest score 14.76 with a difference of 4.59.

**Table 3.** Descriptive statistic of N-gain.

| Class               | Min | Max | Mean | Interpretation | SD  |
|---------------------|-----|-----|------|----------------|-----|
| Edmodo              | -0.09 | 0.34 | 0.11 | Low            | 0.10|
| Conventional learning | -0.10 | 0.55 | 0.06 | Low            | 0.14|

Table 3 gives the fact that students from the Edmodo class have the highest increase in number sense 0.34. In conventional learning, students have the highest number sense increase of 0.55. Both classes with an average improvement include an improvement in low number sense.

**Table 4.** Result of Independent t-test.

| Class               | T    | df  | Sig. (2-tailed) |
|---------------------|------|-----|-----------------|
| Edmodo              | 1.163| 76  | 0.248           |
| Conventional learning | 1.143| 63.843 | 0.257          |

Table 4 shows that there is no different of number sense improvement from students who get Edmodo and conventional learning because the significance coefficient from Edmodo class or conventional learning class is more than 0.05.

### 3.2. Discussion

The increase of students’ number sense with the use of Edmodo is higher than the students with the conventional learning model with the difference 0.05. This happens because students with the use of Edmodo have high enthusiasm toward new things, likewise, the use of media can give a better mathematical understanding [7].

However, by looking at the n-gain category, the increase of number sense in the class which uses the Edmodo classroom and the class which uses the conventional learning models are included in the low category. The result of the t-test independent shows that there is no difference in the improvement of students’ number sense in the Edmodo class and the conventional learning. It is because not all of the students are enthusiastic about the learning process due to the internet limited access and the Edmodo itself as well. Therefore, it is better if Edmodo can be used offline [7]. Students have mathematical views as subjects that are very difficult to understand because mathematical characteristics that are considered abstract, full of symbols and formula [24]. Also, students are not familiar with the high order thinking skill exercises or non-routine question. Non-routine question is a question in which the solution procedure has not been known yet by students, therefore they have the interest to solve it [25]. The students are still transfixed with procedural counting which is taught in school that becomes the reason they don't have a better number sense. In other words, they don't have a better sensitivity to word processing challenging information in the exercise to be done with the properties of numbers, numbers operations, and its characteristics [23]. If the students have a very good understanding of numbers, operations, and their relationships, it’s mean that they have good number sense [26].

### 4. Conclusion

Based on the results of research show that there is no difference of number sense improvement from students who gets Edmodo and conventional learning. The improvement of number sense in Edmodo classroom (0.11) or conventional learning class (0.06), both are included in the low number sense improvement. The low number sense improvement happens because there is internet problem when using Edmodo, so no all students can use Edmodo to learn, it’s mean that the use of Edmodo not appropriate to improve number sense. In order, students don't have a better sensitivity toward processing challenging information in the exercise to be done with the properties of numbers, numbers operations,
and the relationship between number operations. It can be understood that, students' number sense does not become the priority in mathematic learning.

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