INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY: APPLIED BUSINESS AND EDUCATION RESEARCH
2023, Vol. 4, No. 2, 582 – 587
http://dx.doi.org/10.11594/ijmaber.04.02.24

Research Article

Effectiveness of Home Tutoring in Mathematics 6 Under Modular Distance Learning in a Public Elementary School in the Philippines

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Article history:
Submission February 2023
Revised February 2023
Accepted February 2023

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ABSTRACT

Various issues and concerns raised by parents, students, and teachers about the implementation of Modular Distance Learning were addressed during the Online Kamustahan at a public elementary school where the study was conducted. Parents were particularly concerned about how their children would learn the skills required in their subjects without proper instruction from teachers. The development and implementation of an intervention is one method for addressing students' learning gaps and overcoming learning barriers. This study evaluated the effectiveness of home tutoring as an intervention in teaching Mathematics 6 to modular students in a public elementary school in the Philippines. Experimental research design was used in this study. A set of teacher-made tests were given to fifteen (15) Grade 6 modular students enrolled for the Academic Year 2020-2021. The pre-test and post-test scores were interpreted using mean, mean percent score, summation of x, summation of square x, absolute range, standard deviation, and coefficient of relative variation. Results showed that home tutoring focusing on the students' least mastered skills is an effective intervention in teaching Mathematics 6, with a mastery increase of +44.67%. It is recommended that the school allocate funds for promotional materials, marketing expenses, signage, and incentives for program implementation. and that the school will develop another intervention program to address the students' deficiencies, with a committee in charge of developing, implementing, and evaluating the program.

Keywords: *Home Tutoring, Mathematics, Modular Distance Learning*

Introduction

A public elementary school in the Philippines held an *Online Kamustahan* to address the issues and concerns that parents, students, and teachers had regarding the implementation of Modular Distance Learning. Parents were particularly concerned about how their children would learn the skills required in their subjects without proper instruction from teachers.

How to cite:
Galay Jr., F. C. (2023). Effectiveness of Home Tutoring in Mathematics 6 Under Modular Distance Learning in a Public Elementary School in the Philippines. *International Journal of Multidisciplinary: Applied Business and Education Research*. *4*(2), 582 – 587. doi: 10.11594/ijmaber.04.02.24

Long before the K-12 Basic Education Program was implemented, the Department of Education encouraged interventions to improve learners' learning experiences. Thereafter, intervention was introduced into the teaching methods to stimulate student activity and thus increase their level of understanding. It is planned and designed strategically to assist and support low achievers in the subject. The same is given to students who were unable to grasp the concept of the subject matter after regular classroom instruction (Banugan, 2016). In addition, interventions include both learning strategies (student) and content enhancement (for teachers). It is a multifaceted approach for assisting students in becoming independent and successful learners.

Dietrichson (2017) investigated interventions aimed at improving educational achievement for elementary and middle school students from low socioeconomic backgrounds. Tutoring was the most effective of all the interventions tested, including feedback and progress monitoring, cooperative learning, computer-assisted instruction, and student mentoring.

The extent of tutoring varies between countries, cultures and educational systems (Byun, Chung, & Baker, 2018). Tutoring is very common, particularly in East Asian countries with highly competitive school systems and high-stakes examinations. In Japan about 60% of the secondary and in Korea over 80% of the primary school students receive tutoring lessons outside of school (Ha & Park, 2017; Yamato & Zhang, 2017). On the other hand, only around 10% of students receive private tutoring in Scandinavian countries (Byun et al., 2018), where supplementary lessons are mainly integrated in the regular public school system. In Germany, the number of tutored students has steadily increased in recent years. With around 20% of the secondary school students receiving private tutoring, this amount is considered as moderate (Hille, Spieß, & Staneva, 2016).

Nickow et al. (2020) found that students who participate in tutoring programs differ from those who do not. Thus, determining the effects of tutoring programs in observational studies by simply observing students' educational trajectories before and after tutoring is difficult. In randomized studies, however, we can compare two groups that are similar on average before participating in a program and attribute any differences in learning outcomes after the program to tutoring alone. It was found that tutoring was remarkably effective in assisting students' learning, with over 80% of the 96 included studies reporting statistically significant effects.

Younger students (early elementary) benefit more from frequent tutoring sessions than older students (late elementary), which may be related to the role of repetition in early learning (Quan et.al, 2020). Reading tutoring has a significant impact in the early years, whereas math tutoring has a significant impact in the upper elementary years. Although fewer programs at the secondary level were evaluated, programs like Saga proved that tutoring can still be effective for high school students.

Furthermore, Guerra-Martin et al. (2017) emphasized tutoring as a fundamental strategy for achieving academic success in the context of higher education, which is related to quality and excellence. Tutoring can help students improve their academic performance. It has been revealed that the one-to-one academic tutoring model, which focuses on the relationship between tutor and tutee and employs an expert professor as a coach/assessor of the student, is relatively effective. As such, by emphasizing the importance of tutors, students have positively evaluated the tutoring program.

Hence, this study is deemed relevant as it investigated the use of home tutoring as an intervention in teaching Mathematics 6 to modular students in a public elementary school in the Philippines.

Purpose of the Study

This study investigated the effectiveness of home tutoring as an intervention in teaching Mathematics 6 to elementary students enrolled in Modular Distance Learning in the Philippines. Specifically, it sought answers to the following questions:

1. What is the academic performance of Grade 6 pupils in Mathematics before the implementation of Home Tutoring?

2. What is the academic performance of Grade 6 pupils in Mathematics after the implementation of Home Tutoring?
3. Is there a significant difference in the academic performance of the Grade 6 pupils in Mathematics before and after the implementation of Home Tutoring?

Methods

The experimental research design was used in this study to identify the least mastered skills in Mathematics 6 and to determine the effectiveness of the strategic intervention under the Modular Distance Learning Approach.

The respondents were Grade 6 modular students enrolled in a public elementary school in the Philippines for the Academic Year 2020-2021. The research instrument used is a teacher made test consisted of 30 test items using multiple choice with 4 choices, a, b, c and d. Before the study was conducted, the research instrument was validated by experts in the field and pilot tested. The pretest was given to the participants and then the Home Tutoring was tested for 2 months. After which, the post test was given again.

The data gathered from the questionnaire was analyzed qualitatively. The data were statistically subjected accordingly using mean, mean percent score, summation of x, summation of square x, absolute range, standard deviation, and coefficient of relative variation.

Result and Discussion

The succeeding tables present the academic performance of Grade 6 pupils in Mathematics in the implementation of Home Tutoring.

A. The academic performance of Grade 6 pupils in Mathematics before the implementation of Home Tutoring

Table 1. The Academic Performance of Grade 6 Pupils in Mathematics Before The Implementation of Home Tutoring

STUDENT NUMBER	PRE-TEST SCORE
1	6
2	7
3	7
4	18
5	6
6	18
7	6
8	9
9	6
10	6
11	11
12	10
13	18
14	19
15	18
Number of Pupils (N)	15
Highest Score (HS)	19
Lowest Score (LS)	6
Summation of Scores ($\sum x$)	165
Summation of Square of Scores ($\sum x^2$)	2237
Mean	11
Mean Percent Score (%Mastery)	36.66
Standard Deviation	5.49

Table 1 shows the respondents' pre-test results. The pre-test mean for student-respondents (N = 15) was 11 and the mastery level was 36.66% with a standard deviation of 5.49 (highest score is 19 and the lowest score is 6). This implies that Grade 6 Mathematics performance is low to average.

B. The academic performance of Grade 6 pupils in Mathematics after the implementation of Home Tutoring

Table 2. The Academic Performance of Grade 6 Pupils in Mathematics After The Implementation of Home Tutoring

STUDENT NUMBER	PRE-TEST SCORE
1	22
2	20
3	22
4	26
5	15
6	25
7	26
8	25
9	22
10	24
11	22
12	28
13	29
14	30
15	30
Number of Pupils (N)	15
Highest Score (HS)	30
Lowest Score (LS)	15
Summation of Scores ($\sum x$)	366
Summation of Square of Scores ($\sum x^2$)	9164
Mean	24.4
Mean Percent Score (%Mastery)	81.33
Standard Deviation	4.08

Table 2 shows the respondents' post-test results. After the Home Tutoring focusing on the least mastered skills, the post-test mean for student-respondents (N = 15) was 24.4 and the mastery level was 81.33% with a standard deviation of 4.08 (Highest score is 30 and the lowest score is 15).

The results showed a marked mastery increase of +44.67% (mean increase of +13.4) between the pre-test and post-test, from 36.66% (Mean = 11) to 81.33% (Mean = 24.4) mastery level. This implies that Home Tutoring is effective as an intervention in teaching Mathematics 6 for Modular Distance Learning.

Table 3. Significant Difference in the Academic Performance of The Grade 6 Pupils in Mathematics Before and After the Implementation of Home Tutoring

Difference Scores Calculations	
Before Home Tutoring 1	**After Home Tutoring 2**
$N_1 = 15$	$N_2 = 15$

Difference Scores Calculations

Before Home Tutoring 1	After Home Tutoring 2
$df_1 = N - 1 = 15 - 1 = 14$	$df_2 = N - 1 = 15 - 1 = 14$
M_1: 11	M_2: 24.4
SS_1: 422	SS_2: 233.6
$s^2{}_1 = \frac{SS_1}{(N-1)} = \frac{422}{(15-1)} = \mathbf{30.14}$	$s^2{}_2 = \frac{SS_2}{(N-1)} = \frac{233.6}{(15-1)} = \mathbf{16.69}$

T-value Calculation

$$s^2{}_p = \left(\frac{df_1}{df_1 + df_2}\right)(s^2{}_1) + \left(\frac{df_2}{df_1 + df_2}\right)(s^2{}_2)$$

$$s^2{}_p = \left(\frac{14}{28}\right)(30.14) + \left(\frac{14}{28}\right)(16.69)$$

$$s^2{}_p = 23.41$$

$$s^2{}_{M1} = \frac{s^2{}_p}{N_1} = \frac{23.41}{15} = 1.56$$

$$s^2{}_{M2} = \frac{s^2{}_p}{N_2} = \frac{23.41}{15} = 1.56$$

$$\boldsymbol{t} = \frac{M_1 - M_2}{\sqrt{s^2{}_{M1} + s^2{}_{M2}}} = -\frac{13.4}{\sqrt{3.12}} = \mathbf{-7.58}$$

Table 3 shows the significant difference between the pre-test and post-test scores. The 15 student-respondents who received the intervention (M = 11, SD = 30.14) compared to their post-test (M = 24.4, SD = 16.69) demonstrated significantly better peak flow scores, $t(51)$ = 2.1, $\underline{p}$ = 0.04. The t-value is -7.58394. The p-value is < 0.00001. The result is significant at $p < 0.05$.

This implies that the use of Home Tutoring is effective as an intervention in teaching Mathematics for Grade 6 pupils.

Conclusion and Recommendation

This study found that home tutoring is an effective intervention in teaching Mathematics 6 to modular students enrolled in a public elementary school in the Philippines. Home tutoring focusing on the students' least mastered skills revealed a significant difference between the respondents' pretest and posttest scores, resulting in a mastery increase of +44.67%.

For further researches, it is recommended: (1) the school principal allocates funds for promotional materials, marketing expenses, signage, and incentives for the implementation of the intervention program; (2) parents and teachers should collaborate and participate in the assessment process, especially if the school wants to identify the outcomes or impacts of the intervention, which is especially important for the modular approach; (3) teachers create a teaching portfolio, which allows them to collect and display multiple sources of information about their teaching effectiveness; and (4) the school will develop another intervention program to address the students' deficiencies, with a committee in charge of developing, implementing, and evaluating the program.

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