USE OF SIM (STRATEGIC INTERVENTION MATERIAL) AS STRATEGY AND THE ACADEMIC ACHIEVEMENT OF GRADE 7 STUDENTS ON SELECTED TOPIC IN EARTH SCIENCE

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Abstract

This research endeavor aimed to find out whether the use of SIM (Strategic Intervention Material) would improve the academic achievement of grade seven students on selected topic in earth science. The study made use of quasi experimental design which is non- equivalent control group pretest and posttest design. About 120 participants were used as subjects of the study. Mean and t- tests were used as tools in the analysis of data. The result of the study revealed that there was a significant difference in the pretest and posttest mean scores of the experimental and control group in the topic eclipse. The experimental group achieved a better mean gain score than the control group. This points out that the use of strategic intervention material (SIM) in the experimental group significantly improved the performance of the students. It can be concluded that the performance of students in the experimental group was greatly enhanced after SIM was employed in teaching the lesson. Therefore, the employment of SIM was better and effective than the use of traditional method in teaching some topic in science. Furthermore, it was recommended that SIM be adopted as instructional material or strategy in teaching science lessons as well as other subjects.

Keywords

SIM, Strategy, Achievement, Earth Science, Students

1. Introduction

The onset of the K-12 basic education program aims to erase the poor academic achievement of students in the different subject areas. The addition of two years in high school has envisaged development of valuable skills and full mastery of the students in the subjects learned. Unfortunately, the recent NAT result has addresses challenge to the teaching workforce particularly on the subjects that students displayed poor performance. The result suggest that on the average, the students obtained an MPS of 48.90 in the 2012 NAT, an improved performance when compared to the previous years, 44.33 in 2006 and 46.80 in 2005. To conclude, it was still a poor performance. The glaring difference on the result was the scanty performance of students in science which register 40.53 and the lowest among the subjects. This implies that there is a missing ingredient in teaching and handling science lessons. In Portugal, it has been observed that there is a deficient learning in science both at middle and secondary level (Fonseca, 2006). This confirmed that there is a failure in teaching science worldwide.

The letdown was due to the ineffectivity and incongruity of teaching strategies and instructional materials employed in teaching the lesson. Several teaching strategies and instructional materials are utilized to meet the learning style and need of the students. Alas, the result is still poor achievement. To note, learning strategies interact with personal characteristics of students. The fact that there is no ideal strategy that generates success in all learning situations, hence, teachers need to be trained to develop an understanding and skills in using appropriate strategies that satisfy student learning (Simsek & Balaban, 2010).

Moreover, there are manifestations that teaching science and mixing with a teaching material and strategy was too hot to handle. This statement was supported by the finding of Wood (2002) which emphasized that teachers in California High School struggled in teaching science particularly Biology in a way the students can truly understand the concepts. Consequently, the effectiveness of one's teaching approach may require the use of tools, techniques and strategies to improve students learning and is sometimes used in a quantitative way, being very effective or not effective (Drucker, 2006). This finding could be validated by the poor performance displayed by students in F. Bangoy National High School. The lack of appropriate materials, effective strategy and focus of students has been becoming a perennial

problem. Therefore, this endeavor was conducted to offer solutions in improving the academic achievement of students in science. The researcher would like to introduce the use of strategic intervention material (SIM) as strategy in teaching science lessons. Strategic intervention materials are instructional materials that meant to teach the concept and skills. Materials are given to students to help them master a competency based skill which they were not able to develop during the regular classroom teaching. The ultimate aim of SIM is to make students master the least learned concepts in science. In doing so, once they mastered the concept they can easily comprehend questions and answer it correctly, thus, better academic gain is achieved.

This research is anchored on the following theories; first, social development theory by Vygotsky which says that social interaction profoundly influences cognitive development; second is Bandura's social learning theory which posits that people learn from one another via observation, imitation and modeling; and lastly, the constructivist theory by Bruner which suggests that learning is a social process, whereby students constructs new concepts based on current knowledge.

2. Research Questions

This paper aimed to find out whether the use of SIM (Strategic Intervention Material) would improve the academic achievement of grade seven students on selected topic in earth science. Particularly, it sought to answer the following queries:

1. What is the academic profile of students in science in the second quarter?
2. Is there a significant difference in the pretest mean score of the students in the control and experimental group?
3. Is there a significant difference in the posttest mean score of the students in the control and experimental group?
4. Is there a significant difference between the pretest and posttest mean score of the students in the control and experimental group?
5. Is there a significant difference between the mean gain score of the students in the control and experimental group?

3. Operational Definition of Terms

Academic Achievement refers to the performance of students in science in a particular lesson. It is measured in terms of grade.

SIM refers to a strategy or instructional material that is used to increase the academic achievement of students in science. Also, it aims to develop mastery on the least learned concepts in the learning competency.

4. Method

The study made use of quasi experimental designwhich is a non- equivalent control group pretest- posttest design. Non- equivalent design is a good design when you have access to one group for your experimental (Vockel, 1983). This design was used by the researcher because the subjects of the study were intact group of the grade seven students in integrated science class in a naturally assembled setting at F. Bangoy National High School, Sasa, Davao City. This design is represented as follows:

$$O_1 \qquad X \qquad O_2$$

$$O_3 \qquad\qquad O_4$$
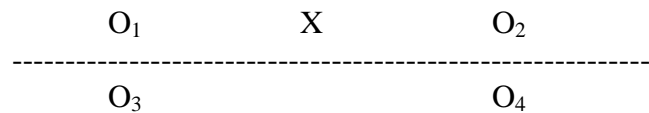
where:

O_1 – Pretest of the experimental group

O_2 – Posttest of the experimental group

O_3 – Pretest of the Control Group

O_4 – Posttest of the Control Group

------------------- - Non- random assignment of subjects

X – Treatment applied in the experimental group

Moreover, the researcher utilized questions which cover the topic eclipse as part of the fourth quarter coverage based on the learning competencies of the Department of Education. The test questions were checked and validated by the master teachers of the science department. The pretest and posttest was designed to measure the academic achievement of grade seven students. The pretest and posttest both consist of a 25- item test determines the level of academic achievement of the students in eclipse. The subjects took the test twice with the same content of the test, pretest and posttest. The pretest was administered to all subjects prior to the treatment. The pretest was helpful in assessing student's prior knowledge of eclipse and testing initial equivalence among groups. A posttest was administered to measure treatment effects. In addition, the results of the pretest and posttest scores were analyzed and categorized using the scale below:

0 – 19.99%   -   Very Poor

20 – 39.99%   -   Poor

40 – 59.99%   -   Satisfactory

60 – 79.99%   -   Very Satisfactory

80 – 100%   -   Outstanding

Further, this study employed the following statistical tests in the treatment of data. These were the mean and t- test for paired and independent samples. Mean is being described as center of gravity of a distribution and is described as the common score of the entire group. On the other hand, t – test for uncorrelated samples used to test the significance of difference between the pretest and posttest mean scores in the experimental and control group while t- test for paired samples used to test the significance of the difference between the pretest and posttest mean scores within each of the group.

5. Results and Discussions

In this section, the data gathered were carefully discussed, analyzed, and interpreted using appropriate statistical tools.

Table 1 describes the academic profile of students in integrated science in the second quarter. It was displayed that students in the experimental group records a mean of 78.83 while the control group registers a mean of 78.53. The performance of both groups was described as fairly satisfactory. There was a slight difference on the grade of students in the second quarter in both groups. This implies that the students in both groups have an almost equal performance in the said subject. Therefore an intervention in improving their performance was highly desired or appropriate.

Table 1: *Academic profile of students*

Groups	N	Mean	Descriptive Interpretation
Control	60	78.5333	Fairly Satisfactory
Experimental	62	78.8387	Fairly Satisfactory

Table 2 indicates the significance of the difference between the pretest mean scores of the students in experimental and control group in the topic eclipse. The experimental group gains a mean score of 4.90 while the control group earns a mean score of 4.83. There was a slight difference of .07. The performance of both groups in the topic can be described qualitatively as poor. The computed t- stat was .26 at 120 degrees of freedom and the p- value was .80 which

was greater than .05 in the level of significance. This means that the null hypothesis was accepted which denotes that there was no significant difference between the pretest mean scores of the students in the experimental and control group in the topic eclipse.

Table 2: *Test on the significance of the difference between the pretest mean scores of the experimental and control group in Eclipse*

Groups	Mean	QD	N	Df	t -stat	p-value	Decision
Experimental	4.90	Poor	62				Accept Ho,
Control	4.83	Poor	60	120	.26	.80	Reject Ha

The result above reveals that there was no significant difference in the pretest means scores of students in both groups. This suggests that students from both groups performed poor in the pretest in eclipse. In addition, this implies that there is an equal performance in the two groups during the pretest. Moreover, the findings was supported by Sahin (2010) which asserts that the effect of any strategy or material on the academic achievement of student in any written course found to be non- significant in the pretest scores of the experimental and control group in the Written Expression Achievement Test.

Table 3 discusses the significance of the difference between the posttest mean scores of the experimental and control group in eclipse. It notes that the posttest mean score of the experimental group is 11.23 and 7.70 in the control group. The performance of students in the experimental group is described as satisfactory and poor in the control group. The computed t-stat was 8.11 at 120 degrees of freedom and the p- value was .000 which was lesser than .05 in the level of significance. This implies that the null hypothesis was rejected which denotes that there was a significant difference between the posttest mean scores of the students in the experimental and control group in eclipse.

Table 3: *Test on the Significance of the Difference between the posttest mean scores of the experimental and control group in Eclipse*

Groups	Mean	QD	N	Df	t -stat	p-value	Decision
Experimental	11.23	Satisfactory	62				Reject Ho,
Control	7.70	Poor	60	120	8.11	.000	Accept Ha

The result reveals that there was a significant difference between the posttest means scores of the two groups. This implies that students in the experimental learned better than the

students in the control group as indicated by higher mean. Further, the exposure of students in the experimental group by the strategic intervention material given has helped them master the lesson better than the students in the control group. Moreover, this result supports the view that the use of learning strategy contributes to higher students' academic achievement. Further, the findings of Iqbal (2004) supports the idea above that the use of learning strategy is more effective as teaching learning technique than traditional method.

Table 4 presents the pretest and posttest mean scores of the experimental and control group in the topic eclipse. It displays that the mean score of the experimental group in the posttest is higher than the pretest which registers a mean scores of 4.9 and 11.23. The performance of the students in the experimental group in the pretest was described as poor and satisfactory during the posttest. On the other hand, the mean scores of the students in the control group records 4.83 in the pretest and 7.70 during the posttest. The performance of the students in the control group during the pretest and posttest was described as poor.In the experimental group, the computed t-statistic was 16.18 at 61 degrees of freedom and the p- value was .000 which was lesser than .05 in the level of significance. This means that the null hypothesis was rejected which denotes that there was a significant difference between the pretest and posttest mean scores of the students in the experimental group in the topic eclipse. On the contrary, the control group registers a t-statistic of 8.83 at 59 degrees of freedom and a p- value of .000 which was lesser than .05 in the level of significance. This implies that the null hypothesis was rejected which denotes that there was a significant difference between pretest and posttest mean scores of the students in the control group in the topic eclipse.

Table 4: *Test on the Significance Difference between the pretest and posttest mean scores of the experimental and control group in Eclipse*

Groups	Mean (Pretest)	QD	Mean (Posttest)	QD	N	df	t-stat	p-value	Decision
Experimental	4.9	Poor	11.23	Satisfactory	62	120	16.18	.000	Reject Ho, Accept Ha
Control	4.83	Poor	7.70	Poor	60		8.83	.000	Reject Ho, Accept Ha

The findings above reveals that there was significant difference between the pretest and posttest mean scores of the students in the two groups. The results suggest that students in the

experimental group who were exposed to the strategic intervention material have gained a significant learning in the topic eclipse as indicated by a higher mean. The increase of mean score in the posttest was attributed to the effect of strategic intervention material which resulted to an increase of scores or better performance of students. This finding is supported by the constructivist point of view which posits that when learners are actively engaged and activities are interactive and student centered, learners learned a lot on their own. Thus, increasing their academic gain or resulted to better performance. Moreover, the study can't be supported by findings based on the effectiveness of strategic intervention material utilized in science subjects because there were no studies conducted to measure its effectiveness. More studies await to discover the usefulness of SIM.

The traditional method (lecture) that was employed in the control group also suggests that there was a significant difference between the pretest and posttest mean scores of the students. This signifies that students who were exposed to traditional method have learned something in eclipse as indicated by an increase in score during the posttest. The result was supported by the findings of Vigor (2006) which implies that even without the integration of learning strategy, the students achievement in any topic (mathematics) were enhanced.

The last table below points out the significance of the difference between the mean gain scores of the experimental and control group in the topic eclipse. The experimental group obtains a mean gain score of 6.33 while the control group records 2.87. Both groups can be described qualitatively as poor. The basis for obtaining a poor qualitative description of the two groups is by getting the difference between the percentage obtained in the pretest and posttest in eclipse. Sixty two students were the subjects in the experimental group and only sixty in the control group. The computed t- statistic in the experimental group tallies a 16.18 at 61 degrees of freedom while the control group notes 8.83 at 59 degrees of freedom explain that there was a significant difference in the mean gain scores of the experimental and control group in the topic eclipse. The p- value obtained for both groups was lesser than .05 in the level of significance. This indicates that the null hypothesis was rejected and proves that there was a significant difference in the mean gain scores of the experimental and control group in the topic eclipse.

Table 5: *Test on the Significance of the Difference between the Mean Gain Scores of the Experimental and Control Group in Eclipse*

Groups	Mean Gain	QD	N	df	t- stat	p-value	Decision
Experimental	6.33	Poor	62	120	16.18	.000	Reject Ho, Accept Ha
Control	2.87	Poor	60		8.83	.000	Reject Ho, Accept Ha

The result from the analysis points out that the experimental group obtained a greater mean gain score than the control group in eclipse. Thus, students performed better in the experimental group than those students in the control group. Students learned best in the topic because the material given through SIM was simplified and easy to understand. Hence, information is retained longer and mastery was achieved.

The effectiveness of SIM as a strategy needs to be explored to measure its relevance in teaching workplace. As shown in the table, it contributes greater gain on the part of the students. Thus, it can be used as intervention strategy in making the lesson easy to understand and mastery was achieved on the part of the students. This idea was supported by the findings of Ceballos (2000) which says that collaboration is a shared act by each member of the group and allows each member to collectively gain knowledge and learn on their own. This statement is in line when SIM was employed in the teaching process. Since SIM entails collaboration on the part of the students. Thus, students learned best if there is collaboration among the members of the group.

6. Conclusions

Based on the findings of the study, the following conclusions were drawn**:**

1. The academic profile of the two groups was described as fairly satisfactory.

2. There was no significant difference in the pretest mean scores of students in the experimental and control group in the topic eclipse. Both groups performed poor in the pretest due to the lack of exposure to the topic.

3. There was a significant difference in the posttest mean scores of students in the experimental and control group in the topic eclipse. The experimental group obtained a

satisfactory performance in the posttest while the control showed a poor performance. The better performance in the experimental was attributed to the utilization of SIM that made students gained significant learning, thus, improving their performance. On the other hand, the control group also demonstrated significant increase in their performance with the use of traditional method.

4. There was a significant difference in the pretest and posttest mean scores of students in the experimental and control group in the topic eclipse. Experimental group recorded a higher pretest and posttest mean scores than the control group. Both groups showed a poor performance in the pretest while the experimental gained the upper hand in the posttest by demonstrating a satisfactory performance compared to the control group.

5. There was a significant difference in the mean gain scores of students in the experimental and control group in the topic eclipse. The experimental group tallied a higher mean gain scores than the control group. Both groups achieved poorly in the topic eclipse.

7. Recommendations

Based on the conclusions of the study, the following are suggested:

1. Since the use of Strategic Intervention Material (SIM) yield a better performance on students, teachers should adopt it as a strategy or instructional material in teaching science lessons.

2. The Department of Education must intensify their campaigns in improving the NAT result of the students by engaging teachers in this kind of material.

3. Each teacher should be required to make a SIM every grading period. Exposure to this kind of activity will make lessons meaningful and easy to understand.

4. The conduct of similar studies in other areas is recommended to validate the external validity of the findings.

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