

# Reading Comprehension as a Determinant of Science Performance

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**Abstract:** The poor level of reading comprehension and its effect on the Science performance has been prevalent problem among the intermediate pupils. Hence, this study was conducted to determine the effectiveness of reading comprehension as determinant of Science performance in Lalud Elementary School, Calapan City Division. This study tried to validate the fact that reading comprehension plays a vital role in Science performance by looking at the performance of 181 intermediate pupils relative to their Reading Performance, Difficulties in Reading and Academic Performance in Science. The quantitative research was used in this research. The researchers used the Learning Resource Materials in formulating the passages and questions for reading comprehension guided by the Revised Bloom's Taxonomy of Learning. Questions used for comprehension purposes were crafted by the researchers and validated by experts in English and Science. Results revealed that intermediate pupils' level of reading was 'frustration', the achievement level of intermediate pupils in reading comprehension in terms of remembering, understanding, analyzing, applying and evaluating was 'average' as revealed by overall mean of 40.974. The findings of the study were used as basis for designing an Enhanced Strategic Intervention Materials proposed as instructional materials to effect on the school's performance in the National Achievement Test in Science.

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

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## Introduction

Effective reading comprehension is essential key to academic performance in the teaching-learning process. Its crucial role takes place in the achievement of educational goals and objectives in all areas of discipline. The important role of teaching intervention materials is imperative in meeting the learning objectives in the process.

Based on the School Improvement Plan, the National Achievement Test (NAT) results of Lalud Elementary School for three consecutive years are alarming. As shown in the NAT, there was an evident "below average" level of performance in reading comprehension and Science subject. The details are fully presented in the Appendix section of this study. The

figure would merely imply that intermediate pupils have difficulty in understanding concepts of Science as well as the skills needed to be proficient readers.

Undersecretary Dina S. Ocampo, during the seminar on K to 3 Early Language Literacy and Numeracy on 2015 at Tagaytay City, explained that NAT results is not determined by Grade VI alone; it is because the contents and competencies are from Grade IV to VI. Hence, the researchers selected the entire level of intermediate pupils as the respondents of their study.

Pupil's understanding to what they read is really important in the learning process. If they understand the context being read they could easily answer questions. They could not understand the stories, facts and directions being read. They encountered unfamiliar words difficult to understand and fail to make relations among concepts.

Some of the pupils may have the ability to identify and locate information but unable to analyze and criticize the whole content. The lack of comprehension in reading Science text frustrates students to learn Science. Sometimes if they do not know the meaning of the word, they just ignore it but still there were pupils who were eager to determine the meaning of it. Best *et al.*, (2005), in their book "Deep-Level Comprehension of Science Texts" emphasized that students of all ages have been found to experience difficulty comprehending and learning from science texts.

There were also lots of action research taken just to help the educational system improve the reading ability of slow learners, so that each one could understand the topic being discuss in all learning areas specifically in Science. Some students hate this subject, they thought this was a difficult one. That's the reason why the researchers come up to this study not only to help teachers but to define if reading comprehension as a determinant of Science performance be a basis for Enhanced Strategic Intervention Material.

The researchers assumed in this study that reading comprehension is important in learning Science. This study is, thus, deemed important for its possible contribution of another dimension in the expanding body of science education—in particular, the relevance strategic intervention materials to be proposed based on the findings and recommendations.

### **Material and Methods**

The quantitative research approach was used in this study which aimed to look into level of reading comprehension and academic performance in Science which later the basis of the Enhanced Strategic Intervention Materials. This study made use of descriptive research method which was designed for the researcher to gather vast information. 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 differences of as the researcher measures, classifies, interprets and evaluates. The researchers used the Learning Resource

Materials in formulating the passages and questions for reading comprehension guided by the Revised Bloom's Taxonomy of Learning. Questions used for comprehension purposes were crafted by the researchers and validated by experts in English and Science.

To determine the level of reading comprehension, the researchers used the Phil-IRI Reading Passages. To indicate the performance of pupils in Science, the researchers obtained the pupils' marks from Form 138 or Report Cards provided by the class advisers.

### Respondents of the Study

Table 1 presents the number of respondents used in this study.

**Table 1. Number of respondents in Grade IV, V and VI of Lalud Elementary School**

Grade Level	Population (N)	Percentage%
Four	66	100 %
Five	53	100 %
Six	62	100 %
<b>Total</b>	<b>181</b>	<b>100 %</b>

The population size was based on enrolment of Lalud Elementary School as indicated in the School enrolment, SY 2016-2017. The researchers used the two sections in each grade level. There were 181 respondents: 66 in Grade IV; 53 in Grade V; and 62 in Grade VI.

### Data Collection

With the grant given by the school head to conduct this action research, the researchers facilitated the conduct of pre-test in Phil-IRI and obtained the quarter marks of respondents from their respective teachers to ensure the accuracy, reliability and validity of the needed data.

Data collected from the source were tabulated, interpreted and analyzed with the help of expert statistician.

### Ethical Issues

The researchers 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 are 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 method and inferential Pearson's  $-r$  were used to find the relationship between the identified variables. To test the null hypothesis of the study, the instruments included frequency, mean and percentage.

## 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. What is the reading level of Intermediate pupils of Lalud Elementary School?

**Table 2. Frequency and percentage distribution on Reading Level of Intermediate pupils**

Reading Level			
Scale	Frequency	Percentage	Interpretation
90- 100%	0	0%	Independent
75-89%	46	25.41%	Instructional
Below 75	135	74.59%	Frustration
<b>Mean 52.17 Frustration</b>			

The table 2 presents the frequency and percentage on Reading Level of Intermediate pupils of Lalud Elementary School. There are 135 pupils or 74.59% belong to frustration level which is considered the lowest level. Having a bigger percentage as seen in the result, this implies that there is a significant gap in the reading proficiency of the learners. This further suggests that there is a need of appropriate intervention to leverage the gap.

However, there are only 46 pupils or 25.41% assessed as instructional. This result would tell that there are pupils who had the ability to comprehend; hence, they could possibly get better marks in their academic subjects.

The foregoing results were validated by the approved Enhanced School Improvement Plan where School Planning team was also able to identify poor reading comprehension of pupils as one of the higher priority improvement areas of the school. As stated in the School Improvement Planning, GAP Analysis Template the following were the inhibiting factors such as, poor study habits, no follow-up at home, not familiarized with the word they read, not interested in reading, insufficient textbook and reference and no reading materials at home. The findings were supported by Caldwell (2009), who confirmed that the reader cannot read if he cannot comprehend, but the minds will overload if the eyes focus much attention to the word.

### 2. What is the achievement level of intermediate pupils in reading comprehension in terms of remembering, understanding, analyzing, applying and evaluating?

**Table 3. Frequency and Percentage Distribution on Reading Difficulties of Intermediate pupils**

Mean Score in Reading Difficulties		
Reading Difficulties	Mean Score	Interpretation
Remembering	53.81	Average
Understanding	39.01	Average
Analyzing	36.69	Average
Applying	41.33	Average
Evaluating	34.03	Average
<b>Overall</b>	<b>40.974</b>	<b>Average</b>

Table 3 shows that pupils attained average in the achievement level in their Reading Difficulties as revealed by the grand mean of 40.974. Remembering gets the highest mean rating of 53.81 interpreted as average. It is revealed that this level of thinking does not entail much effort for about a half of the tested pupils. Meanwhile, understanding, analyzing, applying, and evaluating obtained a mean rating of 39.01, 36.69, 41.33 and 34.03 respectively, all interpreted average as well. Referring to the revised Bloom's Taxonomy, the conduct of reading comprehension evaluation revealed that pupils are not as proficient in answering evaluative type of questions. This can be attributed to the fact that evaluating is among the skills that require higher order thinking skill. Applying, on the other hand, although it also belongs to a skill that requires higher order thinking.

The mean score posted by pupils is not a surprise as it is a reflection that Science learners are used at applying concepts in their daily activities. According to the theory of John Dewey, experiential learning as cited by Young (2006) made the pupils connected to the young people in their home and community. Connections are already made to them as education was not separated from home and community.

The researchers used the scale of National Educational Testing and Research Center (NETRC) which the standard in measuring pupils' achievement level. The level of Average is the over-all mean score of their reading level which suggests that there is the need for an effective teaching intervention to address the reading gap of pupils.

Pupils have to be given sufficient time to read as a venue for them to develop their learning difficulties. They have to be given ample motivation to read. Paris (2014) emphasized that literacy is a skill that must be learned, not an innate talent. Good, effective comprehension does not come naturally with the ability to read. It is imperative that teachers and parents take extra effort to teach young students the skills required to comprehend texts to their fullest.

### 3. What is the level of performance in Science of Intermediate pupils?

**Table 3. Frequency and Percentage Distribution on Performance of Intermediate Pupils in Science**

Grade Interval	Frequency	Percentage	Interpretation
90-100	7	3.87%	Outstanding
85-89	27	14.92%	Very Satisfactory
80-84	63	34.81%	Satisfactory
75-79	81	44.75%	Fairly Satisfactory
Below 75	3	1.66%	Did Not Meet Expectation
<b>Mean = 80.41 – Satisfactory</b>			

The table presents the frequency and percentage distribution on the performance in Science of intermediate pupils. There are three intermediate pupils or 1.66% interpreted as to Did Not Meet Expectation. There are eighty-one pupils or 44.75% interpreted as Fairly Satisfactory. There are sixty-three pupils or 34.81% interpreted as Satisfactory, while twenty-seven pupils or 14.92% interpreted as Very Satisfactory. There are only seven pupils or 3.87% interpreted as Outstanding. The mean of 80.41 is interpreted as Satisfactory.

As the researchers interpret the gathered result of the first and second grading period, it is noticed that there are many pupils that need special attention. Low performance in Science is

a determinant in their success of the National Achievement Test (NAT). Pupils’ performance in NAT is specifically important because it reflects the performance of the school.

As stated in the Priority Improvement Areas of the school, low performance in NAT VI is on top of its priority improvement areas. The School Planning Team, together with the School Governing Council identify the inhibiting factors why an ample number of pupils fall within Fairly Satisfactory in Science. Unmastered competencies, ineffective pedagogies and strategies, teachers’ limited specialization, insufficient instructional and learning materials, pupils’ poor study habits, poor living condition, insufficiency of parental support are to name some of the reasons.

**4. Is there a significant relationship between reading difficulties and reading comprehension of Intermediate pupils?**

**Table 4. Correlation between Reading Difficulties and Reading Comprehension**

Variables	rcomp	r <sup>2</sup>	Description	Decision	Interpretation
Remembering	.402	0.1615	Positive & Moderate	Reject Null Hypothesis	Significant
Understanding	.252	0.0633	Positive & Slight	Reject Null Hypothesis	Significant
Analyzing	.187	0.0349	Positive & Negligible	Reject Null Hypothesis	Significant
Applying	.267	0.0712	Positive & Slight	Reject Null Hypothesis	Significant
Evaluating	.345	0.1192	Positive & Slight	Reject Null Hypothesis	Significant
<b>R crit = .146</b>					

<b>Summary</b>					
Reading Difficulties and Reading Comprehension	rcomp	r <sup>2</sup>	Description	rcrit	Decision
	.413	0.1706	Positive & Moderate	0.146	Reject Null Hypothesis

The table presented above revealed the correlation of reading difficulties and reading comprehension of intermediate pupils.

Since the absolute value of r computed is greater than the absolute value of r critical that is  $|.402| > |.146|$  at 5% level of significance with 179 degree of freedom, the null hypothesis is rejected. Therefore, there is a significant relationship between remembering and reading comprehension. Pupils could not comprehend if they did not remember the important details from the passage they read. Pupils can’t answer questions if they can’t recall what they read. As shown in r computed value which is positive and moderate indicates that there is a moderate or average affect in reading comprehension. The coefficient of determination means that at 16.15% reading comprehension is affected by remembering. As indicated in the Guidelines for Phil-IRI, if a pupil can’t remember what he reads, he is considered a non-reader. Likewise, understanding, applying and evaluating gain an absolute value of r

computed of .252, .267 and .345 respectively, with positive and slight description which indicates that those mentioned difficulties have a little chance to affect reading comprehension. All have significant difference to reading comprehension and null hypothesis is rejected.

Meanwhile, among the reading difficulties presented, analyzing is the least predictor of reading comprehension with the absolute value r computed at 1.87. Pupils have difficulty in analyzing questions.

Each levels of reading comprehension are connected to each other. One has to start from the basic of remembering simple information to be able to go up to the higher level of evaluating the whole reading text. In support to this, Boardman et al., 2008; Pressley, 2006; Reed & Vaughn (2010), pointed out that many pupils struggle to comprehend strategies and deficit in metacognition because of their difficulty in understanding the meanings of words.

**5. Is there a significant relationship between reading difficulties and Science Performance of Intermediate pupils?**

**Table 5. Correlation between Reading Difficulties and Science Performance**

Variables	Rcomp	r <sup>2</sup>	Description	Decision	Interpretation
Remembering	.506	0.2560	Positive & Moderate	Reject Null Hypothesis	Significant
Understanding	.430	0.1852	Positive & Moderate	Reject Null Hypothesis	Significant
Analyzing	.505	0.2547	Positive & Moderate	Reject Null Hypothesis	Significant
Applying	.514	0.2646	Positive & Moderate	Reject Null Hypothesis	Significant
Evaluating	.404	0.1635	Positive & Moderate	Reject Null Hypothesis	Significant
<b>R crit = .146</b>					

Summary					
Reading Difficulties and Science Performance	rcomp	r <sup>2</sup>	Description	rcrit	Decision
	.668	0.4462	Positive & Moderate	0.146	Reject Null Hypothesis

Since the absolute value of r computed is greater than the absolute value of r critical that is  $|.668| > |.146|$  at 5% level of significance with 179 degree of freedom, the null hypothesis is rejected. Therefore, there is a significant relationship between reading difficulties and Science Performance of intermediate pupils. Meanwhile, remembering, understanding, analyzing, applying and evaluating gain an absolute value of r computed of .506, .430, .505, .514 and .404 respectively, with positive and moderate description which indicates that those mentioned difficulties are predictors of Science performance. Hence, there is a significant relationship between reading difficulties and Science performance, thus null hypothesis is rejected. As reflected on the results, evaluating is the least predictor of Science performance. If pupil could not understand what they read, they could not answer the evaluation. Since, comprehension check is part of evaluation.

Reading instruction should become more disciplinary, reinforcing and supporting students' academic performance. All content-area like Science utilizes literary or informational text in some manner, so students must comprehend specific texts and grasp the concepts being communicated in them as cited by Shanahan and Shanahan (2008).

## **6. What Strategic Intervention Materials may be created to improve the pupils' reading comprehension and the academic performance in Science?**

Based on the findings the researchers have crafted an Enhanced Strategic Intervention Materials to address the academic gap.

### **Conclusions and Recommendations**

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

1. The reading level of intermediate pupils is interpreted as 'frustration'. This level of performance is attributed to their reading comprehension and performance in all subjects
2. The achievement level of intermediate pupils in reading comprehension in terms of remembering, understanding, analyzing, applying and evaluating were interpreted as average. It is revealed that this level of thinking does not entail much effort for about a half of the tested pupils, the conduct of reading comprehension evaluation revealed that pupils were not as proficient in answering evaluative type of questions. This can be attributed to the fact that evaluating is among the skills that require higher order thinking skill.
3. The level of performance in Science of Intermediate pupils is described as satisfactory it is concluded that there are many pupils that need much attention. Low performance in Science is a determinant in their success of the National Achievement Test (NAT). Pupils' performance in NAT is specifically important because it reflects the performance of the school.
4. There is a significant relationship among reading difficulties and reading comprehension of intermediate pupils. Each level of reading comprehension is connected to each other. One has to start from the basic of remembering simple information to be able to go up to the higher level of evaluating the whole reading text.
5. There is a significant relationship between reading difficulties and Science performance. Evaluating is the least predictor of Science performance. If pupil could not understand what they read, they could not answer the evaluation. Hence, comprehension check is part of evaluation.

### **Based on the findings and conclusions of this study, the following recommendations are hereby presented:**

1. The school head should ensure that assessments (tests) crafted by the teachers for their quarter tests observe the level of difficulty, which is important in the improvement of the pupils' comprehension skills. The use of Revised Bloom's Taxonomy in reading comprehension must be used as reference in writing test manuscripts.
2. The Curriculum Implementation Division must provide questions similar to NAT with consideration on the reading difficulties mentioned in the research.
3. The teachers should practice using the reading difficulties mentioned to their daily assessments, class discussions and other learning activities.
4. The teachers should design an action plan with the thought of improving the performance of slow learners. Remedial teaching or tutorial using the reading difficulties as bases of learning. There is also a need for the teachers to utilize a strategic intervention material to provide pupils a venue to utilize their higher order thinking skills (HOTS).



5. Since this inquiry is an initial investigation, further research may be initiated using other pertinent variables to map out feasible action to improve the reading performance that effect on the pupils' performance in Science. Students in other grade levels and a larger set of classes could also be considered as respondents to validate the effectiveness of the approach.
6. Validation of designed Enhanced Strategic Intervention Materials is recommended to determine its effectiveness when it is used by teachers in the intermediate level to improve pupils' reading comprehension and their performance in Science.

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