THE EFFECT OF IMMEDIATE FEEDBACK ON MATHEMATICS LEARNING ACHIEVEMENT

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Abstract: Real facts at school show that the ability to solve problems is still considered low. Most students still make many mistakes in solving math problems. These mistakes must be directed to the right path to minimize repeated mistakes. Immediate feedback can be a solution to correct these errors. The purpose of this study was to examine the immediate feedback by the teacher during learning and their relationship to student learning achievement. The participants in this study consisted of 30 students from seventh grade. Data were collected from the final score on the number of subjects. Data were analyzed using descriptive statistics and paired sample t-tests to describe before dan after giving immediate feedback. Paired sample t-test analysis was also used to describe the relationship between immediate feedback on learning achievement. This study revealed a significant difference between immediate feedback and learning achievement. The final mean value shows the pretest average is higher than the posttest average. There is a positive relationship between immediate feedback and mathematics learning achievement. These findings can be used as a teacher's attention in providing feedback immediately during learning.

INTRODUCTION

Providing quality and timely feedback is accepted to correlate with learner engagement and motivation [1]. For learners, lack of timely feedback and teacher contact have been among the frequently reported challenges in addition to technical difficulties faced [2]. Individuals often do not meet their aims because they face obstacles [3].

There were several previous conditions that feedback to students was not a particular concern, as happened at least we have seen, educators give assignments, and then right after students finish working, there is no continuation whatsoever. Then continue through the new material with the same process as if nothing happened before. When students encounter difficulties and cannot understand the content of online resources, they often feel helpless and frustrated [4]. Worse, learners will feel isolated, less involved, and less convinced. Interaction is a key element for online and blended learning, so it is important to understand students' views on interaction [5]. Feedback is an essential interactive step. It can also encourage students' attention in class.

In the context of writing instruction, effective feedback plays a role pedagogical role is essential because, as a means of effective communication between students and teachers, an expected results standard and student responses are established [6]. Evidence of student success in learning mathematics can be seen in students' achievement. A serious problem was faced where most students could not understand what the students had learned. Therefore, help is needed. Teachers rarely provide feedback on formative test assessments or students' homework.

In contrast, feedback given as soon as possible is important in increasing cognitive and mental success. Learning that provides feedback on students'

work is ideal learning [7]. Participants (teachers) in the studies reported that receiving immediate feedback via BIE was beneficial, easy to adapt, and improved their teaching quickly [8]. Feedback brings a person to a level to continue to improve themselves and feel dissatisfied.

Immediate feedback needs to be done to help correct misconceptions immediately so that students will know where the inaccuracy is and immediately correct it so that immediate feedback indirectly reduces the possibility of the same error occurring [9]. According to Roper, feedback can be divided into four levels: 1) Level 1 is feedback in the form of incorrect or correct information. 2) Level 2: feedback on level 1 plus giving correct answers. Level 3: feedback on level 2 plus explanation. Level 4: feedback at level 4 is given additional teaching or concepts to reinforce [10].

The usage of automatic assessment combined with immediate feedback in Ville has helped the treatment group to perform better than the control group [11]. Feedback plays an important role in classroom learning [12]. The benefit of immediate feedback is the learner stops practicing incorrect techniques that become permanent with repetition and instead perform the behavior correctly on the next opportunity. Therefore, using immediate feedback is efficient and effective [8]. The provision of feedback is one component that is easily manipulated and may save teachers time [13]. Feedback is a common practice incorporated in nearly every class that often positively affects learning [14].

Can immediate feedback improve students' mathematics learning outcomes? This study aimed to describe immediate feedback and its impact on student learning achievement.

RESEARCH METHODS

Thus, this study employed the descriptive statistical method and inference research with a quantitative approach. Quantitative research is useful in knowing the effect of immediate feedback in learning on mathematics learning achievement in class. As for the hypotheses in this study are.

Hypothesis Test 1

The individual mastery test uses the t-test, which aims to determine the mastery of individual students in mathematics learning achievement more than BTA, namely 63. The two average mastery test hypotheses are as follows.
H0: 63 (the average of students is less than or equal to 63)
H1: > 63 (the average of students is more than 63)
This calculation uses the t-test. The formula used to calculate the t-test is:
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$$t = \frac{\bar{x} - \mu_0}{\frac{s}{\sqrt{n}}}$$

Hypothesis Test 2

The proportion test is used to test students' mastery classically. Students are said to have BTA test scores of at least 75% of the total number of students in the class. The hypothesis being tested is as follows.
H0: 0.75 (the proportion of learning assisted by immediate feedback has not exceeded 75% classical completeness)
H1: > 0.75 (the proportion of learning assisted by immediate feedback exceeds 75% classical completeness)
The test uses z statistics with the following formula [15]:

$$z = \frac{\frac{x}{n} - \pi_0}{\sqrt{\frac{\pi_0(1 - \pi_0)}{n}}}$$

This study examines the significance of immediate feedback assessment on mathematics learning achievement in the classroom. The participants in this study were one class consisting of 30 students. All participants attended mathematics lessons on the subject of numbers. The learning process lasts four weeks, effective days, with a final exam. The study took place between July and August. Teacher gives immediate feedback to educators through IFAT (Immediate Feedback Assessment Technique) during the regular instructional time in each classroom.

Data collection techniques used to collect data by researchers include validation of test content and tests in the form of description questions. Written tests are used to determine student achievement data in mathematics. Pretest and posttest were used in this study.

Descriptive statistics and inference were used to analyze the data in this study. A descriptive statistical analysis and paired sample t-test were used to describe the assessments the students and their peers carried out. Pearson correlation analysis was conducted to determine the correlation between feedback and its effect on learning outcomes. The Pearson r value represents the magnitude of the effect, where the significance level is 5%. The test uses SPSS. If the value of sig. Less than 5% means a strong relationship exists between immediate feedback and students' mathematics learning outcomes [16].

RESULTS AND DISCUSSION

A prerequisite test, data normality, was performed before the paired sample t-test. The output of these is shown in Table 1. This test was conducted to determine whether the data came from a normally distributed population. The normality test was performed using SPSS 22.0 with the Kolmogorov-Smirnov test.

Table 1. Test of Normality

	Kolmogorov-Smirnov		
	Statistic	Df	Sig.
Pretest	.143	30	.121
Posttest	.137	30	.158

The output above shows the correlation test results or the relationship between the two data, namely the pretest and posttest variables. Based on the output above, it is known that the correlation coefficient value is 0.535 with a significance value (Sig.) of 0.002. because of the value of Sig. 0.002 > = 0.05, it can be said that there is a relationship between the pretest variable and the posttest variable.

Table 2 Paired Sample Correlations

	N	Correlation	Sig.
Pretest-Posttest	30	.535	.002

Table 1 shows that the pretest and posttest meet the following criteria paired sample t-test normality requirements. The significance value of both exceeds 5%. Furthermore, this section discusses the description of immediate feedback as a result of descriptive statistical analysis and paired sample t-tests, presented in Tables 3 and 4.

Table 3 summarizes the descriptive statistical results of the sample studied, namely the Pretest and Posttest scores. This test was performed using SPSS 22.0. Pretest scores

obtained an average of 56.00 learning outcomes. At the same time, the Post Test value obtained an average of 75.27. because the average value of learning outcomes in the Pretest = 56.00 < posttest = 75.27, then descriptively, there is a difference in the average learning outcomes between the Pretest and Posttest learning outcomes. Furthermore, to prove whether the difference is real (significant), it is necessary to interpret the results of the paired sample t-test contained in the "paired sample test" output table. The decrease in the standard deviation in the posttest indicates that the distribution of assessment scores is not so wide, meaning that the more similar student scores are, the more accurate the mean.

Table 3. Statistical description

	Mean	N	Std. Deviation	Std. Error Mean
Pretest	56.00	30	25.022	4.568
Posttest	75.27	30	15.726	2.871

Table 4 Paired Sample Test

	T	Df	Sig. (2-tailed)
Pretest-Posttest	-4.960	29	.000

The output of Table 4 will answer whether or not there is an effect of immediate feedback in learning on student learning outcomes. Table 3 contains information on the value of Sig (2-tailed) of 0.000, meaning that the value of Sig (2-tailed) > = 0.05. It can be said that there is an average difference between Pre-Test and Post-Test learning outcomes. In other words, there is the effect of immediate feedback in improving students' mathematics learning achievement. In addition, the correlations of paired samples are performed, and the results are shown in Table 4.

The results of hypothesis test 1 with an average of 75.26 with a standard deviation of s = 15.72 and several children 30 students. Using the Microsoft Excel application, it was obtained that t count = 4.266 while t table = 1.699, so that t count > t table then Ho was rejected, and it was concluded that the average of students was more than 63. The proportion test is used to test students' mastery classically. Students are said to have BTA test scores of at least 75% of the total number of students in the class. The class consisted of 30 students with an average of 75.26. Using the z-test calculation using Microsoft excel, it was obtained that z count = 1.897 while z table = 1.65, so that z count > z table, it can be said that 75% of students in the experimental class completed classically.

The purpose of this study was first to see if any changes were caused before and after implementing immediate feedback during classroom learning. The descriptive statistical test showed a positive change in the mean values of the pretest and posttest. These changes can be a positive point as a reference for future learning.

The implementation of learning by applying the provision of immediate feedback provides an evaluation of the results of student work so that students know whether or not their answers are correct and how the answers are correct. The mistakes that students make raise questions in the minds of students. The teacher, as a facilitator, provides immediate feedback verbally on students' questions accompanied by explanations that apply to the public. This Immediate Feedback, when applied to liven up the classroom atmosphere, causes students to become active and curious in solving the problems presented. Another advantage of applying feedback in learning is to increase certain teaching techniques [8]. The participants' opinions stated that their favorite mode of feedback because during which they could discuss and ask questions for further explanations and clarifications [6].

Furthermore, immediate performance feedback could also be used to support and train teachers in other effective instructional practices, such as behavior-specific praise [17]. Teachers need to provide feedback, especially immediate feedback. For example, when students are given work in class if the work is not corrected or not even graded, how do you think the students feel or what do students think? Of course, the student is upset, meaning that there is a possibility that it will affect the emotional psychology of the student. Then there is another possibility for students to wonder whether my work is correct or appropriate? What is the actual solution to the problem at work? Those possibilities need to be eroded slowly with the implementation of immediate feedback. The results of the statistical test table show a positive effect of increasing the average class value from the pretest to the posttest. It can be a consideration for teachers in schools to pay attention to the role of this feedback. A big thing starts from small things first, just as good learning starts with applying small things that are useful first. It can be a positive input for learning, especially in Indonesia in the future.

The results of previous research revealed that: when the learners were asked to express their preferred mode of feedback, they all favored face-to-face feedback if possible. The learners said they always prefer face-to-face feedback because I can ask questions to them. They thought the best is to get face-to-face feedback [6]. In addition to further research, technology is part of today's life, not denying the possibility that technological sophistication will be unstoppable in the next five years. However, it should be noted that humans

have limits. One important part of the human body is very valuable and cannot be replaced or created with any technology, namely the eye. Laptops, cell phones, and tablet screens all emit blue light. If it is continuously exposed, it will negatively impact the eyes. Excessive exposure to blue light can cause irreversible photochemical damage to eye tissue, tending to cause a series of changes, such as oxidative stress, mitochondrial apoptosis, inflammatory apoptosis, mitochondrial apoptosis, and DNA damage. It results in developing dry eye, glaucoma, and keratitis [18], impaired barrier function on human retinal pigment epithelial cells [19]. It could be a consideration to engineering this immediate feedback into a teaching aid that can be held or touched directly by students. Protecting the eyes from blue light with short wavelengths can help improve visual disturbance [20]. However, it does not mean that researchers refuse to use advanced technology that can provide convenience for students during the learning process. It is a consideration for the future development of immediate feedback tools. It is better to pay attention to their impact on the health of human body parts.

It is acknowledged that there are some limitations in this study. First, the relatively small sample size may affect the generalizability of the research findings. Second, this study did not collect learners' opinions about the immediate feedback treatment in the classroom but only showed the results of the teacher's observations when learning should be carried out with two perspectives, both from the teacher and from the students.

CONCLUSION

The results of this study imply that the teacher's immediate feedback consistently in learning will positively impact students' final grades and learning achievement. Immediate feedback assistance from educators as facilitators in the classroom helps students answer doubts and questions, giving firmness to their understanding of knowledge while correcting things that are not quite right from understanding their knowledge. When students ask about certain problems they feel doubtful about, immediate feedback will eliminate the doubts that exist in students. Although learning students often experience difficulties and headaches, the enthusiasm of students to know the right way of solving does not decrease. Immediate feedback contributes to learning achievement.

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