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Improving Skills in Rounding off the Whole Number

[1]Mohd Saifullah Rusiman, [1]Suliadi Firdaus Sufahani, [1]Rozaini Roslan, [1]Kamil Khalid,
[1]Maria Elena Nor, [2]Ku Gee Huei, [2]Lim Soo Peng, [2]Nun Shwu Mean and [2]Soh Cher Wei
[1]Faculty of Science, Technology and Human Development,
[2]Faculty of Technical and Vocational Education, Universiti Tun Hussein Onn Malaysia,
Batu Pahat Johor, 86400 Parit Raja, Malaysia

Abstract: This study was conducted to address teaching and learning skills in rounding off a whole number. This study consisted of 15 years 4 students from the Kong Nan Chinese Primary School, Parit Raja, Johor, Malaysia. Initial survey to identify this problem was carried out by analyzing the exercise books and exercises in pre-test. Based on these analyses, a large number of students were not proficient in relevant skills. A 'q' technique was introduced as an approach in teaching and learning to help students master the skills of rounding whole numbers. In summary, this technique helps students to remember the sequence of processes and process in rounding numbers. A total of four sessions of teaching and learning activities that take less than an hour have been implemented specifically to help students to master this technique. Results of the implementation of these activities have shown very positive results among the students. Two post tests were carried out to see the effectiveness of techniques and the results shows that 100% of students were able to answer correctly at least three questions correctly. The t-test analysis was clearly showed the effectiveness of 'q' technique. This technique also indirectly helps to maintain and increase student interest in learning Mathematics. This is shown with the active involvement of students in answering questions given by the teacher.

Key words: Rounding off, 'q' technique, t-test, survey, post, Mathematics

INTRODUCTION

In the process of teaching and learning, the educational contents for 4-6 years are the same but it requires a different approach as the educational level of understanding is different. In order to ensure that the students are good in Mathematics, they must master the basic topic of the whole number. One of the skills that cannot be dominated by students is rounding off the numbers. Most of the students can identify the 'place value' but when it comes to the numbers that they want to round off they will rounded off the wrong number. This is because the students always confuse whether the number should be added one or not. There are also problems in identifying student's placing value and rounding off the basic concept itself. Examples of offenses committed by students are as follows: "78356 round off to nearest hundred". Answer: 78,000 (Answer should be 78,400).

This situation is very critical and what will happen to these students if the problem cannot be resolved immediately. They will face difficulty when they moved to 5 years where the level of learning will be enhanced compared to 4 years. The basic topic of the whole number should be mastered in order to secure good results in Mathematics because this topic is a compulsory question in the examination.

Since the problems faced by certain students in whole number's topic, a proactive approach should be implemented. More systematic approach and method should help students to carry out operations within the rounding of numbers. This can be practiced and used for examination purposes and to benefit their own students as they move into the realm of high school.

Innovation in the classroom is about empowering teachers to develop intelligent, creative and effective teaching methods that will challenge and engage learners. It considers technological impact, environmental factors and thoughts about behavior management (Hewitt and Tarrant, 2015). Currently, many institutions are moving towards problem-based learning as a solution to produce an intelligent graduate. Since, the traditional approaches do not encourage students to question what they have learnt problem-based learning is seen as an innovative measure to encourage students how to learn via real-life problems (Bond and Faletti, 1999).

Corresponding Author: Mohd Saifullah Rusiman, Faculty of Science, Technology and Human Development, University Tun Hussein Onn Malaysia, Batu Pahat Johor, 86400 Parit Raja, Malaysia

There are many techniques can be applied in teaching and learning in a classroom (George, 2001). There are other researchers in Malaysia who did a study in Mathematics education field, especially in problem-based learning, included an application in Mathematics through games and simulations (Rusiman *et al*., 2016).

This research is focused on finding appropriate methods and techniques to be introduced and practiced by students in 4 years at the Kong Nan Chinese Primary School, so that they can solve the question of rounding off a whole number in a systematic way and easy to remember. The usual method of the rounding of numbers is to rounded up and see the numbers whether should add 1 or not. The study involved 15 students of 4 years with 7 girls and 8 boys.

There are four objectives in this study; to improve students skills in answering questions in rounding whole numbers, to assist students in resolving the question in a systematic rounding whole numbers to increase the number of students can answer all questions correctly by using the 'q' techniques and to assist teachers with teaching methods in rounding a whole number for weak students.

MATERIALS AND METHODS

The early review: Preliminary study was carried out to identify target groups for the purpose of implementing this research. It is to look at the effectiveness and reliability of the actions undertaken by teachers for students to solve the learning problems successfully. In carrying out this study, the exercise book needs to be observed to see the exercises that being provided by the teacher before. This is to analyse the problems faced by students in the early stage.

Pre-test: Pre-test was performed on all students in this class. The test consists of four questions involving rounding whole numbers. The findings will be stored as control data to compare and study the effectiveness of implemented actions.

Action taken: Four activities have been arranged for the class in order to help the student mastering in rounding off numbers and stated as follows:

- Activity 1: where is my place
- Activity 2: poor, rich and donate
- Activity 3: 'q' techniques
- Activity 4: Q with them

Activity 1 "where is my place": Time: 10 min. In this activity, teachers review the 'place value' for the whole number and introduce the abbreviation for each 'place value' as follows:

Ones = O, Tens = T, Hundreds = H,
Thousand =Th, Ten Thousands = TTh

TTh	Th	H	T	O

In order to strengthen the students' understanding, a game was implemented in the classroom. Students are divided into 3 groups of 5 students. Each team member is given the name as 'place value'. Then, the teacher will write a set of a whole number and rounding of any one of the number. Members of the group whose name is representing the 'place value' for the circled number should rise quickly, ran to the white board and put the index finger in a circle drawn by the teacher. Marks awarded according to the speed of the group members.

Activity 2 "poor, rich dan donate": Time: 20 min. In this activity, students will be explained with the concept of determining whether or not to add 1 to the number based on the number to be rounded off (to the right 'place value').

Concept of poor number: Consist of numbers 0, 1, 2, 3 and 4. Teacher tells the students that all the poor numbers are poor and cannot afford to give alms to another number. However, you can still donate a smile that does not require money.

Concept of rich number: Consist of numbers 5, 6, 7, 8 and 9. Teacher tells the students that the rich numbers must give alms to others so the rich numbers have a charity number 1 in number.

Concept of charity: Charity is a noble practice but preferably the charity is not displaying honesty. Therefore, all numbers converted back to 0 so that no one knows who donate the money.

After explaining all the concepts, teacher has to implement the game with the skill poor, rich and donate 1 @ 0. Now, the teacher has to prepare the notes or scripts start from number 0-9 (10 notes all together) and 5 notes with the word 'receiver'. The game's rule is that each student has to draw a card. After that, teacher will give 15 sec for students to look for the second pair of number. Rich has to look for receiver or poor number to build up a pair. Anyway, the poor numbers are allowed to

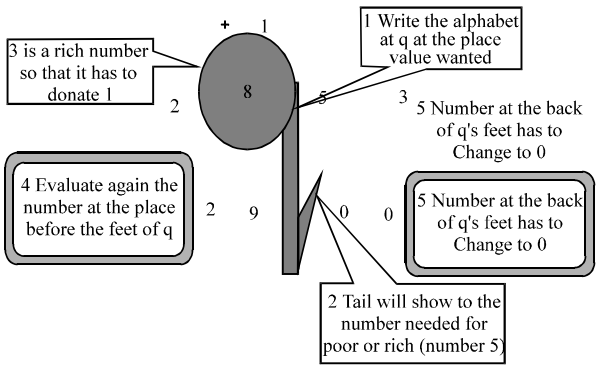

Fig. 1: 'q' technique model for rounding

look for the poor number to build up a pair but not allowed to build up a pair with the receiver. During the game, students are not allowed to make any voice but only can show their note to other friends. In every round of the game if a student could not find their pair, then he or she will be fined to read the multiplication table.

Activity 3; "q techniques": Time: 15 min. In this activity, students will be exposed to 'q' techniques to determine the 'place value' and the number which needs to be evaluated and rounded off. Figure 1 shows the model example and solution using 'q' techniques.

Steps of using 'q' technique:

- Determine the 'place value' of the number which is going to be rounded off and write the alphabet 'q'. The number mentioned is at the head of 'q'
- Referring to the 'q' above, look at the number shown at the tail of 'q' (the number at the right)
- Determine whether the number is rich or poor. Write +1 above the 'place value' if the number is rich or +0 if the number is poor
- Evaluate again the number at the position before the feet of 'q' and replace with 0 for all the numbers after the feed of 'q'

Activity 4; "Q with them": Place: 20 min. This activity is to study the receptions and memories of students for the above technique after learning it for 2 weeks. Students are recommended with the slogan of 'Q with them!!!' in order to help them memorizing what they have to do if they need to solve the problem involving rounding off. At the same time during the activity, second post-test was also implemented to determine the mastering level of students. The reason of implementing the test is due to some of the student is still very unsure with the technique taught by teacher.

t-test: Zimmerman (1997) stated that in order to test the equality of population mean between 2 population groups, the below hypothesis of t-test is used:

$$H_0: \mu_1 = \mu_2$$
$$H_1: \mu_1 \# \mu_2$$

Based on the value of Pr. or Sig. value, if this value is bigger than 0.05, then it is fail to reject H_0 which indicates that the population mean for population 1 and 2 is the same. Otherwise, the population mean for population 1 and 2 is different.

RESULTS AND DISCUSSION

Analysis of data

Analysis of observations: Based on the observation of the student's exercise book, it clearly shown that some of the students having problems in answering questions which involves with rounding the whole numbers. Observations were performed on five questions that have been given to the students to answer. Table 1 shows the result based on the student's answers.

Based on the observations that have been carried out there are only 47% of students who gets all the answer correct. The analysis found that many students still did not know how to determine the 'place value' that is needed to be rounded.

Pre-test analysis: Rounding off the numbers of four multiple levels were given to students in this pre-test. The questions are in hand writing and must be copied by the student in order to see whether there is a problem in copying or writing occurs. This test is also done after two weeks of learning period on this particular topic to see if they are able to recall or major these skills. Table 2 is a summary of findings from the test that has been carried out.

Based on Table 2, it shows that all the students failed to score more than half. In addition, students in this class cannot remember what was taught for the past two weeks. Percentage of students who fail to answer also increased to 53% compared to the previous study which is only 13%. This is clearly shows that the method is not suitable for this group because they cannot remember through the application of this method.

Reflection of activity

Activity 1: During this activity, especially before the games start, student looks so hard to see the number than being circled by the teacher. Some students cannot wait to run to the front and pint-point the answer to the

Table 1: Result on the student's answers

No. of questions answered correctly	No. of students
5/5	7
4/5	2
3/5	3
2/5	1
1/5	0
0/5	2

Table 2: Pre-test results

No. of questions answered correctly	No. of students
4/4	-
3/4	-
2/4	2
1/4	5
0/4	8

teacher. This situation creates positive development because indirectly stimulate the acceptance of the learning concept.

Activity 2: During the game, students are so excited because the activity before has proven that it is really effective for them to memorize 'place value' for rounding numbers. By the time teacher explaining the concept of using story telling method, students looked so concentrated and attracted to the story that been told by teacher. During the game time, students were so cooperative and keen to achieve the objective of the game. They can interact with each other effectively and helping each other to understand the concept taught by the teacher.

Activity 3: At the beginning, students are so relax because some of them thinking that this method is easier to understand. First, they only have to determine the 'place value' and automatically they will know which number they have to look for. This will allow them to evaluate the tail of 'q'. Students look so eager to give their answers right after the teacher gave a question. It is very different with the earlier situation which no one willing to answer the teacher's question due to the lack of confident and poor understanding. After implementing the first post-test, students can answer faster than before. The effort of varying the teaching methods to the students is successful. The teaching method is proven effective to inspire students in the class since the students became more interested and excited for what they going to learn. The students are willing to learn more without any pressure from the teacher. The topic which is very difficult to teach at the beginning is now becoming very easy with the implementation of this method.

Table 3: Result for pre-test, first post-test and second post test

	No. of students		
No of questions answered correctly	Pre test	1st post test	2nd post test
4/4	0	7	12
3/4	0	4	3
2/4	2	3	-
1/4	5	-	-
0/4	8	1	-
Total	15	15	15

Table 4: t-test for the pre-test and second post-test

Parameters	Pre-test	Post-test
Mean	15	96
Variance	18.42	8.28
Observations	15	15
Pearson correlation	0.6667	-
df	14	-
t-stat	25.3813	-
Pr(T< = t) two-tail	0.0	-

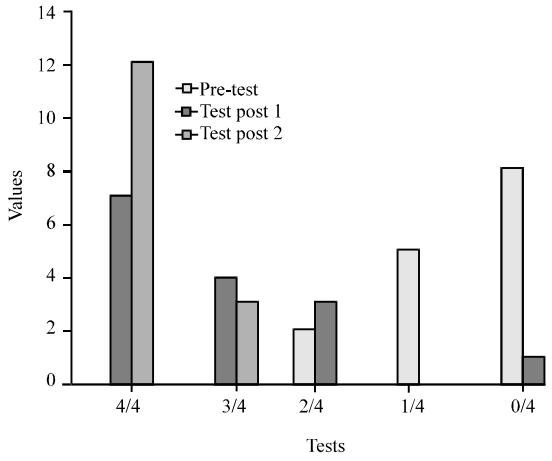

Fig. 2: Graph for achievement test scores for pre-test, first post test and second post test

Activity 4: In this activity, when the teacher gave 4 questions for the students to round off and asked them what are they supposed to do they shouted the slogan 'Q with them'. It means that they still remember what to do. The student's reaction filled with confidence to solve the given problem. Table 3 and Fig. 2 are the results of the analysis of pre test, first post test and second post test.

Based on Table 4, since the value of Pr (T< = t) is <0.05, then we reject H_0 which indicates that the population mean for population 1 and 2 is significantly different. In other word, the mean for 15 student's marks before the 'q' technique was conducted is 15 while the mean for 15 student's marks after the 'q' technique was conducted is 96. This clearly showed that the 'q' technique is really effective.

CONCLUSION

Based on Table 3, it can be seen that the post test's scores are much improved compared to the Pre-test. In fact, the result for the seconds post test was better than first post test. It was found that in the first post test, 73% of students were able to answer at least three out of 4 questions correctly while on the second post test, 100% of students managed to answer at least three out of four questions correctly. Results from the Second Post Test indicated that the quality of student's work from the previous test has improved and increased compared to first post test. The t-test analysis was clearly showed the effectiveness of 'q' technique. There was a change in the attitude of learning. Previously, the students will give up when they were not able to answer the questions correctly due to unconfident with their answers. After they have been introduced with the 'q' technique, the students appeared to be more confident and eager to solve mathematical problems that given by the teacher. As a conclusion, the 'q' technique is very effective and creates a positive impact in rounding off numbers as indicated in the analysis of tables and graphs. Furthermore, this would be easy for the teacher to teach the next topic which is the rounding of decimal numbers.

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