

Friends of 10 Method Improves Pupils' Skills in Subtraction with Regrouping

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ABSTRACT

The purpose of this study was to improve the subtraction skills of pupils with intellectual disabilities (Special Education) in subtraction with regrouping using the friends of 10 method. This study involves 6 primary school pupils at Integrated Special Education Program (Learning Disabilities) in a school in the Machang district. The research instrument uses pre and post-tests to compare whether pupils' subtraction skills improved after the intervention was conducted. The study findings indicate a significant improvement, the use of friend of 10 method has improved pupils' skills in subtraction with regrouping. Therefore, it is important to diversify the techniques and subtraction methods taught to students if they are found to have difficulty grasping the methods already learned in order to enhance pupils' skills and interest in mathematics.

Keywords: subtraction with regrouping, friends of 10, special education needs, learning disabilities, mathematics

Introduction of Best Practices

Addition and subtraction are the most important basic mathematics operations in real life situation. Addition and subtraction operations are fundamental mathematical operations that are important for all pupils including special education students. Primary school children and also children with special education needs (SEN) often face difficulties when it comes to subtraction operations, especially those involving subtraction with regrouping (Erzuah et al., 2018; Masidar et al., 2016). The KSSR Special Education (Learning Disabilities) Mathematics curriculum aims to prepare special education pupils with mathematical knowledge and skills through a flexible teaching and learning process. In order to meet individual needs, teaching and learning in the Integrated Special Education Program for Learning Disabilities are designed flexibly in accordance with the Education Regulations (Special Education) 2013, 8.(1)(c), which states that a teacher may make modifications to teaching and learning methods or techniques, allocated time for each activity, the sequence of activities, and teaching aids.

Therefore, various methods, such as using counting tools and drills, are used to improve pupils' subtraction skills involving regrouping (Torbeyns et al., 2018), but pupils often get incorrect answers. Manipulatives offer pupils with learning disabilities access and support in classrooms, but concrete manipulatives are not the only option (Bouck et al., 2020). This is because pupils frequently make mistakes when performing calculations and according to Mamat and Abdul Wahab (2022), it

happened because pupils did not master the basic concepts, for example, errors when borrowing and subtracting numbers greater than 10.

Several past research findings have shown that the basic addition method of 10 or the group of 10 method has been found to be effective in improving the subtraction skills of primary school pupils in Year 3 and Year 1. There were evidences when the students' achievements improved after the intervention was conducted for four weeks (Nazatul & Maat, 2017; Zainal et al., 2020). Moreover, subtraction by addition strategy or indirect addition was identified as a highly successful strategy for special education students (Peltenburg et al., 2012; Torbeyns et al., 2018) who consist of various levels of ability and requirements.

Justification of Best Practices Implementation

During the teaching and learning activity of subtraction within the range of 1000, some of the pupils were found to be experiencing difficulties when subtracting two numbers, especially when involving subtraction with regrouping process. Six pupils in Class 4 and Class 5 experiences problem when solving subtraction with regrouping. They often unsuccessful to get the correct answer unless with guidance. So, I tried the method of subtracting two numbers using the friend of 10.

I taught my pupils how to subtract two numbers in a different way. I tried to change the method to subtract two numbers with regrouping using friends of 10. I was amazed that the pupils were able to solve the subtraction successfully. Clearly, the pupils did not understand how to subtract the subtrahend digit from the minuend digit when involving larger number than 10. Pupils cannot differentiate between subtraction without regrouping and subtraction with regrouping. Other problems identified were that pupils cannot master the skill of subtraction by borrowing values when doing subtraction with regrouping.

Objectives of Implementation

The objectives of best practice implementation are:

1. To improve pupils' subtraction skills in subtraction with regrouping.
2. Pupils can understand the concept of subtraction with regrouping and convert it into addition calculations after identifying number pairs (friends of 10).

Best Practices Implemented

At first, pupils were teaching to subtract subtrahend digit from minuend digit in ones place value, if the subtrahend digit is larger than minuend digit, pupils need to borrow ten from minuend digit in tens place value, and after that write the friend of 10 for the subtrahend digit in one place value. After that, they need to add the two numbers at ones place value and subtract two numbers at tens place value as usual if the minuend digit is larger than the subtrahend digit, or repeat the steps before if the

subtrahend digit also larger than the minuend digit. The details for the steps for this method are shown below:

Step 1: Identify large and small numbers

Firstly, pupils need to identify large and small numbers, whether the minuend digit is larger or smaller than the subtrahend digit. If the subtrahend digit is larger than the minuend digit, then it is subtraction with regrouping. Pupils must subtract 1 from the minuend in tens place value (there is now one less ten) before going to Step 2.

Example:

$$\begin{array}{r} 5 \\ 165 \\ - 37 \\ \hline \end{array} \quad 7 \text{ is larger than } 5$$

Step 2: Identify number pairs (Friends of 10)

Then, pupils write the number pair for the subtrahend digit (this is actually the ten, we just borrowed and subtracted the subtrahend digit in ones and got the difference).

For this step, to make it easier to think, pupils should know the number pairs to make it ten, we called it friend of 10 such as below:

Friends of 10

- 1 ↔ 9
- 2 ↔ 8
- 3 ↔ 7
- 4 ↔ 6
- 5 ↔ 5

Example:

$$\begin{array}{r} 5 \\ 165 \\ - 37 \\ \hline \end{array} \quad 3 \text{ write the number pair } (7 + 3 = 10)$$

Step 3: Change to addition

Pupils add the minuend digit and the number pair written.

Example:

$$\begin{array}{r} 5 \\ 165 \\ - 37 \\ \hline 8 \end{array} \quad \text{add the two numbers } (5 + 3 = 8)$$

Step 4: Solve the question

Pupils solve the question by subtracting two numbers at tens place value as usual after identifying that the minuend digit is larger than the subtrahend digit and can subtract directly.

Example:

$$\begin{array}{r} 5 \\ 165 \\ - 373 \\ \hline 128 \end{array}$$

Note:

The most important thing is that pupils need to master both large and small numbers, as well as addition within the range of 10 and subtraction within the range of 10, and know the number pairs (friend of 10).

Impact of Best Practices Implemented

Improve pupils' subtraction skills in subtraction with regrouping

The data analysis was based on pre-test and post-test which have been given to pupils. Comparison of both tests was conducted to identify whether there was improvement in pupils' skills in solving subtraction with regrouping operations after the friend of 10 method was taught to the pupils.

Table 1
The Difference of Pre-Test and Post-Test Results

Pupils	Gender	Pre-test (%)	Post-test (%)	Remarks
Pupil A	Male	40	100	Increase
Pupil B	Male	20	90	Increase
Pupil C	Male	20	70	Increase
Pupil D	Male	40	100	Increase
Pupil E	Female	30	80	Increase
Pupil F	Female	40	100	Increase

Based on Table 1 above, we can see that the pupils' skills in solving subtraction with regrouping increased. Pupils' skills in subtraction with regrouping improved. Three from six pupils got all correct answers, Pupil B = 90, Pupil C = 70 and Pupil E = 80. However, it was an achievement for them. Pupils' achievement in post-test and independence were better when using this method (Friend of 10 method) compared to the pre-test before.

Understand the concept of subtraction with regrouping

Figure 1
Example of Pre-test

Figure 1 shows three subtraction problems written on a piece of paper. Each problem is written in two columns. The first column is the minuend and the second column is the subtrahend. The results are written below a horizontal line. Red 'X' marks indicate that the results are incorrect.

$\overset{1}{5}$	5
4	7
<hr/>	
1	2
<hr/>	
6	1
2	9
<hr/>	
4	8
<hr/>	
4	2
1	5
<hr/>	
3	3

As we can see in Figure 1, in the pre-test, the pupil simply subtracted the numbers without identifying which number should be subtracted from, which one is minuend and which one is subtrahend, or whether need to regroup the numbers if the minuend digit is smaller than the subtrahend digit. The pupil just subtracts.

Figure 2
Example of Post-test

Figure 2 shows the same three subtraction problems as in Figure 1, but with correct results and annotations. Red checkmarks indicate correct answers. The annotations show the regrouping process: a '1' is written above the tens digit of the minuend, and a '10' is written above the ones digit of the minuend. The subtrahend is crossed out with a red line.

$\overset{1}{5}$	5
4	7
<hr/>	
0	8
<hr/>	
$\overset{5}{6}$	1
2	9
<hr/>	
3	2
<hr/>	
$\overset{3}{4}$	2
1	5
<hr/>	
2	7

Then, after the friends of 10 method was implemented, we can see the pupil was able to subtract the numbers correctly when the pupil was tested again in post-test after 4 weeks (see Figure 2). Pupils were able to distinguish between subtraction without regrouping and subtraction with regrouping. They also can understand the concepts of subtraction with friend of 10 method.

Summary and recommendations

Pupils' subtraction skills with regrouping improved after the use of friends of 10 was implemented. In addition, pupils seem to be so excited in learning mathematics after they had successfully solved the exercise with less faulty. In conclusion, the skills of pupils who face the problem of subtraction with regrouping can be enhanced and improved by using the friend of 10 method. Furthermore, pupils need to have previous knowledge on how to add and subtract two numbers in order to master the subject of Mathematics at a higher level such as multiplication and division.

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