
Analysis of Elementary School Students Activity in Math Instruction Based on Kurtacil and Beemmath Gamification

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ABSTRACT

This research is motivated by the importance of multiplication operation ability for elementary school students. This research intend to analyze the activity of elementary school students in math instruction based on kurtacil andbeemmath gamification. The research method used is mixed method research and the sample of this research is the 3rdgraders of elementary school students in Purwakarta Regency. The results of this study indicate that there is anexcellent improvement in student learning activity, responses and student perceptions of mathematical instructionbased on kurtacil and Beemmath gamification. The students y feel happy learning math with the game.

Keywords: multiplication arithmetic, gamification, activity

Introduction

Through math education, everyone could masteries the 21stcentury skills, such as critical thinking, creative thinking, problem solving and communication skills (Studies & Languages, n.d.). Therefore, many efforts have been made related to the development and innovation in Mathematics Education in Indonesia as well as in other countries. There is a strong awareness to renew mathematics education so that students achieve the expected mathematical competence. The goal is to make the learning of mathematics more meaningful for the students and to provide adequate competency for both advanced study and entering the workplace.

Student assumptions that mathematics lessons is difficult have become a common to

compared with other lessons. In fact, mathematics it self can not be blamed entirely, because there are many other things that make the process of mathematical education less than the maximum, so that math is considered difficult by students. Some of those include lack of exercise questions as well as maximizing the use of various methods, media and other things.

Based on observations at some primary schools in Purwakarta, the learning process in today, still dominated by the teachers and giving less access for students to independently develop their thinking process through construction theory and discovery. The process of mathematics instruction in the classroom is commonly at the following order: (1) theories/definitions /theorems

information by the teacher, (2) given and discuss examples, then (3) given practice and questions. As a result, today mathematics education quality of in Indonesia is still not good enough and affects students' mastery of mathematical abilities.

The interviews results to a few teachers in some primary schools in Purwakarta, indicate that the difficulties faced by students in learning mathematics is their difficulty in studying the arithmetic operations, especially multiplication. In fact, multiplication is a very important concept to learn other mathematical concepts

The basic problem above, should be sought alternative solutions. One alternative solution is to apply the game of mathematics. This is in line with the age of development of student elementary school whom are in the concrete operational stage, and very fond of the game. The game will make students relax, and feel happy, did not feel forced and afraid, even though they are in the middle of the math education. In the previous year's research, a funtastic game has been developed that emphasizes fun and extraordinary elements in acquiring mathematical education information, namely Bee Math and Kurtacil games. The study has successfully described the role of Beemmath and Kurtacil as a context to help elementary school students understand the concept of multiplication operations, as well as the learning process of students that evolves from play activities to meaningful and fun formal activities.

Beemmath game is a game that is adopted from one of the quizzes often seen on television. Beemmath so called because it uses a honeycomb pattern as a math game media to determine the game map and determine the winner. Bee Math games will attempt to improve ability of the primary school students because the questions will be

about multiplication that can be implemented in high or low grade.

The game is relatively easy to implement and requires simple tools. The game can be done with 2 people plus 1 person as a judge. some tools needed are:1. Two dice of six, eight or ten and a combination for low grade. For high grade the dice can be increased to twenty.2. A honeycomb game map to be played by 2 people; 3. Different color markers 2 pieces. (Widodo & Rahayu, 2016)

Like Beemmath games, Kurtacil's game is also aimed of students' abilities in elementary school. But this game is not only multiplication operations practice, but also with addition and subtraction operations. The word kurtacil is taken from the word Subtract from the Smallest Addition. This game is only played by two people without the help of the judges. The results of the game can be directly submitted to the teacher. Some tools and materials to carry out this game are as follows: 1. Two dice of six, eight or ten and a combination for the low grade. For high grade the dice can be increased to twenty; 2. Kurtacil game card and a pencil. (Widodo & Rahayu, 2016)

The results that have been and will be obtained in previous studies with research to be performed are described in Figure 1. This study, will describe the result of large scale testing of implementation Beemmath and Kurtacil in some Purwakarta Primary School.

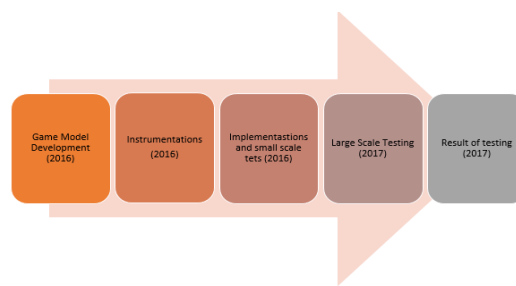


Figure 1. Obtained Results and the Advanced Research Plan Diagram

Methodology

This research use mixed method research design, a research method that combines quantitative and qualitative data (Creswell and Plano, 2011). This research obtained quantitative data of student learning outcomes on multiplication numbers of grade 3 elementary school students. The students were give an initial test, multiplication preliminary test and a multiplication post test.

Qualitative data in this research is the data of student learning activities during the application of kurtacil and Beemmath gamification model on multiplication learning in grade 3 of elementary school. After that, based on student learning outcomes, some students will be randomly selected and interviewed to get data about students 'responses and students' perceptions. Interviews with teachers will also be conducted to obtain data about teachers' perceptions of learning that have been done by applying the kurtacil and beemmath gamification models.

This study uses quasi experimental design. The subjects are grade 3 of elementary school in Purwakarta which apply kurtacil and beemmath gamification model and called as experiment class. To see the difference of student achievement, this study used several grade 3 primary schools that have the same characteristics and initial abilities with the experimental class and apply conventional learning in multiplication arithmetic as the control class.

The design of this study uses pretest and postes group control design, that involve two groups of subjects. One subject group will be treated by applying the kurtacil and beemmath gamification model while the other subjects will use conventional learning (Suter, 2016). From this design the effect of a treatment on the dependent variable will be tested by

comparing the state of the dependent variable in the experimental group after the treatment with the control group that did not have the treatment.

The population in this research is the 3rd graders of elementary school in Purwakarta. While the sample will be selected by purposive sampling technique, by selecting sample in some primary schools in Purwakarta)

Result and Discussion

After drawing up the lesson plan, and the required instrument that is the observation guideline, this research is carried out in 3 lessons. This section will only explain student activity in learning that has been designed in experiment class only. In the 1st lesson, applied the kurtacil gamification to the subject matter multiplication 1 to 6. In the second lesson, the subject matter is multiplication 1 to 7 with beemmath gamification. In the third lesson the subject matter is multiplication 1 to 10 by doing kurtacil and beemmath gamification.

Observations technique were conducted to obtain student activity data consisting of several descriptors during the learning process. This observation is made using the observation guidelines that have been prepared. In this study the observations were done on two objects, namely student observation and teacher observation. Observations were made to find out the activities during the learning process by using beemmath and kurtacil games.

The student activity observed in this research, conducted by teacher of researcher and observer. the indicators used to observe students are as follows: 1. Students show a high learning motivation; 2. Students are disciplined in learning; 3. Students pay attention to teacher's explanation; 4. There

was communication between students and other students during the discussion; 5. There is communication between teacher and student through student inquiring; 6. There is communication between the teacher and the student where the student responds actively to

the teacher questions; 7. Students play the game enthusiastically; 8. Students conclude learning materials and take on the evaluation.

Students activity after applying kurtacil and beemmath gamification learning in 3 lessons is shown in table 1.

Table 1 Students Activity Progress in 3 Lessons using “Funtastic Beem Math dan Kurtacil”

Indctr No.	A Class			B Class			C Class		
	L 1	L2	L3	L 1	L2	L3	L 1	L2	L3
1	3	4	4	4	4	4	4	4	4
2	3	3	3	3	4	4	3	4	3
3	3	3	3	4	4	4	3	3	3
4	4	3	4	4	4	4	3	4	4
5	3	3	3	4	4	4	4	3	4
6	3	3	4	4	4	4	4	3	4
7	4	4	4	4	4	4	3	4	4
8	3	3	4	4	4	4	3	3	3

Score 3 indicates that the quality of the indicator is good, while score 4 indicates that the indicator is commonly happened or very good.

Based on the above data, student activity in all classes is "very good" category. This shows that student engagement in mathematics education with “funtastic beem math and kurtacil” games is very good. in class A, the student activity on lesson 1 and 2 remains, but increased by 0.375 points on lesson 3. The activity score improvement also occurred in class B, and achieved the highest score in the second lesson with score 4 and the increase of 0.125 points. Student engagement in class B, can be maintained in the third lesson. In class C, the student activity improvement occurs continuously, and ends with a fairly convincing score. This improvemnet indicates that student engagement increases with the repetition of learning Math withbeemmath and kurtacil gamification.

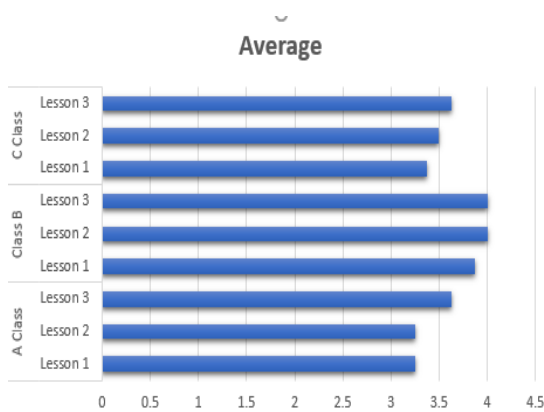


Figure 2. Average student activity score on learning by using game “funtastic beemmath and kurtacil”

Overall, students activities in mathematics education by applying beemmath and kurtacil

gamification indicate that there is an improvement of average score, that shown in figure 3.

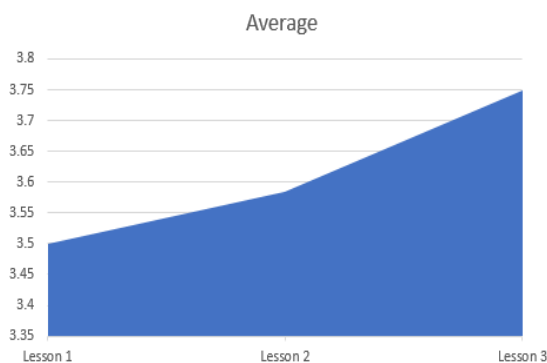


Figure 3.

The average improvement of student activity in math education using beemmath and kurtacil gamification

The student activity and engagement from lesson 1 to lesson 2, show an average improvement with the score of 0.08, and 0.17 from lesson 2 to the 3rd lesson. Things that need to be highlight is that the average score of activity and student involvement has been very high since lesson 1. This is caused by the very high student response to the learning of mathematics with the beemmath and kurtacil gamification.

Conclusion

Based on the findings above, student activity continues to increase during the implementation of mathematics education with the gamification. The games applied in this study are beemmath and kurtacil that attempt to improve the multiplication ability of students of elementary school.

Therefore the recommendation is addressed to educators in primary schools to implement fun

learning and appropriate to the age of elementary school students, which can do with the game. Through the game students will not feel depressed, bored and engage more actively in learning.

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