EFFECTIVENESS OF STRATEGIC INTERVENTION MATERIAL ON THE LEARNING OUTCOMES OF STUDENTS

Reina Anne Cecilia Limbago-Bastida[1],
Garry L. Bastida[2i]
[1]RN, LPT, MAEd,
SHS Teacher 2,
Mati National Comprehensive High School,
DEPED- Division of Mati City,
Mati, Philippines
[2]RL, MLIS, DBM,
Faculty,
Davao Oriental State University,
Mati, Philippines
orcid.org/0000-0003-0901-898X

Abstract:

This study employed a quasi-experimental method of research to determine the effectiveness of Strategic Intervention Material (SIM) on the learning outcomes of grade 11 senior high school students. 90 students were taken for the study, 45 per group; control and experimental group. This experimental group was exposed to SIM in physical science while the other 45 students were catered to the conventional/traditional method. Data was gathered through the use of questionnaires and analyzed, employing mean and t-test. The results showed that there was a significant difference between the mean gain scores of the experimental and the control group by a t-computed of 2.710 with p-value of 0.008. The utilization of SIM can help to increase the learning outcome of the senior high school students than using conventional/traditional way of teaching. The data collected for this study included students' responses on the pre-test and post-test in physical science from the researcher-made questionnaire. The research findings formed the basis of recommendations for the development of teaching and learning strategies and approaches which will develop students' learning outcomes, eventually leading to high academic performance.

Keywords: strategic intervention material, mean, t-test, quasi-experimental design, senior high school, Philippines

---

[i] Correspondence: email garry.bastida@dorsu.edu.ph , reina.limbago@deped.gov.ph

1. Introduction

As economic, social and cultural changes are taking place faster and faster, educational skills should clearly prepare people for new situations and changing social conditions in order to address both learners' individual needs and society's collective needs. Science education is also revolutionizing in an answer to the needs of the learners. A gradual shift from a classroom focusing to a more flexible classroom centered on learners took place. The primary aim of learner-centered classroom is to support independent students. Students can achieve independent minds and the ability to make educational choices and judgments through student-centered training (Fuchs, 2014).

The major problem in underachievement in many countries has been identified since 1990. It investigated boys' underachievement in the United Kingdom and recognized the legitimate concern of underachievement of some boys in schooling. The article from issues in science and mathematics (2003) discussed the growing concern of the United States in the stagnation of learners' performance in mathematics and science. The report clearly explains this issue of the underachieving curriculum of that time (Warrington, 2012).

In the Philippines, the achievement rate of fourth-year students in science dropped from 39.49 percent to 37.98 percent in the same period. In the Trends in International Mathematics and Science Study (TIMSS) in 2003, the last time the Philippines participated in this assessment, we scored 378 and ranked 34th of 38 countries (HS II math) and 43rd of 46 (HS II science). Furthermore, the Philippines ranked 67th of 140 countries in quality of math and science education in the 2015-2016 global competitiveness report of the world economic forum, 79th of 138 in the 2016-2017 data, and 56th of 137 in the 2017-2018 data (World Economic Forum, 2017). These data simply show that Philippine education still has problems that wait to be resolved. Legaspi (2014) published that the unavailability of learning materials is just one of the problems still hounding the country's new basic education program, K to 12 implementations. The lack of classroom instructional materials has a big impact on the teaching and learning process inside the classroom. The status of instructional materials, equipment and facilities are inadequate, obsolete and dilapidated. Further, she recommended that science, vocational and technology teachers should be resourceful in the selection and utilization of instructional materials that are useful in the concepts that they teach in each lesson (Dela Cruz, 2017).

In Davao City, teachers express their worries because of the new teaching approaches under the K to 12 curriculums. The start of the semester for students is new and because of their learning gap, it is difficult for them to organize and understand each topic. Although the learners' materials are clear and easy to understand, students are having a hard time with the topics and it was found out that the science skills and competencies that were expected of the students are not on the highest level (Javier, 2015).

In Mawab district, one of the secondary schools showed a significant increase of 13.31 percent in NAT mean percentage score in Science (48.55%) in the school year 2016-2017 from the school year 2014-2015 which was 35.24 percent. However, this is still not a passing rate (Mawab District, 2019).

With the hope of improving the teaching and learning processes as long as teaching science is concerned, the researcher is interested to investigate the effect of SIM on the level of learning outcomes of senior high school students. This study also wanted to develop science strategic intervention materials which are based on the student's least mastered science topics anchored on the new K to 12 curriculum of the Department of education.

Moreover, the researcher has not come across any study that deals with instructional support through SIM to the learning outcomes of students in science especially in the secondary school setting here in Davao de Oro. It is in this context that the researcher is interested to determine the effect of SIM whether academic enables predict learning outcomes of students in science as this can raise concern to the intended beneficiaries of the study and possibly develop a specific intervention to fully implement quality instructional services to students which will help improve their academic achievement in science. The researcher is also motivated to pursue this study as she would be able to nurture science skills necessary not only in conducting investigatory research but also in establishing a culture of inquiry in the school where she is in. Furthermore, the findings of this study would open learners' eyes to the concrete application of abstract science concepts taught inside the four walls of the classroom.

2. Research Objectives

This study aimed to improve learners' achievement using intervention material for the selected grade 11 students in physical science.

Specifically, this study sought an answer to the following questions:
1. What is the level of the students' academic performance in physical science when taught with conventional method and taught with SIM?
2. What is the level of students' academic achievement in physical science in terms of quarterly grades?
3. Is there a significant difference in the pre-test and post-test scores of the control group and experimental group?
4. Is there a significant difference in the mean difference in the post-test scores of the control group and experimental group?
5. Is there a significant difference between the academic performance of students in the control group and the experimental group?

2.1 Hypothesis
The following null hypotheses were formulated and tested at a 0.05 level of significance:
1. There is no significant difference in the learning outcomes between the control group and the experimental group.
2. There is no significant difference in the mean difference in the post-test scores of the control group and experimental group.
3. There is no significant difference between SIM to the learning outcomes of students.

2.2 Theoretical Framework

The theories anchored to this study are twofold. First is Bruner (1966) in his discovery learning theory or inquiry method/ theory of instruction that s that learning is more meaningful to learners when they have the opportunity to discover on their own the relationships among the concepts or to actively search for a solution to a problem. This theory is an approach to instruction through which the students interact with their environment by exploring and manipulating objects, wrestling with questions and controversies or performing experiments.

Furthermore, the proponents of this theory believe that discovering learning encourages active engagement in different interventions, promotes motivation, promotes an increase in learning outcomes, responsibility and independence, develops creativity and problem-solving skills, and tailors the learning experience. The idea is that students are more likely to remember concepts they discover on their own. Bruner (1966) calls his view of learning "*instrumental conceptualism.*" Second is Ausubel's meaningful verbal theory (1968) that asserts meaning is created through some forms of representational equivalence between language and mental context. There are two processes involved: first is reception, which is employed in meaningful verbal learning; and the second is discovery, which is involved in concept formation and problem-solving.

2.3 Conceptual Framework

Figure 1 shows the schematic presentation of the conceptual framework of the study where there are two variables enclosed in the study known as the independent and dependent variables. The independent variable was composed of SIM for the 1st group and the usual traditional method (the chalk talk method) for the 2nd group. The dependent variable was composed of senior high school students learning outcomes in Physical science.
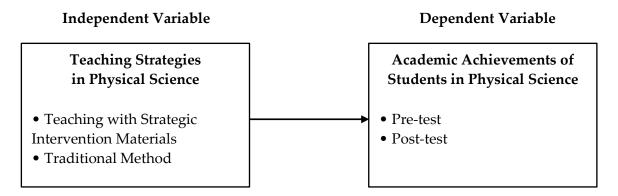
Independent Variable	Dependent Variable
Teaching Strategies in Physical Science • Teaching with Strategic Intervention Materials • Traditional Method	**Academic Achievements of Students in Physical Science** • Pre-test • Post-test

Figure 1: Conceptual paradigm of the study

3. Methods

3.1 Research Design

This study utilized a pre-test - post-test quasi-experimental research design. In this design, the experimental group was exposed to the intervention materials that used SIM.

Before the start of the experiment, the experimental and control group were given a pre-test, then after the experimental period, they were given a post-test. The scores were analyzed after the post-test. As in the pre-test – post-test control group design, at least two same characteristics were chosen and randomly assigned (RA) to the control and experimental group (David, 2005).

Figure 2 shows the model of pre-test – post-test only design which is adopted in this research, where the experimental control group were given a SIM in learning life and earth science, while the control group were given a traditional teaching strategy. A pre-test was conducted on the experimental group as the basis for the post-test which was given after the conduct of intervention in the experimental group and control groups.

Group	Pre-test	Intervention	Post-test
Experimental	O1	X	O2
Control	O3		O4

Figure 2: Model Design of the Study

Where:
O1 – refers to pre-test scores in learning outcomes of the experimental group.
O2 – refers to post-test scores in learning outcomes of the experimental group.
O3 – refers to pre-test scores in learning outcomes of the control group.
O4 – refers to post-test scores in learning outcomes of the control group.
X – refers to the used of Strategic Intervention Materials in the experimental group.

3.2 Research Locale

The participants of this study were the officially enrolled students of grade 11- computer system servicing (CSS) section A and section B of School Year 2019-2020 of a certain public school in Mawab district.

Purposive sampling was used in the selection of the respondents. Forty-five (45) students from one section were selected for remediation using the grade 11 learner's material (control group) and another forty-five students from the other section for remediation using the strategic intervention material developed by the researcher (experimental group). These students from both sections were those who got lower scores in the quarterly examination. This study was conducted in the municipality of Mawab from December to February school year 2019-2020.

3.3 Research Intervention

In this study, control and experimental classes were used in determining the effectiveness of the SIM. Those in grade 11- CSS A were identified for purpose of the study as the control group where they were taught using the traditional method, while those in grade 11- CSS B tagged as the experimental group were taught using the SIM.

Each of the groups was given a pre-test before the introduction of the lesson, and then a post-test after the end of the lesson. Both groups were given the same tests, such that the questions given in the pre-test were the same questions given in the post-test. The control group undergone a conventional method of teaching while the experimental

group utilized SIM integrated into their physical science class. The pre-test and post-test results of each group were treated separately.

The experimental group had their science class in the morning; they used SIM. While the control group also had their science class in the afternoon; they used a traditional way of learning without intervention.

SIM is a tool that is developed with five (5) parts. These are guide cards, activity cards, assessment cards, enrichment cards and reference cards. On the other hand, the grade 11 learner's material of DepEd is composed of four (4) parts. These are what to know, what to process, what to reflect on and further understand and what to transfer.

Guide card 1 discusses the dispersion of white through a glass prism which consists of one activity card, one enrichment card and one assessment card. The lesson in SIM started with the guide card presenting the overview of the whole lesson. Under this part, the objectives of the lesson were stated and the students' corner was provided for the understanding check of the respondent. Guide card 1 consists of one activity card about light vs zombies in which the students enumerated the different colors of light by coloring and naming the color of each flower. In the assessment card, the students answered the multiple-choice. In the enrichment card, students performed the making rainbow in 3 steps.

Guide card 2 deals with the hierarchy of colors in relation to light which consists of one activity card, one enrichment card and one assessment car. In the activity card, the students performed the spin a spectrum in which they spun the wheel and fill up the table with the information present on the wheel. Next is the assessment card where the students answered the table and then arranged the color strips in the box based on their highest to lowest energy followed by the enrichment card entitled reflecting rainbow.

The last part is the reference cards which contains the title of books and internet websites which also provided additional reference related to the topic covered by the SIM. The SIM underwent phases of validation. The material was prepared by the researcher and validated by the master teachers. Suggested ideas by the experts were incorporated into the content of the SIM. These include diagrams, improvement of guide questions and additional activities under the activity card.

3.4 Research Instruments

The study utilized 20-item researchers-made test. It is categorized as pre-test and post-test. The contents of the instrument had been presented to the group of experts for validation; pilot testing was carried out on 30 participants who were not part of the study. It has a computed Cronbach's alpha of 0.842 which means that the internal consistency was good.

All these instruments were constructed based on some relevant studies and literature reviews. Prior to the administration, the drafts of these instruments were tested for face and content validity by the panel of experts in SIM. The validation resulted in a mean rating of 4.76, described as very high.

3.5 Data Collection

In the conduct of the study, the researcher underwent data collection and analysis with an estimated 2-month maximum length, including manuscript writing. The following were the steps used in gathering the study's data: the researcher had the questionnaires validated by the experts and conducted pilot testing. Results of pilot testing were sent to the Statistician, who measured the validity and reliability of the questionnaires.

The researcher preceded the following steps and procedures in data collection:

First, seeking permission to conduct the study. The researcher asked permission to conduct the study. Primarily, the researcher obtained an endorsement letter from the Dean of the graduate schools. Then, the researcher forwarded the letter of permission to conduct the study to the division superintendent of the division of Davao de Oro. Upon approval, the researcher provided a copy to the school principal.

Second, administration of pre-test. Pre-test was given to the students prior to the interventions, after giving the test and establishing the comparability of the participants. The researcher explained to the respondents the direction on how to answer the questions found in the questionnaire. The pre-test was administered to the students before conducting the lessons for the experimental and the controlled group.

Third, implementation of the intervention. The SIM group which was subjected to the use of the researcher-made SIM were the teacher's guide and the learner's module. On the other hand, the second group were the non-SIM group which was not subjected to the conventional way of teaching using the learner's module and the teacher's guide only.

Fourth, administration of post-test. The post-test was given to the students of both groups after the lessons. The test questions were the same however, as in the pre-test number sequences were sprawled to eliminate memorization.

Fifth, debriefing of the participants. The participants have undergone debriefing after the experimentation was done. Participants were informed about the intentions of the study in which they took part voluntarily and without coercion. They were assured that the test they took as part of the study will not affect their grades. And the researcher seeks the approval of the participants for the use of data during the pre-test and post-test. Finally, the researcher gathered, checked, and tabulated the raw scores in the excel form of the respondents and asked the graduate school statistician for analysis. Thereafter, the researcher interpreted the data for the results and discussion.

After such, an Informed Consent Form (ICF) was given personally to the participants and asked for permission to be part of the study. It cannot be denied that there were students who opted not to participate in the study, but the researcher explained that all data they have given were handled with maximum confidentiality; thus, consent was granted. Nevertheless, the researcher personally administered the questionnaire to the study participants to ensure 100% retrieval. After the questionnaires were retrieved, they were tallied and recorded accurately. The results were encoded, tabulated, analyzed, interpreted, drawn conclusions, and formulated recommendations based on the results.

3.6 Statistical Treatment of Data

The gathered data were classified, analyzed, and interpreted using the appropriate statistical treatment as follows:

a. Mean

This was used to determine the student learning outcomes of the experimental and control group at the start of the experiment and their quarterly grades.

b. T-Test

This was used to determine the significant difference between the mean gain scores of the experimental group and the control group.

3.7 Ethical Considerations

This investigation was submitted to St. Mary's College Research and Ethics Committee for review to guarantee that the quality of this research project was based on the researcher's ability to present valid argumentation to readers while giving a fair presentation of data. The researcher ensured the proper implementation in anonymizing the respondents since the findings were confidential. After which, the researcher complied with the recommendations and requirements set by the committee. Also, the researcher obtained informed consent from the survey respondents specifying their awareness and purposes of the study.

4. Results

Table 1: Level of the Students' Academic Performance
in Physical Science when taught with Conventional Method
and taught with Strategic Intervention Material

Groups	Test Set-ups	Mean Score	Rating	Descriptive Equivalent
Control	Pre-test	5.47	27.33%	Poor
	Post-test	8.31	41.56%	Satisfactory
Experimental	Pre-test	5.31	26.56%	Poor
	Post-test	9.24	46.22%	Satisfactory

Table 1 presents the level of the student's academic performance in Physical science when taught with the conventional method and taught with strategic intervention material in both the experimental and control groups in the pre-test and post-test of the senior high school students. Results showed that in the experimental group, 46.2% had satisfactory learning outcomes in post-test and 26.56% had poor learning outcomes.

Likewise, the control group showed that the post-test has a mean score of 8.31 with a rating of 41.56% or satisfactory while the pre-test is 5.47 with a mean rating of 27.33% or poor.

Table 2: Level of Students' Academic Achievement
in Physical Science in terms of 3rd Quarter Grade

Groups	Mean Grades	Descriptive Equivalent
Experimental	82.76%	Satisfactory
Control	80.24%	Satisfactory

Table 2 shows the level of students' academic achievement in physical science in terms of 3rd quarter grade. It shows that the experimental group had obtained higher mean scores of 82.76% with the descriptive equivalent of satisfactory and the control group had obtained a mean score of 80.24% with the descriptive equivalent of satisfactory which the result implies that the students' academic achievement is high. The results reveal that the use of SIM in the classroom has moderately increased the learning outcomes of students in science.

Table 3: Difference in the Pre-test and Post-test
Scores of the Control Group and Experimental Group

Time of Implementation	Mean	T-test df=44		p-value	Decision on Hypothesis	Decision on Significance
		Computed	Tabulated			
Control Group						
Pre-test	**5.47**	-6.267	+/- 2.015	0.000	Reject	Significant
Post-test	**8.31**					
Experimental Group						
Pre-test	**5.31**	-9.318	+/- 2.015	0.000	Reject	Significant
Post-test	**9.24**					

Table 3 shows the difference between the pre-test and post-test scores of the experimental and control groups. The experimental group attained a higher mean gain score of 9.24 than the control group with a mean gain score of 8.31. It could be inferred that students in the experimental group have a slight improvement in their academic performance. This improvement in students' scores was due to the exposure of the students to the strategic intervention material that initiated such improvements. Results also revealed that there is a significant difference between the means of the two groups as evidenced by a t-computed value in control group which is -6.267 and – 9.318 in the experimental group with p-value of both 0.000. A p value of less than .05 (p=.000 < .05).

Table 4: Difference in the Mean Difference in the Post-test
Scores of the Control Group and Experimental Group

Groups	Mean	T-test		p-value	Decision on Hypothesis	Decision on Significance
		Computed	Tabulated			
Control	2.844	2.052	+/- 2.015	0.046	Reject	Significant
Experimental	3.933					

Table 4 shows the difference on the mean difference in the post-test scores of the control group and experimental group. The experimental group attained a higher mean difference gain score of 3.933 than the control group with a mean difference gain score of

2.844. It could be inferred that students in the experimental group got an improvement in their academic performance. This improvement in students' scores was due to the exposure of the students to the strategic intervention material that initiated such improvements.

Table 5: Difference between the Academic Performance
of Students in Control Group and Experimental Group

Groups	Mean	T-test df=88		p-value	Decision on Hypothesis	Decision on Significance
		Computed	Tabulated			
Experimental	82.76	2.710	+/- 1.987	0.008	Reject	Significant
Control	80.24					

Table 5 presents the difference in the mean gain scores of the experimental and the control groups. The experimental group attained a higher mean gain score of 82.76 than the control group with a mean gain score of 80.24. It can be gleaned from these results that there was a significant difference between the mean gain scores of the experimental and the control groups. This is supported by a t-computed of 2.710 with p-value of .008, thus the null hypothesis was rejected. Computation in the mean difference gain scores of the experimental and the control groups revealed that the computed t-value of 2.710 was greater than the tabulated t-value of +/- 1.987, thus the null hypothesis was rejected.

5. Discussion

5.1 Pre-test and Post-test Mean Score of the Control and Experimental Group
None of the students has outstanding, very satisfactory, and very poor learning outcomes. On the other hand, 41.56% of the control group in the post-test had satisfactory learning outcomes while 27.33% had poor learning outcomes. The mean gain of the experimental group is high compared to the mean of the control group.

The results revealed that at the start of the experiment, the experimental group had higher learning outcomes than the control group. This result is also related to the studies conducted by Barredo (2012) and Plenos (2014). Barredo (2012) stated in her study that there was a significant difference between the experimental group in the pre-test and post-test. However, a higher mean was observed from the experimental group after the presentation of the intervention material. Moreover, Plenos (2014) in her study entitled, "Effectiveness of the teacher-made science strategic intervention material in increasing the performance level of students in the specified competency", revealed that there was a 100% increase in the passing rate of all students who used the science strategic intervention material.

5.2 Level of Students' Academic Achievement
An increase in grades in the experimental group was noted. Based on Shauna and Gordon (2017), learning materials can aid in motivating and engaging learners, and encouraging learners to become active members in their particular learning and training process with

continuous utilization of such activity on increase of the learning outcome of the students is expected.

5.3 Pre-test and Post-test Scores of the Control Group and Experimental Group

This implies that the results of the test at the start of the experiment were different. The experimental group had a higher mean than the control group. Considering their mean scores, students in the SIM group performed low in the beginning but after the intervention, gained a satisfactory performance in Science. Meanwhile, students in the non-SIM group maintained low performance before and after the intervention.

This result conforms with the findings of the study of Soberano (2011) who mentioned that SIMs were effective in mastering the competency-based skills in Science based on the mean gain scores in the post-tests of the experimental and control groups. He found out that there was a positive transfer of learning in both groups. However, a higher mean was observed from the experimental group after the presentation of the intervention materials.

5.4 Mean Difference in the Post-test Scores of the Control Group and Experimental Group

It can be gleaned from these results that there was a significant difference between the mean difference gain scores of the experimental and the control groups. Computation in the mean difference mean of post-test scores of the control group and experimental group revealed that the computed t-value of 2.052 was greater than the tabulated t-value of +/- 2.015 with a p-value of 0.046 lower than the level of significance of 0.05, thus the null hypothesis was rejected.

These findings were recognized by Rosenshine (2010) that intervention studies taught students to generate questions as means of improving their comprehension. Overall, teaching students the cognitive strategy of generating questions about the material they had read resulted in gains in comprehension, as measured by tests given at the end of the intervention.

5.5 Difference between the Academic Performance of Students in Control Group and Experimental Group

This revealed that the use of SIM in physical science was better than the conventional method in improving the learning outcomes of students in science. Pedreira (2015) stated that learning intervention materials enhances cognitive learning outcomes, affective learning outcomes and communicative learning outcomes.

As supported by Horn (2011) it also optimizes the instructional design and enhances students to access multiple resources to ensure an increase in the learners' performance. Thus, using strategic intervention materials in teaching was more successful in improving the learning outcomes of senior high school students.

6. Conclusion

The foregoing findings from the study led the researcher to draw the following conclusions.

The experimental group is very high compared to the control group. The results revealed that at the start of the experiment, the experimental group had higher learning outcomes than the control group. The use of SIM in the classroom has increased the learning outcomes of students in science. An increase in grades in the experimental group was noted. The experimental group had a higher mean than the control group.

Considering their mean scores, students in the SIM group performed low in the beginning but after the intervention gained a satisfactory performance in science. Meanwhile, students in the non-SIM group maintained low performance before and after the intervention. It could be inferred that students in the experimental group got an improvement in their academic performance than the control group. Therefore, the use of SIM in teaching could increase the learning outcomes of students in science.

7. Recommendations

Based on the findings, analysis and conclusion drawn in this study, the following recommendations.

Science teachers to use the developed strategic intervention material in teaching or remediating their low achieving students. In the same manner, science teachers may develop and integrate the use of SIM in teaching difficult science concepts to low achieving learners through their in-service training.

In addition, school administrators may provide facilities and equipment that would aid teachers, not only science teachers, in integrating strategic intervention material in their respective classes that can help improve the teaching and learning process inside the four walls of the classroom.

DepEd needs to devise a learning approach program to address the unique learning needs of students in order for them to appropriately address the needs of students. Lastly, it is highly recommended that researches would further the use of SIM in other disciplines.

Conflict of Interest Statement
The authors declare no conflicts of interest.

About the Authors
Ms. Reina Anne Cecilia R. Limbago-Bastida is a Registered Nurse and a Licensed Professional Teacher. She is a full-time Senior High School Teacher at the Mati National Comprehensive High School in the Division of the City of Mati, Philippines.
Dr. Garry L. Bastida is a Registered Librarian, a graduate of Bachelor of Secondary Education major in General Science, a Master in Library and Information Science and a

Doctor in Business Management. He is a Faculty at the Davao Oriental State University, Philippines.

References

Ausubel, D. (1968). The psychology of meaningful verbal learning. *New York: Grune & Stratton;* Retrieved November 15, 2019 from https://bit.ly/2KxQ9ih.

Barredo, K. J. (2012). *Evaluating the effectiveness of using strategic intervention material in improving the academic performance in science strategic intervention material*

Bruner, J. (1966). The role of Discovery Learning Approach. *The Child's Concept of Language.* New York: Springer-Verlag.

David, L. (2005). Strategic intervention material-based instruction, learning approach and students' performance in chemistry. *International Journal of Learning, Teaching and Education Research,* 2(1), 91-123.

Dela Cruz, M. (2017). *Effects of lack of instructional material.* Retrieved: http://www.academia.eu/13158439. September 2019.

Fuchs, T. (2014) Effectiveness of Tri-in-1 strategic intervention materials for grade 9 students through Solomon four-group design. *Asia Pacific Journal of Education, Arts and Sciences.* 4(1).

Horn, A. (2011). *The conditions of learning and theory of instruction.* New York: CBS College Publishing.

Javier, P. (2015). *Effects of strategic intervention material (SIM) on the academic achievements in Chemistry of public high school students.* Retrieved from http://www.slideshare.net/neoyen/strategic-intervention-material. September 2019.

Legaspi, D. (2014). *Performance of Philippine high schools with special curriculum in the trends in international mathematics and science study* (TIMSS Advanced). Retrieved from http://www.nscb.gov.ph. October 2019

Pedreira, E. (2015) *Educational potential, underachievement, and cultural pluralism.* Education in the North, 16, 23-32.

Plenos, J. (2014) Effectiveness of the Teacher-Made Science Strategic Intervention Material in Increasing the Performance Level of Grade Six Pupils of Bacongco Elementary Schools in the Specified Competency.

Rosenshin, B. (2010). *Strategic Intervention Material (SIM) on Educational Statistics for B. Ed. Students-* An Experiment Statistics for Journal of Open Learning. 24-31.

Shauna C., Gordon N. (2011). *Blended learning: How Does Skill builder LMS Simplify your Learning Delivery.* Retrieved from www.skillbuilderlms.com

Soberano, A. (2011). *Strategic intervention materials in Chemistry.* Paper presented at the Third International Conference on Science and Mathematics Education, Penang Malaysia.

Warrington, T. (2012). *United States in the stagnation in Mathematics and Science.* http://m.search.proquest.com/proquestws/mlogin