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# Effects of Using "A Momentum with You!" A Strategic Intervention Material on the Students' Performance of Grade Nine Students of Marcos Calo National High School

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***Abstract***
**Aim:** This study aimed to develop strategic intervention material in science nine that can be used as supplemental material that will enhance learning and remedy the least mastered skill which is the momentum.
**Methodology:** The chosen least mastered was identified through the result of item analysis. The respondents of the study were all grade nine students of Marcos Calo National High School. The scores of the pretest and posttest were gathered, tabulated, and analyzed through statistical procedure t-test. A questionnaire on the student's perception on the effectiveness of strategic intervention material in science were given, tabulated the result and analyzed using weighted mean.
**Results:** Findings have shown that the strategic intervention material entitled "A Momentum with You!" can be supplemental material in teaching momentum in science nine. T-test rejects the $Ho_2$ "There is no significant differences that exist between the pretest and posttest scores before and after using the strategic intervention material". Students find the SIM interesting, enjoyable and it contributes positive attitude towards learning more concepts in science.
**Conclusion:** It means that the performance of the students was improved or enhanced using the SIM in delivering the lesson and the said SIM gives a positive perception on the students.

***Keywords:*** Strategic Intervention Material, Pre and Posttest, Mean Percentage Score, T-Test, Momentum

## INTRODUCTION

Science allows students to explore their world and discover new things. It is also a dynamic subject area, containing activities such as hands-on laboratories and experiments (Barredo, 2013). Students' performance in the National Achievement Test (NAT) shows science continued to be the most difficult field of study in basic education (Philippines Basic Education, 2013).

The Department of Education (DepEd) introduces Strategic Intervention Materials popularly known as SIM in Philippine Education. This SIM is conceptualized and designed to aid teachers to provide students the needed support to make progress in their studies.

The SIM will increase and deepen the skills, knowledge, and understanding of the students in the various concepts of science like electron configuration in grade nine. In that way, it gives them an opportunity to comprehend the ideas and concepts that would enrich their understanding of the identified least mastered skill (Rodrigo, 2015). In addition, the designs of the SIM are attractive to the interest of students.

The benefit of the SIM is not only for teachers' convenience and system but also for the easy grasp of the students. It indicates, however, that many Filipino students do not achieve functional literacy considering they find it difficult to meet the challenges posed by our rapidly changing world.

The National Achievement Test (NAT) results are intended to guide the Department of Education in the efforts toward the improvement of the quality of education in public schools and to provide appropriate intervention for the students.

Almost two-thirds of the country's high school students performed poorly in the NAT last school year with some 67.10 percent of schools getting below average NAT scores (Quismundo, 2011).

Cai Ordinario (2013) published 'Low NAT scores may worsen under K to 12' where she stated that some sectors have expressed concern that the K to 12 program would further worsen the deteriorating performance of the public high school students in NAT.

DepEd data showed that the average NAT score of public high school students for the school year 2011 to 2012 was significantly lower at 48.9% where science only gained 40.53 %.

As the National Education Testing and Research Center (Philippine Basic Education [PBE], 2013) provides some factors that have been found to correlate positively with Mean Percentage Score (MPS): first, single shift schools; second, schools, where learning is not engaged in labor, have an MPS of 51.90% and third, schools where teachers present

first the concept (theory followed by a variety of examples and/or situational roles) the MPS is 52.30% in science.

According to Barredo (2013) the goal of science is to demonstrate understanding of how science relates to the comprehension of the environment and application of skills, attitudes, and values in solving varied life situations.

It is for these reasons that the researcher athirst on developing SIM in science for grade nine to help them to master a competency-based skill that they were not able to develop fully during the classroom teaching, thus attain growth in their academic performance.

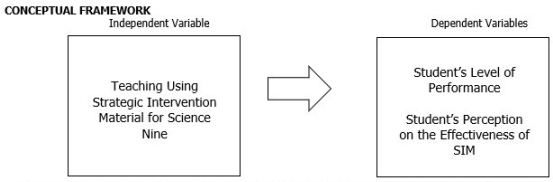


Figure 1: A schematic diagram showing the interplay between an independent variable and dependent variables.

**Statement of the Problem**

This action research aimed to develop a strategic intervention material that can be used as supplemental material in science. It will enhance learning and serve as a remedy to the least mastered skills of the learners.

Specifically, this study sought answers to the following problems:

1. What is the level of student's performance using the strategic intervention material based on the MPS of the given pretest and posttest?
2. What are the significant differences between the pretest and the posttest scores?
3. To what extent do students consider the effectiveness of SIM in learning the concept?

**HYPOTHESES**

1. Ho1: The strategic intervention material entitled "A Momentum with You!" cannot be used as a supplemental material in teaching momentum in science nine.

   Ha1: The strategic intervention material entitled "A Momentum with You!" can be used as a supplemental material in teaching electron momentum in science nine.
2. Ho2: There is no significant differences that exists between the pretest and post-test scores before and after using the strategic intervention material.

   Ha2: There is significant differences that exists between the pretest and posttest scores before and after using the strategic intervention material.

**SIGNIFICANCE OF THE STUDY**

People who work with the students should clearly understand the nature of the learner to be more effective in dealing with them and with their problems.

The findings of the study were beneficial to the students, science teachers, science supervisor, parents, and future researchers. Furthermore, the findings help them to decide on appropriate interventions to meet students' needs, especially those students with learning difficulties, and to create necessary instructional aides to elevate quality education in public schools.

**Students.** It could give them motivation on how to manage their difficulties and encouragement to study hard by overcoming their weakness in science.

**Science Teachers.** Teachers may find the result of the study helpful in planning and initiating suitable strategic intervention materials in teaching science at any learning level inside the classroom. They encourage other teachers to advance their approaches and techniques in the teaching-learning process.

**School Administrators.** To make decisions and allocate more budgets particularly those related to the production and use of the SIM in the condition that the said instruction material has been validated by the experts. With the help of the SIM, students were able to attain high achievement, thus giving the name of the school and even the division another big achievement.

**Science Supervisors.** This study may serve as the catalyst for the Science supervisor in refining instructional methods. It helps them recognize the needs that caused the weakness in attaining good scientific skills.

**Parents.** The result of the study may augment parents' active participation in supporting the needs of their children and improve their relationship as supporters and partners of the school in achieving high student performance.

**Future Researchers.** This study may serve as valuable basis of data while conducting their own research.

**SCOPE AND DELIMITATION OF THE STUDY**

The electron configuration topic in grade nine is the main focus of this research.

The science coordinator together with the science teachers of Marcos Calo National High School conducted a thorough analysis of test results in science nine. Then, it was found out that momentum is one of the topics which is under the least mastered skill.

The study started on the third week of the second quarter (month of August) of the school year 2017 – 2018. The respondents were the currently enrolled 68 grade nine students from sections Banzon and Alcaraz of Marcos Calo National High School.

They had diverse qualities in terms of intellect and scientific ability.

Below showed the distribution of the population:

Distribution of Population

| Grade & Section | Number Of Male | Number of Female | Total |
|---|---|---|---|
| Grade 9 Banzon | 15 | 17 | 32 |
| Grade 9 Alcaraz | 19 | 17 | 36 |
| | | | 68 |

**INSTRUMENTATION**

**Strategic Intervention Material (SIM)**

They were intervention materials designed to help teachers in providing students with the needed support for progress. They tried to increase and deepen their skills, knowledge, and understanding from concrete science to what was more abstract. They gave students the opportunity to explore their understanding and make sense of these new scientific ideas. Furthermore, the SIM tend to reteach the lessons which are not clear to the learners and to help them gain mastery of the skills.

Each SIM has five parts such as the guide card, activity card, assessment card, enrichment card, and reference card. The guide card stimulates the student's interest in the topic discussed and gave a preview of what they would learn. The activity card translates the focus skills in at least three activities. The assessment card provides exercises, drills, or activities that allow students to assess their understanding of what they have learned correct errors when appropriate and monitor their learning and use feedback about their progress. The enrichment card provides activities that reinforce the content of the lesson and provides opportunities for the students to apply what they have learned to other subject areas or in new contexts. Finally, the reference card provides further reading to the students (Rodrigo, 2015).

**Strategic Intervention Material Validation**

The SIM was validated by the School Learning Resource Validation Team. LRMDS Consultant, LRMDS Coordinator, Science and English Coordinators, ICT Coordinator, an IT Artist and District Supervisor are the members of the team. The evaluation of the SIM is according to the following four factors:

1. content;
2. format;
3. presentation and organization; and
4. accuracy and up-to-datedness of information.

Also, this SIM was validated by District LRMDS and District Science Coordinator as preparation for an entry to Science and Technology Fair 2018.

**Pretest/Posttest**

A pretest/posttest design is usually a quasi-experiment (participants are not randomly assigned) where participants are studied before and after the experimental manipulation. This is by far, the simplest the most common, and the most useful way of ensuring that an experiment has a strong level of internal validity.

The SIM contained a 10-item teacher-made test that was designed to measure the mastery level of the students on the lesson chosen by the researcher.

**TESTING THE FUNCTIONALITY AND VALIDITY OF THE SIM**

The researcher had been permitted by the School Head, Miss Analyn L. Yuting and the School Science Coordinator, the researcher conducted the study in Marcos Calo National High School. The researcher informed the School Science Coordinator, Science Teachers, and the Teacher-advisers of each two sections of Grade Nine.

The lesson was introduced to the students using cooperative learning. A 15-item pretest was given to students prior to the use of strategic intervention material to assess the prior knowledge of the students of the selected least mastered skills which is the momentum. The MPS of the pretest was only 51.00%.

The researcher introduced the SIM to all Grade nine students with the help of other science teachers. Students used the said SIM within 1 hour as the required time allotment for science under K-12 Basic Education Curriculum, and then the posttest was administered.

**STATISTICAL TREATMENT**

The pretest and post-test results were compiled, sorted out, organized, and tabulated. The same was subjected to statistical treatment to facilitate the presentation, analysis, and interpretation of the data. The following statistical tools were utilized to process the data:

**Percentage.** This was used to determine how a part is related to a whole. It was used to determine whether the respondents have successfully passed or failed the intervention process.

**Weighted mean** was used to determine the percentage of MPS to identify the level of student's performance between pretest and post-test scores.

Formula in calculating the Mean and the Mean Percentage Score:

Mean(x) = $\frac{\Sigma x}{N}$ where, x = scores multiply by no. of correct responses/s
N = no. of cases (respondents)

Mean Percentage Score (MPS) = $\frac{Mean}{No.\ of\ Items}\ x\ 100\%$

The following scale was also applied by the researcher:

| Verbal Description | Scale | Explanation |
|---|---|---|
| 5-Strongly Agree (SA) | (4.21 - 5.00) | The respondent is 81-100% agree with the effectiveness of SIM. |
| 4-Agree (A) | (3.41 - 4.20) | The respondent is 61-80% agree with the effectiveness of SIM. |
| 3-Moderately Agree (MA) | (2.61 - 3.40) | The respondent is 40-60% agree with agree with effectiveness of SIM. |
| 2-Disagree (D) | (1.81 - 2.60) | The respondent is 21-40% agree with agree with effectiveness of SIM. |
| 1-Strongly Disagree (SD) | (1.00 - 1.80) | The respondent is 1-20% agree with effectiveness of SIM. |

**T-Test** was employed to determine the significance between the scores of pretests before using strategic intervention material and posttest after using strategic intervention material.

**PRESENTATION, ANALYSIS AND INTERPRETATION OF DATA**

It deals with the presentation, analysis, and interpretation of the data gathered from this study. The discussions are presented sequentially based on the statement of the problem.

*Problem 1: What is the level of students' performances based on the MPS of pretest before using strategic intervention material and posttest after using strategic intervention material?*

This is to discuss the results of the study on the students' performance in SIM entitle "A Momentum with You!". The Mean (x) and the Mean Percentage Score (MPS) of the students were calculated.

Scores of the Pretest of Respondents before Using SIM

| Scores | Number Of Correct Response/s Section Banzon | Section Alcaraz |
|---|---|---|
| 15 | 1 | 1 |
| 14 | 2 | 2 |
| 13 | 0 | 2 |
| 12 | 2 | 3 |
| 11 | 2 | 2 |
| 10 | 0 | 0 |
| 9 | 2 | 3 |
| 8 | 1 | 1 |
| 7 | 2 | 0 |
| 6 | 2 | 1 |
| 5 | 1 | 2 |
| 4 | 1 | 3 |
| 3 | 0 | 0 |
| 2 | 1 | 2 |
| 1 | 0 | 1 |
| No. of Cases | 32 | 36 |
| Σx | 152 | 195 |
| Mean | 4.75 | 5.42 |
| MPS | 47.50% | 54.20% |
| | **Total MPS** | **51%** |

Above showed evident results before using the strategic intervention material. Section Alcaraz got high (54.2 % - near mastery) MPS compared to the other section but still did not meet the 75% (mastered) target MPS of DepEd – DepEd Order No. 08 s.2015 Policy Guidelines on Classroom Assessment for the K to 12 Basic Education.

Similarly, result is also evident in the study of Alboruto (2017) and Sinco (2018) where the pretest transmuted scores are below the 75% passing rate.

Scores of the Posttest of Respondents after Using SIM

| Scores | Number Of Correct Response/s | |
|---|---|---|
| | Section Banzon | Section Alcaraz |
| 15 | 2 | 2 |
| 14 | 2 | 3 |
| 13 | 2 | 2 |
| 12 | 2 | 3 |
| 11 | 2 | 2 |
| 10 | 2 | 2 |
| 9 | 2 | 3 |
| 8 | 4 | 3 |
| 7 | 2 | 2 |
| 6 | 2 | 2 |
| 5 | 3 | 2 |
| 4 | 2 | 3 |
| 3 | 2 | 3 |
| 2 | 1 | 2 |
| 1 | 5 | 3 |
| No. of Cases | 32 | 36 |
| Σx | 262 | 291 |
| Mean | 8.188 | 8.083 |
| MPS | 81.90% | 80.83% |
| | **Total MPS** | **81.30%** |

learning accomplishments of students, the same as what Sinco (2018) findings.

It could be seen from table above that all of the sections in Grade Nine has an MPS above 75% after using the SIM.

The post-test result in the study is similar with that of Salviejo (2014) and Miguel (2012) where the posttests of the experimental group increased evidently after the use of SIMs.

*Problem 2: What significant differences exist between the scores of pretest before using strategic intervention material and posttest after using strategic intervention material?*

Table of Difference in the Pretest and Posttest Scores of Respondents

| Grade & Section | No. of Respondents | Pretest | Posttest | Difference |
|---|---|---|---|---|
| Grade 9 – Banzon | 32 | 47.50% | 81.90% | 34.40% |
| Grade 9 - Alcaraz | 36 | 54.20% | 80.80% | 26.60% |

The data in the table showed the difference between pretest and posttest scores of the two sections of grade nine. Section Banzon got the notable improvement where the difference between the pretest and posttest score was 34.4%. It specifies that grade nine students have great improvement, or they learned more when a supplemental material like SIM is
used in teaching momentum.

This is similar result with Togonon (2011), she stressed that students exposed to SIMs performs better on posttest than the pretest.

T-test on the Significant Difference between the Pretest and Posttest Scores using Strategic Intervention Material

| Variable | Number of Respondents | Mean | SD | df |
|---|---|---|---|---|
| Protest | 68 | 4.92 | 2.13 | 292 |
| Posttest | 68 | 8.22 | 1.46 | |

| Variable | Computed t | Tabulated t | Decision | Interpretation |
|---|---|---|---|---|
| Protest Posttest | 12.69 | 1.96 | Reject Ho2 | Significant |

It could be gleaned in the table above that there is a significant difference in the pretest and posttest result using SIM. This means that the performance of the students improved/enhanced using the SIM in delivering the lesson. The SIM could be the best supplemental material in teaching momentum in science nine.

This is an indication that the SIM used showed effectivity of remediation in uplifting the learning accomplishments of students, the same as what Sinco (2018) findings.

*Problem 3: To what extent do students consider the effectiveness of SIM in learning the concept?*

| *To what extent do students' perceive the following* | $w\bar{x}$ | *Verbal Description* | *Equivalent* |
|---|---|---|---|
| 1. The SIM inspired and encouraged me to learn more concepts in science 9. | 4.32 | Strongly Agree | Very High |
| 2. The instructions are simple and easy to follow. | 4.21 | Strongly Agree | Very High |
| 3. The SIM helps me understand the momentum topic in science 9 that were not understood during regular classroom teaching. | 4.12 | Agree | High |
| 4. Confusing concept of momentum was clearly presented. | 4.82 | Strongly Agree | Very High |
| 5. I enjoyed reading and doing all the activities provided in the SIM. | 4.74 | Strongly Agree | Very High |
| 6. I want to use SIM during remediation class. | 4.66 | Strongly Agree | Very High |
| 7. The SIM offers interesting activities. | 4.33 | Strongly Agree | Very High |
| 8. After using the SIM, I learn the concepts that were not fully understood in the regular classroom instruction. | 4.57 | Strongly Agree | Very High |
| 9. The SIM is student-friendly material. | 4.49 | Strongly Agree | Very High |
| 10. I can set up my own pace in learning without feeling pressured about time. | 4.05 | Agree | High |
| ***Composite*** | **4.43** | **Strongly Agree** | **Very High** |

Legend:

| Scale | Verbal Description | Equivalent |
|---|---|---|
| 4.21 - 5.00 | Strongly Agree | Very High |
| 3.41 - 4.20 | Agree | High |
| 2.61 - 3.40 | Moderately Agree | Moderate |
| 1.81 - 2.60 | Disagree | Low |
| 1.00 - 1.80 | Strongly Disagree | Very Low |

Above is the data from consolidated responses of 68 students on their perception on using strategic intervention materials.

An instructional material that has simple and easy instructions gives impact to the learning of the students ($w\bar{x}$ = 4.21), this is also the findings of Policarpio (2011) that SIM should be clear and easy to use.

Students further reveal that confusing momentum topic as regularly tackled and discussed in the classroom setting, by using SIM, it helped them understand the lessons that were clearly presented ($w\bar{x}$ = 4.12 and $w\bar{x}$ = 4.57). These results are the same with the findings of Dy (2011) that revealed the usefulness of SIM as an instructional material that increases student's level of understanding.

Most of the students also say that enjoyed reading and doing all the activities in the SIM ($w\bar{x}$ = 4.74) because it offers interesting topics ($w\bar{x}$ = 4.33). This runs parallel to the finding of Acuña et.al. (2015) wherein they concluded that the integration of reading skills in the development of SIM may facilitate the learning of science concepts.

## FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

Based on the findings, the researchers agreed on Hogan (2000) and Woodward (2004) as cited in Soberano (2009) that the intervention materials contributed to better learning of the concepts among students. As Barredo (2013), students learn best when they can build on experience. They can relate their learning to things that are relevant to them, have hands-on experience, construct their own knowledge in collaboration with other students, and communicate their results effectively.

### Findings

1. The mean percentage score of all grade nine students in the pretest was in the range of 74% and below. Section Alcaraz received 54.2%, near mastery bracket description based on DepEd Evaluation of MPS. It was followed by Section Banzon with an MPS of 47.5%. MPS 75% and above has a bracket description of skills, mastered. The post-test MPS of all three sections was marked above 75% for this reason they all mastered the skill.
2. There were significant differences that exist between the pretest and posttest scores before and after using the SIM. The difference in the mean score of pretest (4.92) and posttest (8.22) was indeed significant. There was a positive transfer of learning in the respondents.
3. The students' perception on the effectiveness of SIM in learning the concepts is $w\bar{x}$ = 4.43 that has a verbal description of strongly agree and has very high equivalency.

### Conclusions

Based on the findings, the following conclusions were drawn:

1. The strategic intervention material was effective in teaching competency-based skills. There was a significant difference between the mean score in the posttest.
2. This SIM can be supplemental material to teach the momentum topic of grade nine science.
3. The students had a positive perception on the use of Strategic Intervention Material. Students find it interesting, enjoyable and it contributes optimistic attitude towards learning more concepts in science.

### Recommendations

Based on the outcomes and implications of the study, the following are recommended:

1. Teachers in science can use the strategic intervention material made by the researcher to re-teach the concepts and skills and help the students master the competency-based skill.
2. Science teachers should develop more strategic intervention materials for the remaining lessons which were not included in this SIM.
3. Seminars, workshops, and in-service training should be conducted at the division level regarding the development and implementation of the strategic intervention materials in the classroom.
4. School administrators must encourage and support their science teachers to develop SIM as this found to be useful in remediating low performing students.
5. Future researchers can conduct a similar study covering a large number of respondent in other location. They can also conduct a study regarding the developed SIM's effectiveness.

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