

Teachers' Mastery on the Content and Academic Performance of Pupils: Basis for Designing Learning Modules

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Abstract: Low mastery on the competencies and academic performance of pupils in Science had been evident concern among pupils in the district. Hence, this descriptive study was conducted to determine the mastery level of teachers and pupils on the content and its effect on their academic performance in specific grading period. This action research tried to validate the fact that teachers' mastery on the content plays a vital role in the academic performance of pupils by looking at the mastery level of 17 teachers on the content standard as well as the 248 pupils and their academic performance in Science V. The researchers used the K to 12 Curriculum Guide in Science V to identify the competencies that need to be mastered in first and grading period that serve as guide in formulating test questions for the respondent which validated by group of experts. Self-made questionnaires were tested to group of teachers and pupils and was used to determine their mastery level on the content. Academic performance of pupils was gathered and analyzed. The findings of the study revealed that there is a significant difference on the mastery of teachers and the mastery of pupils on the content. The low achievement of pupils in the mastery of content affect academic performance. These were inputs to designing learning modules for the least mastered competencies to augment pupils' performance in the National Achievement Test in Science through a School Learning Action Cell.

Keywords: Reading comprehension, academic performance, Science performance, strategic intervention materials

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Introduction

Concerns over elementary pupils' low performance in Science classes which are evident in public schools are still observed by many teachers and school heads. These pressing challenges are revealed in school reports presented by school managers. The contention has also been supported by academic researches and past investigations. Evidently, there were lots of action researches conducted to help the educational system improve the performance

of pupils as well as teachers in all disciplines particularly in Elementary Science. In spite of the interventions made by Science teachers still the concerns for improving pupils' performance are the focus of every academic endeavors and scholarly researches to address the academic gaps that are evident in most public Filipino basic education classrooms.

Cognizant of the Department of Education's advocacy of quality basic education in every Filipino classroom, the researchers being Science and Language mentors strongly believed that learning the Science concepts is indispensable for the pupils to relate them to real life conditions. Consequently, this process ensures possible learning among the pupils. This concept is clearly stipulated in the Basic Education Curriculum Primer of 2002 stating that Science and Health should aim to help the Filipino child gain a functional understanding of science concepts and principles that are linked with real life situations, acquire Science skills as well as scientific attitudes and values needed in solving everyday problems.

The Trends in Mathematics and Science Survey (TIMSS) had alarming reports. According to the survey, the Philippines has ranked 41st in Math and 42nd in Science out of 45 countries that were tested (Manila Times, 2004). This proved that vast majority of Filipino pupils have performed way below par in all national achievement tests, and below the levels of most pupils from other countries in the international tests. The trend is somewhat observed in the local scene. It was evident on the result of 2016–2017 National Achievement Test (NAT) for Grade VI. The reports revealed that School's Division of Calapan City had gained the following Mean Percentage Score in five major subjects were English obtain an average of 42.78, Science got 31.93, Math attain 36.69, Filipino achieve 58.18 and HEKASI reach 43.18. Results show that Science has got the lowest score which directly implied that this subject has remained the most difficult field of study in basic education. The said NAT result poses challenges and has been considered an alarming situation and an urgent concern on the part of school heads, teachers, and parents.

Measures have been tried to effect on the improvement of Science performance in the NAT. In fact, teaching Science and Health has formally introduced in Grade III using Mother Tongue as a medium of instruction. In Grades IV-VI, more complex study of Science concepts is taken up in preparation for high school setting where competencies need to be mastered before they graduate from elementary. That's the reason why the researchers had come up with this study to determine if teachers' mastery of the content which affects the academic performance of pupils.

Challenged by the abovementioned scenarios, the researchers assumed that the teachers' mastery on the content is important in improving the academic performance of pupils. Thus, this study was deemed relevant as this would help determine the significance of mastery of content in the teaching-learning process. The recommendations and the relevance of the interventions would be considered significant contribution to the expanding body of knowledge particularly on science education as the researchers would propose a set of learning modules to address the least mastered competencies among the pupils, which may eventually effect on their academic performance.

Materials and Methods

The quantitative research approach was used in this study which aimed to look into teachers' mastery on the content standard of Science V and academic performance of pupils which served as the basis for a set of learning modules least mastered competencies of pupils as a part of School Learning Action Cell or SLAC.

This study made use of descriptive correlational design. This study utilized more statistical tests to explain the nature, characteristics, relationships and differences of variables. Descriptive research is devoted to the gathering of information about prevailing conditions or situations for the purpose of description and interpretation. This type of research method is not simply amassing and tabulating facts but includes proper analyses, interpretation, comparisons, and identification of trends and relationships (Salaria, 2008).

The reason of using descriptive method was that it encompasses all the data gathered useful in adjusting or meeting the existing phenomenon. Another reason was that descriptive research interprets and explains the phenomenon. It deals with existing relationship, prevailing practices, established processes, strong effects and developing trends. While other methods are mere gathering and interpretation of data, descriptive method goes beyond usual research activities. This research method involves does not only interpret information, but also analyzing meaning or significance of what is being gathered and described. One very important fact about descriptive research is that it reveals the similarity and relationship of as the researcher measures, classifies, interprets and evaluates.

The researchers used the competencies of the first and second grading period as stated in the K to 12 Curriculum Guide. A 50-item questions used in this study were crafted by the researchers and validated by group of experts in Science, language gurus, and research experts.

To determine the teachers' mastery on the content standard and the academic performance of pupils, the same set of questionnaire was given to them. The researchers also obtained the pupils' marks from Form 138 or Report Cards provided by the class advisers.

Respondents of the Study

The respondent schools of this study were the 17 out of 19 public elementary schools in Calapan South District, City Division of Calapan, Oriental Mindoro. The schools where the researchers are teaching were not included in the study. All the 17 grade V teachers teaching Science and the 248 pupils who were randomly selected with the total of 265 were the respondents of the study.

Sampling Technique

To determine the total number of teachers in the sample size, purposive sampling with total enumeration was used. This non-probability sampling gives the researchers control over the unit being studied (Broto, 2008). However, Stratified Random Sampling Technique was employed to determine the sample size for pupil-respondents. Sample size was determined using Slovin's Formula

Research Instrument

The researchers employed the self-constructed 50-item test questionnaire as the research instrument. The questionnaire for teacher population contained two parts, namely: Part I– Profile of Science Teachers; Part II –Teachers' Mastery on the Content Standard in Science V.

Part I was solicited background information from the teacher-respondents. This was only limited to the Grade V Science teachers. It included age, sex, length of service, educational attainment, and area of specialization. Part II is about Teachers' Mastery on the Content Standard in Science V. It consisted of 50 questions on the content standard in Science V for

the first and second quarter. First quarter competencies were 4 while second quarter has 9 competencies. Competency 1 and 2 for the first quarter have 5 questions each while competency 3 and 4 for the first quarter have 6 questions each with the total of 22 questions.

There were 28 questions for the 9 competencies for the second quarter. Competency 1 to 8 have 3 questions each while competency 9 has 4 questions to measure the teachers' mastery level on the content standard of the Grade V teachers in Calapan South District.

Same questions were given to their pupils to test their academic performance on the competencies they have learned from their teachers.

Validity of the Instrument

Content validation of the instrument was done by taking all the suggestions and comments from the District Supervisor in-charge of Science and the Division Education Program Supervisor in-charge of Science, language gurus, and research experts. Their recommendations were integrated in the final copy of the instrument.

Reliability of the Instrument

The test-retest method was conducted to ten non-respondent teachers and ten non-respondent pupils from Adriatico Memorial School over a period of ten-day interval. After retrieving the responses from the respondents, the raw scores were consolidated. These were statistically treated with the use of Pearson's Product Moment of Correlation with the formula as shown below:

Data collected from the source were tabulated, interpreted and analyzed with the help of experts, statistician to determine the reliability of the self-made test. Results show that the research instrument was reliable as indicated by correlation coefficient 0.943 (Teachers) and 0.927 (Pupils). After the reliability test, the researchers immediately conducted the study in select public elementary schools in Calapan South District.

Data Collection

In order to collect all the necessary data systematically, the researchers sent a letter of request to the Schools Division Superintendent. Upon approval, the letter was forwarded to the District Supervisors of Calapan South District for approval. The questionnaires were individually distributed to the teacher-respondents and pupil-respondents of the 17 schools. They were convened in the same room to answer the questions. Materials were retrieved right after they answered the test-questionnaires. The data were tabulated, analyzed and interpreted.

Statistical Treatment of Data

The data gathered were analyzed and interpreted using descriptive and inferential statistics. Descriptive statistics such as weighted mean, percentage and frequency were used to describe the variables of the study. Inferential statistics using Pearson's r coefficient of correlation was used to find the relationships among selected variables. To test the difference between the teachers' mastery on the content in science V and the academic performance of pupils, t -test for independent samples was used.

Ethical Issues

The proponents observed fairness in conducting the study. They ensured that the objectives of the research were clear to the respondents before the actual conduct of the research. They

guaranteed that the data gathered were correct and accurate through validation. The researchers personally gathered the instruments and validated the result from teacher's record and the names of the respondents were dealt with full confidentiality. Acknowledgement of the sources was considered through proper citation.

The researchers ensured that the research design and tools were appropriate to the data as they collaborated with efforts of experts in the field of research and statistics.

Data Analysis

The data from retrieved questionnaire were encoded, tabulated and statistically treated, analyzed and interpreted using the descriptive statistics such as mean, percentage and frequency. Statistical tools such as descriptive correlational design and inferential Pearson's-r with simple linear regression were used to find the relationship between the identified variables.

Results and Discussion

Each group of data was analyzed and interpreted based on the problems raised in the study, with the corresponding tables presented sequentially to give clarity on data presentation analysis.

1. Level of mastery of teachers on the content standard of Science V in the first and second quarter

Table 1. Level of Mastery of Teachers on the Content Standard in Science V

No. of Teachers' Respondent	No. of Item	No. of Teachers who got 74 and below	Percentage	No. of Teachers who got 75 and above	Percentage	Interpret a-tion
17	50	1	2%	16	94.12 %	Mastered
Mean = 43.65						

Table 1 shows that out of 17 teacher respondents only 1 got 74% and below. Sixteen teachers mastered the content standard in the first and second quarter in Science V as revealed by the grand mean of 43.65. This may be attributed to the fact that teachers' mastery which can be derived from seminars and trainings they had attended. However, the mean (43.65) which is indicated as average suggests that there is still a need for teachers to have further improvement through attendance to seminar like School Learning Action Cell or SLAC and similar others.

The results got support from the study of Darling- Hammond (2008) stating that a solid foundation of subject matter knowledge and how it relates to students' achievement. The research article emphasized the importance of teachers having a deep and flexible understanding of the material. It further underscored that teachers who possess a deep knowledge will increase students' creativity and better academic performance. The researchers used the scale of National Educational Testing and Research Center (NETRC) standard in measuring the achievement level. The level of Average as revealed in the over-all mean score of their mastery on the content standard in Science V suggests that there is a need to conduct School Learning Action Cell for teachers to address their need in improving and sustaining their skills in mastering the content standard.

2. Academic performance of Grade V pupils in Science in the first and second grading period.

Table 2. Frequency and Percentage Distribution on Academic Performance of Grade V Pupils in Science

Grade Interval	Frequency	Percentage	Interpretation
90-100	18	7.26 %	Outstanding
85-89	106	42.74%	Very Satisfactory
80-84	89	35.89%	Satisfactory
75-79	35	14.11%	Fairly Satisfactory
Total	248	100%	

Table above shows that out of 248 pupils, 35 of them or 14.11% got an average grade in the first and second quarter interpreted as fairly satisfactory, 89 or 35.89% have satisfactory performance, 106 or 42.74% attained very satisfactory and 18 or 7.26% reach an outstanding performance.

The data reveal that half of the pupil respondents had not met the satisfactory level. Thus, this directly suggests that the pupil respondents have to improve their academic performance in Science. It further implies that teachers have to consider the improvement of their teaching skills to help improve the academic performance of the pupils.

3. Level of mastery of pupils on the content standard in Science V.

Table 3. Level of Mastery of Teachers on the Content Standard in Science V

No. of Pupils' Respondent	No. of Item	No. of Pupils who got 74 and below	Percentage	No. of Teachers who got 75 and above	Percentage	Interpretation
248	50	238	95.97%	10	4.03 %	Low
Mean = 22.96						

Table 3 shows that 238 or 95.97 % pupils failed to master the competencies in the first and second quarter in Science V. Only 10 or 4.03% of the learners mastered the said competencies as revealed by the mean of 22.96. It suggests that pupils have not retained or improved the competencies that they have developed in the first and second quarter.

As indicated in National Educational Testing and Research Center (NETRC), the level pupils' mastery on the content standard suggests that there is a need for an effective teaching intervention to address the problem. Pupils have to develop their competency, through the support of teachers, that will take effect on the extent of their academic performance. Laczko-Kerr and Berliner (2002) supported the results indicating that educators coursework and effective delivery of knowledge and experience are stronger predictors of pupils' academic performance.

4. Significant difference between the Teacher's Mastery of Content and Academic Performance of Pupils

Table 4. Significant Difference between the Teachers' Mastery of Content and Academic Performance of Pupils

Indicators	Computed t-value	Critical t-value	Decision	Interpretation
Teacher's Mastery of Content and Academic Performance of Pupils	8.12	2.11	Rejected	Significant relationship

Table 4 presents the There is no significant difference between the teacher's mastery of content and the Academic Performance of pupils as revealed by the computed t-value of 8.12 which exceeded the tabular value 2.11 using 16 degrees of freedom at 5 % level of significance, the null hypothesis is rejected. There is significant difference between the two variables.

5. Relationship between the pupil's mastery of Content and their Academic Performance

Table 5. Relationship between the Pupils' Mastery on the Content and their Academic Performance

Indicators	Computed t-value	Critical t-value	Decision	Interpretation
Pupils' Mastery of Content and Academic Performance of Pupils	0.021	0.044	Rejected	Significant relationship

There is a significant relationship between the pupil's mastery on the content and Academic Performance of pupils as revealed by the computed r-value of 0.021 which is less than the tabular value of 0.044 using 15 degrees of freedom at 5 % level of significance, the null hypothesis is rejected. There is significant relationship between the variable correlated.

6. Proposed learning modules for least mastered competencies

The researchers conducted this study to determine the teachers' and students' mastery on the content standard of Science V and academic performance of pupils was the main objective of this study. After doing all the process from validating of questionnaire to conducting survey, from making analysis and interpretation of gathered information to making recommendation, the researchers came up with the proposed learning modules that will be included in the School Learning Action Cell or SLAC to address the pupils with least competencies. The proposed learning modules include lessons that can be utilized by Science teachers to improve the pupils' mastery of content and their academic performance.

Conclusions and Recommendations

The following are the conclusions drawn from the findings of the research:

1. Since majority of teachers have mastered the content in the first and second quarter, they are competent and capable of improving the competency of pupils and their academic performance for the succeeding grading periods;
2. Because half of the pupils had average and fairly satisfactory as revealed in the results of their academic performance, there is a need to improve the pupils' learning and more effective teaching process;

3. Since most of the pupils had failed to meet the competency level as revealed in the first and second quarters, this could be attributed to the low retention and mastery of content learning;
4. There is significant difference between mastery of the teachers on the content and pupil's academic performance; there is significant relationship between the pupils' mastery on the content and their academic performance; and
5. The designed learning modules for least mastered competencies may be implemented to address the gap of mastery level of pupils on the content standard in Science V.
6. Based on the findings and conclusions of this study, the following recommendations are hereby presented:
7. Technical assistance may be provided to teachers through an individualized or team teaching. Teaching modules may be provided to teachers with least mastered competencies. Allotment of fund for teachers' training may be proposed as one of the school's top priorities;
8. More suitable teaching strategies such as process-based and task-based learning methods may be applied to improve pupils' learnings. Utilization of quality learning materials in Science for more effective learning experiences;
9. Enhanced remediation program for learners may be applied to engage them in more productive and responsive learning activities that improve retention and mastery of content;
10. Design a more engaging activities for both teachers and pupils to sustain mastery level of content standard that is significantly remarkable factor in improving pupils' academic performance; and
11. The designed learning modules for least mastered competencies that address the gap of mastery level of pupils on content standard in Science may be proposed to be an essential part of School Learning Action Cell or SLAC. Immediate implementation may be supported by school heads, master teachers, and subject teachers to effect on the pupils' academic performance.
12. Future researches relative to the improvement of pupils' mastery of content standard and their academic performance may be conducted using other important variables and bigger number of respondents and wider scope to evaluate the validity of this study.

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