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Reading Comprehension Skills and The Level of Performance of Grade 7 Students in Chemistry

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***Abstract*—** This study determined the reading comprehension skills and the level of performance of grade 7 students in chemistry, for S.Y 2021-2022. The participants of the study were 35 grade 7 students of Donsol Vocational High school. Descriptive-correlational method was utilized as research design of the study. The adopted self-learning modules (SLMs) of the four selected topics and the teacher made test were the main instruments of the study. This method was chosen to gather data in determining the reading comprehension skills and the level of performance of the grade 7 students in chemistry.

***Keywords*—** Applied, Critical, Inferential, Level of Performance, Literal, Reading Comprehension Skills.

I. INTRODUCTION

The global importance of science and technology which dominates in every society requires an educational system that provides a venue for the development of scientific knowledge and skills. Evidently, the rapid development of this field of knowledge through scientific inventions and discoveries post a challenge to educational institutions to contribute their part in this growing demand of scientific inquiry.

Many countries acknowledge the importance of raising individuals who understand what they are reading and they conduct research to identify as to what extent their students are successful in reading by using different evaluation methods and the factors affecting this success. Moreover, being able to read is an avenue for personal and social growth; thus, a child can fully view ever winding horizons and explore areas in the world of people, things, and events through reading. Reading is vital in every individual, but some students do not fully understand what they are reading or some students know how to read but they cannot understand what they are reading (Zuhra, 2015) students faced reading comprehension problem because they did not know the meaning of words. With this, it can be presumed that reading is not easy to be mastered; knowing the meaning of words alone does not help the reader to comprehend and understand what the students read.

Acoording to national international tests of literacy, such as the Program for International Students Assessement (PISA) and National Assessment of Education Progress (NAEP), students in the United States are unable to do relatively easy literacy tasks such as locate relevant information to determine the main idea of a text of make simple inferences. (Kastberg et al.,2016; National Center for Education Statistics, 2017). According to the most recent PISA, U.S. adolescents rank 15th literacy skills. Unfortunately, thes scores have remained relatively flat for many years and have led many educators, researchers, and policy makers to question how well students are being prepared for a job market that increasingly requires self-learning, analytical skills, and transferable knowledge (Goldman & Pelegrino, 2015).

Along English reading, there are many researches that focus on reading comprehension. The following are some of the researches that related to the writer's topics. The writer tries to relate the student's difficulty in doing English reading comprehension test and whether there are some similar problems or not in some researches that have already done from these studies. For some students it is difficult to comprehend the text because they have problem in vocabulary. Garcia, Ramayan, Sepe and Silor (2014) analyzed student's difficulty in reading. They found that students had difficulties in understanding difficult words because they forgot the vocabulary words that they learnt.

Furthermore, reading comprehension has great contributions to students on learning science. Not all approaches appeared to be equally effective, but most evaluation studies reported significant positive effects on reading proficiency on science. Similarly, science has become a focus to be considered in terms of educational systems and administration around the world in the last decade. In recent years, educators have found that there are so many factors that affects students' performance in science classes especially reading comprehension has

changed so many traditional procedures in teaching science it also shows remarkable benefits.

Science is considered as the most important core courses among others in the secondary schools that need reading comprehension skills because difficulties comprehending science texts may stem from several sources of problems. Science performance is highly affected by students reading comprehension. Researchers have found that reading comprehension is an important part of learning science and scientific literacy, because science can only be constituted, changed and communicated with the help of the language.

Connectedly, this study covers the relationship between the level of performance of the students in reading comprehension skills and in the performance in chemistry in a new normal setting. The current mode of pedagogical delivery implemented by the school as prescribed by Department of Education which is the Modular distance learning totally affect the performance of the learners. Bordeos (2021) mention that modular distance learning can be tough routine for the students working modular learning at home. The use of modules helps students to become more responsible learning from himself. Therefore there is a need for a teacher to be skillful and resourceful in developing resources that could enhance instructional materials for learners. As a solution, this study enhance self learning modules which is a great help for students especially for students in understanding science concepts and enhancing their academic performance. These become an integral part of a planned system and will compliment the teachers work. Indeed, teachers can work to achieve quality education.

METHODOLOGY

Descriptive-correlational method was utilized as research design of the study. The adopted self-learning modules (SLMs) of the four selected topics and the teacher made test were the main instruments of the study. This method was chosen to gather data in determining the reading comprehension skills and the level of performance of the grade 7 students in chemistry.

The primary sources of data were the 35 grade 7 students of Donsol Vocational High School. These students were purposively chosen because they comprise the section being handled by the researcher. It is easy to facilitate one section especially that SLMs was used wherein you have to distribute, retrive and consolidate the results. Hence, one section was convenient and reachable considering our current situation that we are facing right now. Pearson r was employed to analyze if there is a significant relationship between the reading comprehension skills of the students and their level of performance in chemistryalong the selected four topics. The coefficient of determination was calculated to identify the percentage of variability between the two variables.

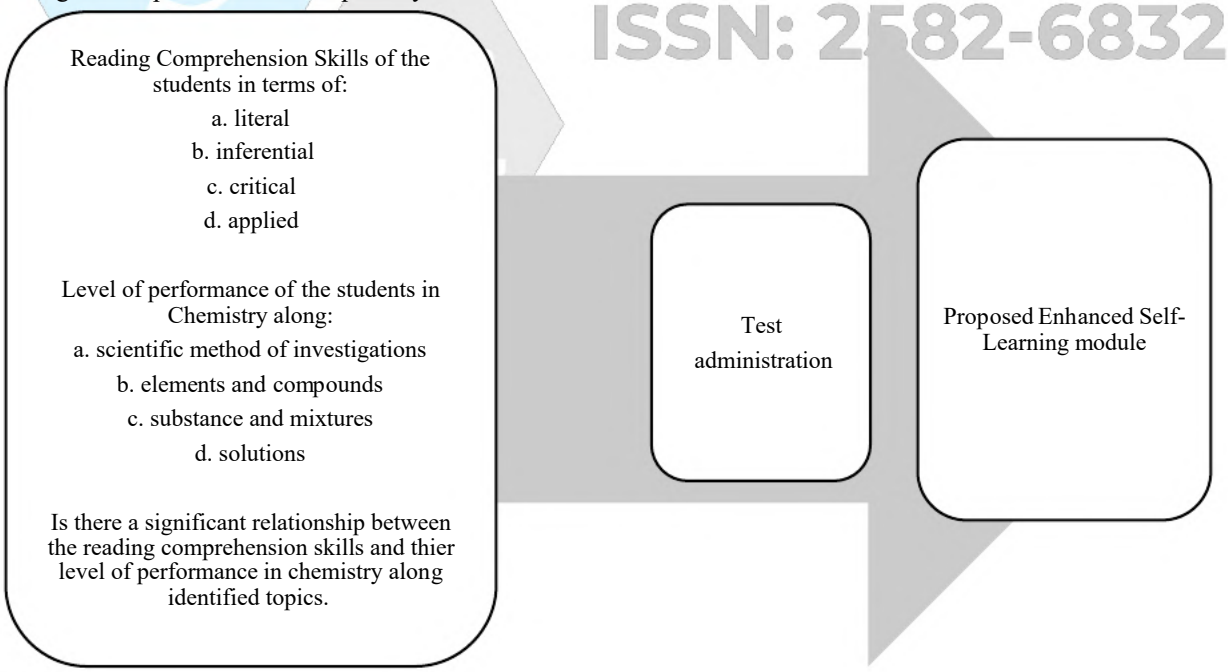

Figure 1. *Conceptual Paradigm*

READING COMPREHENSION SKILLS OF THE STUDENTS IN TERMS OF:

1. Literal

Table 1A reveals the reading comprehension skills of the students along literal. It shows that the student's reading comprehension skills is moving towards mastery for the topics Scientific Method of Investigation and Elements and Compounds as evidenced by the mean values of 83.57 and 80.71 respectively.

Table 1A: *Reading Comprehension Skills of the Students along Literal Level*

Topics	Mean	Description
Scientific Method of Investigation	83.57	Moving toward mastery
Elements and Compounds	80.71	Moving toward mastery
Substances and Mixtures	79.49	Moving toward mastery
Solutions	74.29	Moving toward mastery
Overall Mean	79.51	Moving toward mastery

This may mean that the reading comprehension skills of the students along literal level is taken with the understanding of information and facts of the subject and the topics provided with it. Regardless of its recognition as the most basic level of comprehension in reading, respondents successfully employed literal comprehension skills to better locate information efficiently. Generally, this is marked to be approaching proficiency which indicates that the students have developed the fundamental knowledge, skill, and core understanding with little guidance to the topics particularly to the high remark ones.

In this level of reading comprehension as it relates to Sofyan (2016) and Sari(2017) that students who lack motivation to learn actively, understanding and knowledge deeply will face difficulty in doing learning process. Even in the basic level, reading comprehension and science proficiency has an alignment to the teaching and learning process.

Inferential. Table 1B reveals the reading comprehension skills of the students along inferential. It shows that among the indicators provided, the topics Solutions and Scientific Method of Investigation reached the uppermost weighted means of 80.71 and 77.14 correspondingly with verbal descriptions of moving toward mastery.

Table 1B: *Reading Comprehension Skills of the Students along Inferential Level*

Topics	Mean	Description
Scientific Method of Investigation	77.14	Moving toward mastery
Elements and Compounds	72.14	Moving toward mastery
Substances and Mixtures	70.71	Moving toward mastery
Solutions	80.71	Moving toward mastery
Overall Mean	75.18	Moving toward mastery

This may elucidate that the reading comprehension of the students along inferential level is under the competence of understanding concepts with mastery and well-off insights. However, there is still a progress to take as the results imply in which upholds towards developing proficiency from all the science topics indicated. Comparatively to the inferential level, respondents found quite difficulty in some areas of the subject probably due to inferential instruction, but relatively, it can still be undertaken through proper enhancing of learning material as their guide in answering at this present set up of learning.

Similarly, in this level of comprehension, it can be related to (Swanson et al.,2016) primary barriers to remediating skill deficits of adolescent readers include instructional foci that target content and knowledge acquisition as opposed to improving reading skills, increasingly more difficult and complex text that has outpaced students reading skills, and limited opportunities for reading text in middle and secondary grades. Inferencing must be practiced over time, requiring plenty of both time and practice.

Critical. Table 1C reveals the reading comprehension skills of the students along critical or evaluative. It shows that among the indicators given, the topics Solutions and Elements and Compounds reached the highest mean of 91.43 and 80.00 separately with verbal descriptions of closely approximate mastery and moving toward mastery respectively.

Table 1C: *Reading Comprehension Skills of the Students along Critical Level*

Topics	Mean	Description
Scientific Method of Investigation	77.14	Moving toward mastery
Elements and Compounds	80.00	Moving toward mastery
Substances and Mixtures	75.71	Moving toward mastery
Solutions	91.43	Cloely approximate mastery
Overall Mean	81.07	Moving toward mastery

This may opine that the reading comprehension skills of the students along critical or evaluative level apply certain processes, models, and questions that resulted in enhanced clarity and comprehension of the respondents to answer correctly. There is more involved, both in effort and understanding, in a critical reading than in a mere skimming of the text. As a result, it specifies approaching proficiency that seems to helps the students assess the strength of the given topics. It is just as useful to conclude that the indicators present very strong evidence and a well-reasoned insight towards it through schema learning procedure, as it is to identify the definite answer.

Relatively, the results are correlated to Clemens, Simmons, Wang & Kwok (2017). Increasing text complexity present a distinct challenge to adolescent readers. Several studies have demonstrated that among adolescents with below average reading comprehension, the majority also demonstrate below average skills in decoding, text reading fluency, or vocabulary knowledge, with difficulties in multiple areas being the most common.

Applied. Table 1D reveals the reading comprehension skills of the students along applied or creative. It shows that the topic Solutions, Elements and Compounds and Substances and mixtures got the top mean percentages of 87.14, 75.71, and 75.71 respectively with the verbal descriptions of closely approximate mastery and moving toward mastery.

Table 1D: *Reading Comprehension Skills of the Students along Applied Level*

Topics	Mean	Description
Scientific Method of Investigation	77.14	Moving toward mastery
Elements and Compounds	72.14	Moving toward mastery
Substances and Mixtures	70.71	Moving toward mastery
Solutions	80.71	Moving toward mastery
Overall Mean	75.18	Moving toward mastery

This may perceive that the reading comprehension of the students along applied or creative level requires the respondents of their high level of comprehension. In the same sense, it involves the use of some external criteria from own experiences in order to evaluate the quality, simplifications, and generalizations of the material. At this variable, respondents became in developing proficiency that needs specific intervention to progress and attain mastery in this concerned level. Moreover, of all the reading comprehension level, this highest-level lack from the respondents which may show that they had absence of conceptual interpretation and application beyond the given situations; they less consumed analyzing or synthesizing information otherwise. However, the results still show conviction of progress through proper intervention and enhancement of materials as the other developing proficiency levels of reading comprehension need to.

The results concludingly dealt with the reading comprehension and the effect on the performance in science as it reached the high level of the process where was found out that there is a strong relationship between reading comprehension and the performance in science. Additionally, the general outcome aligned to Cromley (2011), studies reveal that students reading

compehension highly correlates with their science performance indicating that reading comprehension is a crucial prerequisite for science performance. Therefore, good readers usually perform better in science, whereas struggling readers often faced obstacles in science performane due to their reading difficulties in reading comprehension, even though their scientific knowledge might equal those of good readers. Additionally, there has been some evidence that the relation of reading comprehension and science performance is significantly affected by specific text features, such as syntax or word count, revealing variation in item difficulty when liguistic features are modified.

1. Level of Performance of the Students in Chemistry

This section reflects the level of performance of the students in chemistry along the following topics - scientific method of investigation, elements and compounds, substances and mixtures, and solutions as shown in Table 2.

Table 2: *Level of Performance of the Students in Chemistry*

Topics	Mean	Description
Scientific Method of Investigation	78.29	Fairly Satisfactory
Elements and Compounds	81.26	Satisfactory
Substances and Mixtures	85.46	Very Satisfactory
Solutions	84.69	Very Satisfactory
Overall Mean	82.42	Satisfactory

Table 2 revealed the level of performance of the students in chemistry in the following topics: Scientific Method of Investigation, Elements and Compounds, Substances and Mixtures, and Solutions. Primarily, it showed that among the indicators cited, the items Substances and Mixtures and Solutions got the highest mean percentages of 85.46 and 84.69 respectively with verbal description of very satisfactory.

These results probe that the level of performance of the students in chemistry is satisfactory which occasionally meets proficiencies of standards as established by a variety of work and assessments. As this is concerned, students perform well in Substances and Mixtures and less in Scientific Methods of Investigation. For the low results, they can just easily look into it without learning deeply the learning subjects.

These technically imply that out of the indicators given, Scientific Methods of Investigation had an enormous impact to the respondents which barely to affect the large component of the learning process for teaching and learning utilization. Correspondingly, for the high results, it is conceptual and content figuration in which the respondents deal on in order to perform well that push them to meet competence in the subject matter.

The results direct the view of Hall et. al.(2014) showing the importance of reading comprehension for science performance. Concerning the assessment of science performance, this result may be interpreted from at least two perspectives. First, one may argue that tests measuring science performance should not defend too strongly on the test takers language skills. Similarly, the same reason was evidently reflected to the Department of Education (DepEd) and other State and Private Universities' recommendations who respond to the need for an assessment and evaluation system that truly reflects students' performance towards a competent system of proficiency that provides a more reliable measure of what the students are actually learning in their classes.

3. Relationship between the level of performance of the students in Chemistry and their reading comprehension skills

This portion shows the relationship between the level of performance of the students in Chemistry and their reading comprehension skills. The foregoing data were treated using Pearson correlation coefficient (r) using two-tailed test at .05 level of significance and 33 degrees of freedom with a critical value of 0.3338.Meanwhile the value of coefficient of determination ranging from 0.33% to 35.44% indicates a weak relationship between the student's level of performance in chemistry and their reading comprehension skills.

Scientific Method of Investigations. Table 3A reveals the relationship between the level of performance of the students' reading comprehension skills and their level of performance in Chemistry along scientific method of investigations. It discloses that the student's reading comprehension skills along literal, inferential, and applied are all significantly related to their level of

performance in Chemistry as revealed by the computed Pearson r values of 0.4084, 0.5953, and 0.3463 respectively which are all beyond the critical value of 0.3338 . This computed r values in the three level of comprehension skills exceed in the critical value, hence, the null hypothesis of no significant relationship between the level of the reading comprehension skills of the students and their level of performance in Chemistry along scientific method of investigations is rejected. This means that the level of reading comprehension skills of the students affect their level of performance in chemistry along scientific method of investigations.

Table 3A: *Relationship between the reading comprehension skills of the students and their level of performance in chemistry along scientific method of investigation*

Statistical Bases	**Statistical Analyses**			
	Literal	Inferential	Critical	Applied
Coefficient of determination	0.1668	0.3544	0.0346	0.1199
Computed r value	0.4084	0.5953	0.1863	0.3463
Decision on Ho	Reject	Reject	Do not reject	Reject
Remarks	Sig	Sig	Not Sig	Not Sig

Level of significance = .05 *Degree of freedom = 33* *Critical value of r0.05 = ±0.3338*

This means that the literal, inferential and applied levels of reading comprehension skills affect their level of performance in Chemistry along scientific method of investigations. This shows that the students in their literal reading comprehension skill are able to identify the main ideas, recall details and organize the sequence of main events in the scientific method of investigations.

For inferential skills, the students are able to read between the lines, predict, state reason, make generalizations and understand the fact that in the learning context of the scientific method of investigations. In terms of applied skills, the students are able to link the scoientific method of investigations in their own experince and knowledge to develop or generate answer, ask open-ended questions to promote deeper understanding of the lesson and support their answer with logical reason. This showed that the critical level of reading comprehension skills does not affect their performance level in Chemistry along scientific method of investigations. This result is supported by the Shoebottom (2015) which revealed that reading is an essential strategic and a life-long skill required to achieve higher academic performance. Elements and Compounds. Table 4B reveals the relationship between the students' reading comprehension skills and their level of performance in Chemistry along elements and compounds. It can be gleaned from the table that the literal and inferential RCS of the students are significantly related to their level of performance as revealed by the computed r values of 0.3708 and 0.4535 respectively which are also beyond the critical value, hence the null hypothesis was rejected. Meanwhile, the critical and applied RCS are not significantly related to their level of performance in Chemistry as shown by the computed r values 0f 0.2211 and 0.0947 respectively which are both within the critical value, thus the null hypotheses cannot be rejected.

Table 4B: *Relationship between the reading comprehension skills of the students and their level of performance in Chemistry along elements and compounds*

Statistical Bases	**Statistical Analyses**			
	Literal	Inferential	Critical	Applied
Coefficient of determination	0.1375	0.2057	0.0489	0.009
Computed r value	0.3708	0.4535	0.2211	0.0947
Decision on Ho	Reject	Reject	Do not reject	Do not Reject
Remarks	Sig	Sig	Not Sig	Not Sig

Level of significance = .05 *Degree of freedom = 33* *Critical value of r0.05 = ±0.3338*

This reveals that the students in their literal and inferential reading comprehension skills affect their level of performance in Chemistry along elements and compounds. This denotes that students in their literal reading comprehension skill are able to identify or determine elements and compounds, recall details on

elements and compounds and organize data. In terms of inferential reading comprehension skill, they are able to understand the data on elements and compounds.However, the critical and applied reading comprehension skills of the students does not affect their level of performance in Chemistry along Elements and Compounds. This implies that the criticala and applied reading comprehension skills are not contributory to their performance level in Chemistry along Elements and Compounds.

This findings is reinforced by Osman and Sukor (2013). They presented that Chemistry is an important subject to be mastered by students. However, Chemistry is regarded as a difficult subject to learn among students. Because of this, students, as disclosed by Broman et.al (2011) are not interested in Chemistry and do not have the motivation to learn the subject. Yunus and Ali (2013) students tend to have a negative attitude towards Chemistry. This is applicable to elements and compounds which are topics in Chemistry. This reveals that their performance in Chemistry as a Science subject is affected by their literal and inferential reading comprehension skills. Neri, Guill and Retelsdorf (2021)clarified that science performance is higly affected by students reading comprehension. Further, reading comprehension is crucial for science performance and enhance the interaction between reading comprehension ang liguistics features of written texts in science subjects. In addition, the current mode of pedagogical delivery implemented by the school as prescribed by department of Education which is modular distance learning affects the learners. Bordeo S. (2021) mentioned that Modular distance learning can be tough routine for the students working modular working at home.

Substances and Mixtures. Table 4C shows the relationship between the students' reading comprehension skills and their level of performance in Chemistry along substances and mixtures. The table exposes that only the critical RCS showed to have a positive correlation to the level of performance of the students in Chemistry as shown by the Pearson r value of 0.3488 which is greater than the critical value. On the other hand, the literal, inferential and applied RCS of the students are all not significantly related to their level of performance in Chemistry.

Table 4C: *Relationship between the reading comprehension skills of the students and their level of performance in Chemistry along substances and mixtures*

Statistical Bases	**Statistical Analyses**			
	Literal	Inferential	Critical	Applied
Coefficient of determination	0.0488	0.0142	0.1217	0.0033
Computed r value	0.2209	0.1193	0.3488	-0.0577
Decision on Ho	Do not reject	Do not reject	Reject	Do not reject
Remarks	Not Sig	Not Sig	Sig	Not Sig

Level of significance = .05 *Degree of freedom = 33* *Critical value of r0.05 = ± 0.3338*

This result on critical reading comprehension skill informs that this affect thier level of performance in Chemistry along Subtances and mixtures. Students have critical thinking on subtances and mixtures. They have the ability on critical thinking. Indah (2020) posited that this is the ability to analyze ideas logically, reflectively, systematically and productively to understand and evaluate information. This provide that reading comprehension of an individual has an impact on academic performance Copper et.al., (2014. Understanding a written task is essential for solving it Leis et.al. (2017). Similarly, Bayat et. al. (2014) supports that students reading comprehension has a positive effect on Science performance. Science performance increases with higher reading comprehension. In terms of the literal, inferential and applied reading comprehension skills, results show that these do not affect their level of performance in Chemistry along Substances and mixtures. This denotes that for literal skills, they have the ability to answer questions and idenstifyy or determine data on substances and mixtures.

They are also able to make inferences on substances and mixtures. Inference questions, as stated by Kendeou, McMaster and Christ (2016) is the ability to integrate knowledge to fill in information not expectedly stated.

Solutions. Table 4D shows the relationship between the students' reading comprehension skills and their level of performance in Chemistry along solutions. It illustrates that the four reading comprehension skills of the

students are all significantly related to their level of performance in Chemistry as denoted by the Pearson r values of 0.3984, 0.3423, 0.5220, and 0.4423 respectively which are beyond the critical value.

Table 4D: *Relationship between the reading comprehension skills of the students and their level of performance in Chemistry along solutions*

Statistical Bases	**Statistical Analyses**			
	Literal	Inferential	Critical	Applied
Coefficient of determination	0.1587	0.1172	0.2725	0.1956
Computed r value	0.3984	0.3423	0.5220	0.4423
Decision on Ho	Reject	Reject	Reject	Reject
Remarks	Sig	Sig	Sig	Sig

Level of significance = .05 *Degree of freedom = 33* *Critical value of r0.05 = ±0.3338*

Table manifests that they have an astonishing performance in all levels of comprehension, of all the tables this is the only one that the four levels of comprehension are correlated. This implies that they have enough knowledge about the topic. Their previous teachers in elementary might made an intervention in the midst of pandemic just to make sure that they understand the lessons. Questions in this portion are easier, maybe because it is interesting for them. Therefore interest of the learners and innovations of teachers to motivate them is paramount in any kind of learning modality.

After all, the relationship between the level of performance of the students in chemistry and their reading comprehension skills along literal, inferential, critical or evaluative, and applied or creative successfully relate to Hartig et al (2015) the importance of reading comprehension for science nmeasures is demonstrated by remarkable correlations of students'performance on science tasks and their reading competencies. Results indicated that a correlation did exist between reading and science performance at the given level. Examining each grade level individually yielded similar results from the significant and not significant ones. Moreover, a correlation did not exist at some topics in some levels; however, the correlation still appeared to grow in strength at some areas and levels.

The study aforementioned is somehow similar in dealing on the problems. Science classes in schools have become a focus to be considered in terms of educational systems and administration around the world in the last decade. Related to the mentioned classes, there are many benefits that lead students to academic success which was profoundly assimilated to the relationship of reading comprehension and performance level of students in science as Stiller et.al. (2016) assumed that especially students with high reading comprehension benefit from increased item word count, leading to better science performance due to their better competence of extracting the information relevant for solving the science items correctly.

CONCLUSION

On the light of the findings, the following conclusions were drawn: The reading comprehension skills of the students are moving towards mastery along literal, inferential, critical and applied in almost all topics. The students performance in Chemistry is satisfactory. The students literal, inferential, and applied reading comprehension skills are related to their level of performance in chemistry along the scientific method of investigation. The literal and inferential RCS of the students are related to their level of performance along elements and compounds but not for substance and mixtures. Meanwhile, the critical and applied RCS of the students are significantly related to their level of performance in chemistry along substance and mixtures but, not for elements and compounds. Lastly, the students RCS are all significantly related to their level of performance in chemistry along solutions. An enhanced self learning modules in chemistry was proposed to improve the reading comprehension skills of grade 7 students and their level of performnace in chemistry.

RECOMMENDATIONS

Based on the conclusions, the following recommendations are made: 1. The teachers may provide the students some supplementary reading materials that may reinforce the SLMs to give then opportunity to further test their reading comprehension skills. 2. The teachers may initiate to futher enhance the self learning modules in Chemistry to improve the performance of the students. 3. The school administrators may intensify the implemenatation of the

reading programs like Phil-IRI and numeracy and literacy program to assist the students in improving their reading comprehension skills and scholastic performance. 4. The proposed enhanced self learning modules in chemistry may be submitted for further review and evalaution by the authorities prior to its implemantation. 5. Further studies may be conducted to explore other factors that affect either the performance of the students and their reading comprehension skills.

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