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Assessing reading comprehension difficulties in core science subjects of senior high school students in a private school in Calamba City, Philippines

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Abstract

Reading Comprehension is the ability to define word by word and create a profound idea from the talks were given or read. It plays a significant role in the total functioning of a community. It is also one of the pillars of reading. This paper aims to assess the Reading Comprehension level of the Senior High School in their Core Science Subjects and determine different factors that affect one's reading comprehension skills. A descriptive survey attempts to establish the range and distribution of some social characteristics, such as education or training, occupation, and location, and to discover how these characteristics may be related to certain behavior patterns or attitudes. The instruments used to assess Reading Comprehension has three difficulty level; Upper beginner-level story, Intermediate-level story, and Upper Intermediate level story. Students with a 75% and above correct answer are categorized as "mastery level." Students with 50%-74% correct answers are categorized under "near mastery level." While the category "low mastery level" is for students with a score of 49% and below. The students were categorized based on the reader category of Imam (2014). In terms of reading comprehension skill result, it shows that only 7% of the total respondents are classified as Mastery Level readers. The result is trifling compared to the 49% near mastery level and 44% poor mastery level.

Keywords: Core Science Subjects; Senior High School; Reading Comprehension in Science; DepEd Philippines

1. Introduction

1.1. Introduce the problem

Imagine a vital document such as a birth certificate, marriage contract, or housing agreement. However, a reader cannot understand what he reads. Alternatively, maybe solving an exam, but one cannot understand the instruction. This is the moment when

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reading comprehension comes in. It plays a significant role in the total functioning of our community. It is also one of the pillars of reading. A person may know how to read certain words, but comprehension is something that is developed, practiced, learned, and experienced over time. One can read terms like "dog," "banana," or "walk," simple words with known meanings but, Reading Comprehension is way more profound than that. It is the ability to define word by word and create a profound idea from the talks given or read (K12 Reader, 2018).

Moreover, reading comprehension also includes the ability of a person to translate the essence of the sentences using his own words. This also consists of applying the text read in one's life. One aspect of reading comprehension is when a person articulates some of his life experiences and relates them to the text written. It is a sign that a person truly comprehends because some personal emotions are attached to it (Wilhelm, 2018). The recent 2018 research conducted by the Program for International Student Assessment (PISA) tested around 600,000 students aged 15-year-old over 79 participating countries. The study found out that the Philippines ranked the lowest in terms of Reading Comprehension with 340, which is the lowest score in all countries surveyed.

Meron (2018) argued that poverty is one reason for this. In the Philippine context of the education system, students from low-income families tend to put work first at an early age instead of formal schooling. Poverty and lack of academic resources also affect their cognitive development and socialization with people in the academe. A child surrounded by teachers, books, or any reading materials has a clear vision of the importance of education. The survey also shows that the Philippines ranked second to the lowest in Science and Mathematics. Many academicians argue why the Philippines, one of the best English-speaking countries globally, ranks lowest in the survey. They say that education in reading here focuses on the primary word definition; this is important, but it is a problem in the context of reading comprehension. Filipino students should be surrounded by essays and try to relate and reflect on them, enhancing their Comprehension. They also suggested that learning the mother tongue by heart will lead to the proper understanding of the second language. The first language should be mastered before focusing on the second language, English. According to them, students are having confusion when they study their mother tongue and English language at the same time (Manlapig, 2020).

There are two vital elements in Reading Comprehension. These are Vocabulary Knowledge and Text Comprehension. Vocabulary Knowledge is the more profound understanding of the words. It includes the correct definition, pronunciation, written form of the word, spelling, and synonyms of that specific word (Moghadam et al., 2012). On the other hand, Text Comprehension happens when readers put the context of the text written in their own life. This element occurs when the readers have a clear visual

representation or, somehow, imagine a picture in their brain reenacting the text's message. As stated in a Malaysian journal article by (Sidek Het. al., 2015), students with deficient scores in vocabulary knowledge tend to fail to understand the overall message of the text that they have read. The study argued that insufficient vocabulary knowledge hinders students' ability to appreciate the story and answer several questions. It also happens when the readers reflect on their personal experiences while or after reading. Another manifestation of practicing text comprehension is when the readers have an insight or predict what will happen next to the story they are reading since there is a personal emotion attached to it (National Institute for Literacy, 2013).

According to the National Center for Education Statistics research, 43% of adults with a low reading comprehension and literacy level lived in poverty. It also shows that people who have an average or high literacy can break the cycle of poverty because they can have many opportunities to work full time (Bales, 2018). One factor why people with low literacy and low level of reading comprehension struggle to be successful is the social impact. They have low self-esteem, fear, and powerlessness. Due to these factors, persons with low reading comprehension levels cannot perform well at their jobs or school. Since low-level readers cannot communicate well, there is a wall between their interaction with the world and they will eventually leave (Gunn, 2018).

1.2. Major Components of Reading Comprehension

There are many factors for successful reading comprehension. According to studies, there are five major components of reading comprehension needed to be an efficient reader. These are Phonics, Phonemic Awareness, Vocabulary, Fluency, and Comprehension (Learning Point Associates, 2014).

Phonics is the ability to relate written words to their sounds. It is one of the early skills for developing reading called the “alphabetic principle.” It will help the students to have a proper and firm grasp of how certain words should be spelt and read. Phonics also serves as their memory aid to signal their reflexes to imitate the sounds of specific letters (Starrette, 2016). Both Phonics and Phonemic Awareness are closely related to each other, but even so, there are differences. While Phonics is concerned with the sounds of the letter, Phonemic Awareness is concerned with manipulating these sounds or phonemes to create a new word. It is a powerful tool in terms of reading. For example, in the word “smile,” students should be able to create the sounds of each letter to read the word “smile,” but using letter cancellation, the students should still be able to read the word even if the letter “s” is removed. If the students can read “mile” instead of “smile,” this is a good improvement already (3P Learning, 2020).

On the other hand, vocabulary is not a skill unlike the other components, but this is very important as well. It is like a toolbox of words that increases as a person grows older and encounters new words. Vocabulary helps the students with their Reading Comprehension. When a student meets a new word, he may refer to his vocabulary and find some context clues that can help him decode the meaning of a word and use it in a context. Students with a wide range of vocabulary are sound readers and very confident in public speaking.

Fluency is the ability to let words flow while reading. It is the ability to read and comprehend the text's message even if reading silently. Fluency is also about the emotions while reading, pausing, and stopping inappropriate punctuation marks, and the ability to read at speed and accurately. It served as a bridge between word recognition and reading comprehension. Fluency can help a person read fast and accurately; the reason behind this is that the reader is no longer focused on decoding. Instead, he is focused on the word itself and comprehending it (Cotter, 2012).

Lastly is Comprehension. It is one of the main goals because people read. Comprehension includes image visualization on the readers and seeks to ask questions. It is also concerned with answering the questions like "what," "how," "when," "who," and "why." As observed, most of the reading comprehension assessments include questions at the end of the story to evaluate the students' ability to understand what was read. Aside from the questions like what, how, when, who, and why, it also assesses whether the students can summarize the story using their own words. The readers should restate the stages of the story, stating the plot, theme, setting, and even identifying the attitude and behaviors of the characters (Allen et al., 2014). These components work together for the readers to be influential, decisive, fast, and critical thinkers. There are the essential components that reading materials should maintain.

1.3. Reading Comprehension in the Science Test

The Science curriculum has been a part of the education system in the Philippines for decades. There might be some changes and modifications in the content due to the implementation of the K-to-12 curriculum. However, many journals state that the Philippines has below-average scores in the Science and Mathematics exams in schools locally or internationally.

There have been many studies that tried to incorporate reading comprehension in science subjects in schools. The students' reading ability may impact how they will answer their exams and other assessments in this subject. The 2018 research of the Program for International Student Assessment (PISA) stated that the Philippines ranked second to the lowest scores in science among over 79 participating countries. The 1990 research by the University of the Philippines showed that Filipino students have

difficulty answering their science exams. This result is very much connected with the 1998 research by the International Assessment of Educational Achievement, where there were 15 participating countries and ranked the Philippines lowest.

Based on the journal article of Imam (2014), there is only 3.2% of the total sample categorized as "mastery" level in reading comprehension. It implies that only a few students answered above 75% of the test items in reading comprehension. While on the Science test, only 3.3% of the total sample scored more than 75% or categorized as "mastery." It also turned out that these students who qualified for the mastery level studied in a private school. The result says a lot about how the education system in the Philippines works, especially in public schools. Most of the students in public schools are living in poverty (Taylor, 2017). Imam (2014) also used a level on how to categorize the readers. Students with a 75% and above correct answer are categorized as "mastery level." Students with 50%-74% correct answers are categorized under "near mastery level." While the category "low mastery level" is for students with a score of 49% and below.

In line with this, Lu-Fang Lin's (2010) journal article from the Institute of Applied English, National Taiwan Ocean University entitled "Senior High School Students' reading comprehension of Graded Readers," focused on the cognitive skills of the Senior High School students on how they will utilize their skills to comprehend the test on reading comprehension. Given the preceding, many factors are affecting the reading comprehension of individuals. Specific components need to be developed and practiced.

Lin's (2010) study participated by 78 Senior High School readers assigned three types of reading materials, namely: Level 2 (600 words- A Christmas Carol), Level 3 (1200 words- Forest Gump), and Level 4 (1700- The Client). The result shows that in terms of reading comprehension, the females increased their score by 6.5% from their pre-test to the post-test wherein the boys got only 2.68% increase from pre-test to post-test. This result is consistent with the research by Logan et al. (2009), which found that female readers have more patience in reading. They always take their time to read and enjoy every word that leads them to a higher reading comprehension. In terms of the time spent in reading, the females spent less time than male readers. This implies that longer time in reading does not always result in a high score in reading comprehension. Female readers are excellent in using word, sentence, and word knowledge and consequently perform reading efficacy. In terms of the result for the Reading Strategies, each gender uses the word Meaning strategy but primarily female readers. Word Meaning strategy is how to translate unfamiliar English words to the readers' mother tongue to be much easier for the readers to understand the whole concept and context of the reading materials. This well-written journal was used as a basis for this research.

The study adopted some parts of Imam's (2014) and Lin's (2010) research as references. The framework of Imam (2014) in using the category of readers, and the framework of Lin (2010) was used in assessing reading comprehension by looking at other factors.

The days of having only General Science in Science 7, Biology in Science 8, Chemistry in Science 8, and Physics in Science 10 are long gone. Changes were made when the K-12 Curriculum was implemented. Spiral advancement is required by Republic Act No. 10533, also known as the Enhanced Basic Education Act of 2013, in both private and public schools. to implement a spiral progression approach to solve the congestion of the Philippine primary education curriculum. As a result, students in the current secondary Science K–12 curriculum are introduced to a spiral progression approach in which the four fields of Earth Science, Biology, Chemistry, and Physics are taught every grading cycle (Resurreccion, 2014). The four subject areas should be covered by science teachers. Along these lines, the country's Science education faces numerous challenges, including a scarcity of trained Science teachers, a lack of high-quality textbooks, insufficient teaching materials and facilities, large classes, and a lack of administrative support. Furthermore, it was discovered that a shortage of teaching resources and facilities in the classroom has been used to excuse students' bad results. Currently, the Department of Education is working to find solutions to these issues. From 2017 to the present, a variety of laboratory instruments and supplies have been distributed to selected public Senior High Schools around the country. This package had laboratory tables and stools to go with it. As a result, public Senior High Schools with junior high schools on-site are all permitted to use the above laboratory facilities and equipment. In addition, the Department of Education distributed television sets and computer kits to assist teachers with their instructional materials. The computers housed the Department of Education's Learning Resources Management and Development System (LRMDS), which offers teaching and learning resources aligned to the K–12 curriculum. However, most Learner's Materials/textbooks in science are not yet available for students, especially in the Senior High School Science core subjects. That is probably why, despite the lack of textbooks, teachers are subjected to a variety of trainings and seminars.

1.4. Difficulties in Core Science Subjects in the Philippines

In the Philippines, the Senior High School program was first implemented 2006. The Science curriculum in the Philippines has changed dramatically since then. For non-STEM students, Earth and Life Science and Physical Science are the two main Science subjects. Many studies have demonstrated the challenges that Senior High School students face in their science classes. Since teachers primarily provide life Science education, students become bored with biology and less interested in studying more deeply. Other studies have shown that due to time constraints, teachers deliver learning

material rapidly and incompletely. They do not have enough time to compare concepts learned in biology with chemistry and physics concepts. The teacher's instruction focuses solely on the content required by the curriculum, leaving little time for students to engage in experimental activities that they enjoy. As a result of such circumstances, the academic environment in biology learning activities becomes unsuitable for optimum learning. Students are more concerned with having fun than with learning biology when it comes to learning events. Teachers find it difficult to perform classroom management practices because of this phenomenon.

According to McComas (2014), Earth Science and disaster risk mitigation topics include meteorology, geography, astronomy, and geology, as specified by the National Science Education Standards and most state standards documents. Earth Science teachers cover technology, the history and nature of science, and the relations between technology and human culture. As a result of this diversity, Earth Science teachers need extensive training in Science, Science-related social sciences, and education. They also need additional training, such as field and study experiences, to teach about the development and application of scientific knowledge.

Not all Earth Science teachers intended to teach the subject in college, and not all college students who study to teach enter or stay in the field. Technology majors are often drawn to science first, then teaching as they investigate the intersection of "what can I do about this?" and "what do I want to do?". Geoscience majors, especially those at liberal arts colleges or research universities that do not place a strong emphasis on teaching, may pursue a career as a teacher through graduate teacher training programs, which can take several years after graduation.

Administrators see "science instructor" whereas universities see "geology major" or "biology major." Schools need the flexibility to adapt to changes in student enrollments and state requirements, so one or more parts of Earth Science, particularly at the eighth or ninth-grade level, are often taught by a biology major. Many interdisciplinary high school classes, such as "environmental science" or "integrated science," are taught by instructors with no formal training in the Earth sciences. Such teachers also seek out additional Earth science coursework and professional development opportunities during the summers and evenings if they are accessible, affordable, and convenient.

It is in line with the research of King (2012), which studied Senior High School students and aimed to determine students' perceived factors why Earth Science and Disaster Risk Reduction are hard to understand. Some emerging themes came up, including the students' difficulty in understanding abstract concepts, visualizing since there are Earth's processes that people cannot see, depth of geological time, and spatial literacy.

Science educators in the early twenty-first century face a variety of challenges. Indeed, students in the Philippines continue to lag behind students in other countries, especially in Europe and Asia, in science achievement (National Center for Education Statistics, 2007). The availability of adequate textbooks and instructional resources, Science teacher preparation and training, political and religious resistance to cutting-edge Science instruction, the need to meet expectations and prepare students for standardized examinations, and the dramatically increasing use of the internet are just a few of the emotional problems in science education. Given these and other concerns, it is critical to recognize, respect, and build on adolescent learners' talents while also tailoring instruction to meet the challenges that this age group faces. Educational psychology may make a significant contribution to science education. There have been many significant recent advances in the study of adolescent cognition and motivation, and this new awareness will help improve Science education. Science learning necessitates the coordination of a diverse range of cognitive, affective, and motivational strategies and skills. Taking Science to School: The National Research Council published learning and Teaching Science in Grades K-8 in 2007. (National Research Council, 2007). This study details research-based guidelines for enhancing Science literacy in young children and early adolescents. This excellent resource contains a wealth of helpful knowledge and acts as a great starting point for thinking about the unique needs of older adolescent students.

According to Anderman (2012), Science education faces three general problems or distinctions. For starters, Science educators face challenges due to adolescents' developing cognitive abilities. Second, unlike K-8 science teachers, who are typically trained in general teacher education systems, secondary science teachers are generally trained in a particular scientific discipline. The third one is that the depth and breadth of science content available to late adolescents allow them to build on previous learning progressions through advanced electives and concurrent enrollment in multiple science courses. These distinctions between young science learners and adolescents enable educators to foster a greater understanding of science as a discipline and encourage students to consider careers in science.

1.5. Research Questions

The Core Science subjects in the Senior High School of the K-to-12 program of the Department of Education are composed of Physical Science and Earth and Life Science. These two core subjects consist of basic or introductory chemistry, Physics, Biology, and Earth Science topics (DepEd, 2016). Core Science subjects and Reading Comprehension

are connected because Core Science subjects consist of word problems, experimentations, concepts, research, and inquiries of results to compare with their other classmates (Johnson et al., 2005). The recent 2018 research conducted by the Program for International Student Assessment (PISA) found that the Philippines ranked the lowest in terms of Reading Comprehension with 340 points. This is the lowest score in all countries surveyed. Aside from reading comprehension, the Philippines ranked second to the lowest in Science and Mathematics. The problem with science education is not limited to the difficulty of the subject but rather the ability of the Filipino students to comprehend what they have read.

This research entitled "Assessing Reading Comprehension Difficulties in Core Science Subjects of the Senior High School Students in a Private School in Calamba City, Philippines," was conducted to provide answers to the following questions:

1. What are the reading comprehension skills of the Senior High School Students in Core Science Subjects?
2. What are the factors that can affect the reading comprehension skills of the senior high school students?
3. What is the perceived confidence level in the reading of the senior high school students?

For question 1, a standardized test in assessing the reading comprehension in core science subjects with three difficulty level was used. The three difficulty levels are Upper beginner level story, Intermediate level story, and Upper Intermediate level story. These stories are in the field of Life Science, Earth Science, and Disaster Risk Management. These areas include core science subjects. For the upper beginner level story, the reading comprehension test entitled "GM Food" was used. For the intermediate-level story, "The Most Amazing Structures on Earth" was used. Both foregoing stories are written by Shantel Ivits (2018). For the upper intermediate level, "Causes of Flood," written by Charlotte Shaldrake (2018), was used. For question 2, the profile and reading habits of the respondents were used to analyze the effect of these factors on their reading comprehension skills. Lastly, for question 3, after the data were collected, a Likert scale of 1-5 was used to get the students' perceived confidence in reading.

2. Method

2.1. Identify subsections

The study initially involved seeking permission from the Principal and School Director of the private school in Calamba, City. Tests were the main instruments for the data gathering and were given via an online platform. The respondents accessed the test

using google forms. The data collection was completed in the span of 2 weeks since all the respondents have enough gadgets that they also use for their online synchronous classes. The first part of the instrument includes questions to know the demographic profiles of the respondents as well as their reading habits. The instruments also used to assess Reading Comprehension has three difficulty level: Upper beginner level story, Intermediate level story, and Upper Intermediate level story. These stories are in Life Science, Earth Science, and Disaster Risk Management as the core Science subjects for all the strands. For the upper beginner level story, the reading comprehension test entitled "GM Food" was used. For the intermediate-level story, "The Most Amazing Structures on Earth" was used. Both the foregoing stories were written by Shantel Ivits (2018). For the upper intermediate level, "Causes of Flood", written by Charlotte Shaldrake (2018) was used.

For analysis and interpretation, the data gathered were coded, tallied, and tabulated and subjected to the following statistical treatment.

1. Frequency and Percentage

The frequency and distribution tables were used to categorize the respondents according to their demographic profile and reading habits such as age, sex, strands, favorite subjects, preferred reading materials, preferred reading genre, factors that negatively affect their reading, and their perceived reading confidence. The formula below was used to determine the proportion of students who answered in certain way in the reading comprehension test.

$$P = \frac{F}{N} \times 100$$

Where:

P= Percentage

F= Frequency

N= No. of Respondents

2. Averaging

Another technique used in the study was the averaging. This was used to determine the average score of the respondents in the reading comprehension test. This technique was used to determine the reading category of the respondents. The averaging formula was shown below.

$$Ave = \frac{R}{ni} \times 100$$

Where:

Ave= Average

R= Raw Score

Ni- Number of Items

2.2. Participant (subject) characteristics

This study was conducted in a private school in Calamba City, Laguna, Philippines as the testing school. It involved Grade 11 Senior High School students enrolled in the academic year 2020-2021. The testing school used for this study was founded in 1983 by entrepreneurs Augusto C. Lagman, Herman T. Gamboa, Benjamin A. Santos, and Edgar H. Sarte. It only had two campuses in its inaugural year, but it today has over 100 around the Philippines. Tourism management, business administration, accounting information systems, communication, accountancy, hospitality management, multimedia arts, computer science, information technology, computer engineering, hospitality and restaurant services, and computer technology are among the undergraduate programs available. They also offer senior high school program and are accredited for several tracks such as academic and technical-vocational track.

2.3. Sampling procedures

Stratified random sampling (ratio and proportion) was used to come up with the number of respondents for specific Senior High School Strand.

2.3.1. Sample size, power, and precision

It involves 115 grade 11 senior high school students from a private school located in Calamba City, Philippines.

The sampling size computation using Slovin's formula is shown below:

Sloven's Formula Computation:

$$N = \frac{n}{1 + n(e)2}$$

Where:

N= Sampling size
n = Total population
e = Margin of error (5%)

$$N = \frac{161}{1 + 161(.05)2}$$

$$N = \frac{161}{1.4025}$$

N= 115 (Respondents)

2.3.2. Measures and covariates

The instruments used to assess Reading Comprehension has three difficulty level; Upper beginner level story, Intermediate level story, and Upper Intermediate level story. These stories are in Life Science, Earth Science, and Disaster Risk Management as the core Science subjects for all the strands. For the upper beginner level story, the reading comprehension test entitled "GM Food" was used. For the intermediate-level story, "The Most Amazing Structures on Earth" was used. Both the foregoing stories were written by Shantel Ivits (2018). For the upper intermediate level, "Causes of Flood" written by Charlotte Shaldrake (2018) was used.

Table 1. Specific phases of question per difficulty level

Difficulty Level	Science Story	Core Science Field	Number of Words	Phases	Number of Items	Total
Upper Beginner	GM Food	Life Science	215	a. Reading Comprehension	5	25
				b. Story Recreation	15	
				c. Vocabulary Matching	5	
Intermediate	The Most Amazing Structure on Earth	Life Science	530	a. Reading Comprehension	10	20
				b. Vocabulary	10	
Upper Intermediate	Causes of Flood	Earth Science and Disaster Risk Reduction	420	a. Pre-Reading Exercise	10	30
				b. Reading Comprehension	10	
				c. Practice Exercise	10	
TOTAL:						75

Table 1 above shows that each story difficulties has phases to assess the reading comprehension skills of the respondents. For upper beginner level, the phases are reading comprehension (5 points), Story Recreation (15 points), and Vocabulary Matching (5 points. For the Intermediate-level, the phases are reading comprehension (10 points), and Vocabulary (10 points). For the Upper Intermediatelevel, the phases are Pre-reading comprehension (10 points), reading comprehension (10 points), and Practice Exercise (10 points).

2.3.3. Research design

This study used a descriptive-survey method of research. A descriptive survey attempts to establish the range and distribution of some social characteristics, such as education or training, occupation, and location, and to discover how these characteristics may be related to certain behavior patterns or attitudes (Zurmuehlin, 1981). It uses surveys to gather data about varying subjects. This data aims to know the extent to which different conditions can be obtained among these subjects. It involved description,

analysis, and interpretation of Senior High School Students' answers from the given set of test problems from the reading comprehension test in Core Science Subject.

3. Results

3.1. What is the reading comprehension skills of the Senior High School Students in Core Science Subjects?

Figure 1 shows that only 7% of the total respondents are classified as Mastery Level readers. The result is meagre compared with the 49% near mastery level and 44% poor mastery level. This finding is supported by the research conducted by PISA (2018), which stated that the Philippines ranked second to the lowest in the fields of Science and Mathematics and lowest in reading comprehension. It is also aligned with the research conducted by Imam (2014), which suggests that students seemed to be struggling with both the content of science and the skills needed to be a proficient reader. The poor performance of Filipino students in science, which contributed to the bad image of Philippine education both locally and abroad, can be well expounded by other relevant factors. There are many constraints facing Science education in Philippine schools like shortage of qualified Science teachers, lack of quality textbooks, inadequate equipment, large classes, lack of support from administrators, and many others. Thus, the government and other concerned agencies can initiate some bold steps towards improving students' reading and science achievements.

Figure 1. Reading Comprehension in Core Science Subjects

Many academicians argue why the Philippines, one of the best English-speaking countries globally, ranks lowest in the survey. They say that here, education in reading is focused on the bare word definition. Filipino students should be surrounded with essays and try to relate and reflect on it to enhance their comprehension. Mastery Level 7% Near Mastery Level 49% Poor Mastery Level 44% They also suggested that learning the mother tongue by heart will lead to the proper understanding of the second language. The first language should be mastered first before focusing on the second language,

which is English. According to them, students are having confusion when they study their mother tongue and English language at the same time (Manlapig, 2020).

The days of having only General Science in Science 7, Biology in Science 8, Chemistry in Science 8, and Physics in Science 10 are long gone. Changes were made when the K-12 Curriculum was implemented. Spiral advancement is required by Republic Act No. 10533, also known as the Enhanced Basic Education Act of 2013, in both private and public schools. to implement spiral progression approach to solve the congestion of Philippine basic education curriculum. As a result, students in the current secondary science K–12 curriculum are introduced to a spiral progression approach in which the four fields of Earth Science, Biology, Chemistry, and Physics are taught every grading cycle (Resurreccion, 2014). The four subject areas should be covered by science teachers. Along these lines, the country's science education faces numerous challenges, including a scarcity of trained science teachers, a lack of high-quality textbooks, insufficient teaching materials and facilities, large classes, and a lack of administrative support. Furthermore, it was discovered that a shortage of teaching resources and facilities in the classroom has been used to excuse students' bad results. Currently, the Department of Education is working to find solutions to these issues. From 2017 to the present, a variety of laboratory instruments and supplies have been distributed to selected public Senior High Schools around the country. This package had laboratory tables and stools to go with. As a result, public senior high schools with junior high schools on site are all permitted to use the above laboratory facilities and equipment. In addition, the Department of Education had distributed television sets and computer kits to assist teachers with their instructional materials. The computers housed the Department of Education's Learning Resources Management and Development System (LRMDS), which offers teaching and learning resources aligned to the K–12 curriculum. However, most Learner's Materials/textbooks in Science are not yet available for students, especially in the Senior High School Science core subjects. This is probably why, despite the lack of textbooks, teachers are subjected to a varitrainingainings and seminar.

Figure 2 shows that only 7% of the respondents are considered Mastery Level readers in Life Sciences. In contrast, most of the respondents are under the Poor Mastery Level.

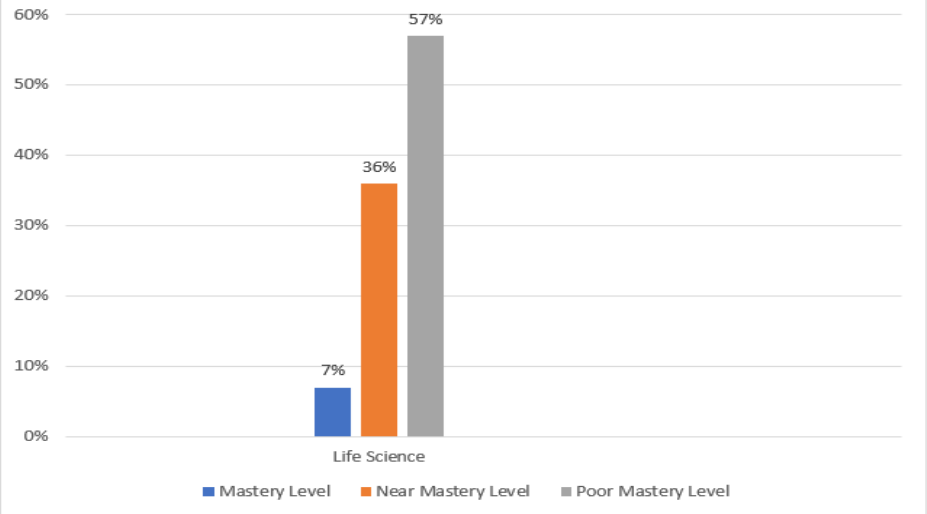
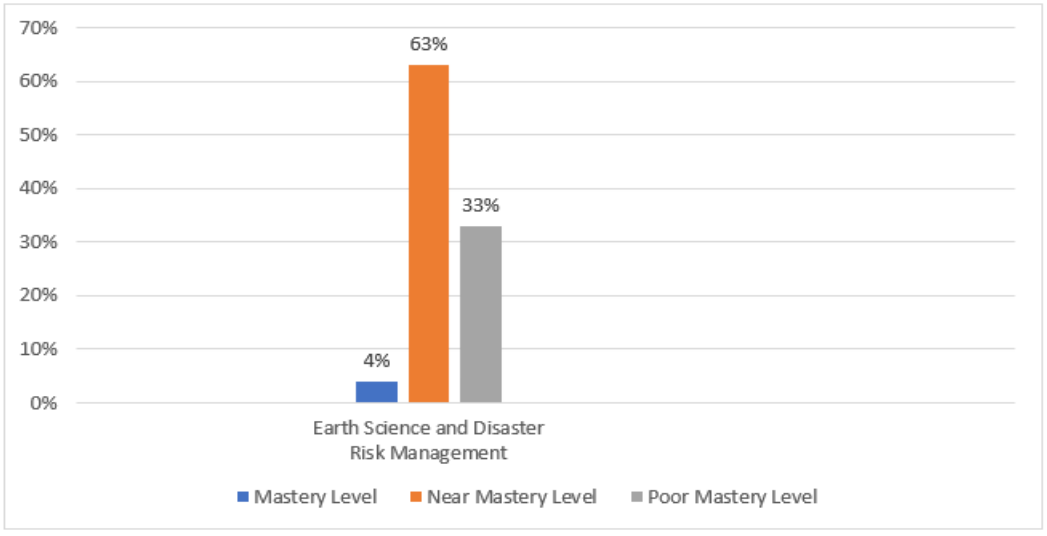


Figure 2. Reading Comprehension in Life Sciences

In this research, the Life Sciences section of the instrument is composed of two stories entitled "GM Food" and "The Most Amazing Structures on Earth." These stories are in genetics, Artificial selection, Food security, and Anatomy and Physiology, which are part of their lessons in life Sciences.

Most of the respondents are poor mastery readers. Life Sciences require the students to memorize, analyze, and observe. Knowing that senior high school students have low retention makes Life Sciences harder (Strikwerda, 2019). Unlike Chemistry and Physics, these subjects have more computation parts, while life Science is too wordy. There are many vocabularies to learn and understand before comprehending the whole context of the lesson. The result is in line with Cimer's (2011) research, which studied 207 senior high school students from private and public high schools. It aimed to determine students' perceived factors why Life Sciences are hard to understand. Some emerging themes came up, including the students' difficulty in understanding the vocabulary, experimentations, memorizations, and too many details in the context of each specific life sciences lesson.

Figur



'ed as Mastery Level reader in Earth Science and Disaster Risk Reduction, while 33% of the respondents are as Poor Mastery Level readers in Earth Science and Disaster Risk Reduction.

In this study, the Earth Science and Disaster Risk Reduction section of the instrument comprises a story entitled "Causes of Flood." This story is in the context of structures of the Earth, Earths' materials and processes, natural hazards, and adaptation and mitigations, which are part of their lessons in Earth Science and Disaster Risk Reduction.

Only 4% of the respondents are under mastery level readers in the instrument's Earth Science and Disaster Risk Reduction section. Unfortunately, this is considered very low. This study has 115 respondents, and there are only five respondents who got scores higher than 75% of the item in Earth Science and Disaster Risk Reduction.

This result is consistent with the research of King (2012), which studied senior high school students and aimed to determine students' perceived factors on why Earth Science and Disaster Risk Reduction are hard to understand. Some emerging themes came up, including the students' difficulty in understanding the abstract concepts, visualizing since there are Earth's processes that the people cannot see, depth of geological time, and spatial literacy.

It is a fact that Disaster Risk Reduction is essential in mitigating hazards and how people can use their learnings to survive when certain disasters come possibly. According to Prevention Web (2015), students have a hard time understanding and appreciating Disaster Risk Reduction because these kinds of learning areas need to have a practical and physical application. On the other hand, these activities, such as constructing flood defenses, planting trees to stabilize slopes, first aid, and cardiopulmonary resuscitation (CPR) lessons, are costly and time-consuming, knowing that the teachers have a full load schedule. Some schools cannot afford to fund these activities due to the lack of resources and qualified teachers to handle the course.

Science educators in the early twenty-first century face a variety of challenges. Indeed, students in the Philippines continue to lag behind students in other countries, especially in Europe and Asia, in science achievement (National Center for Education Statistics, 2007). The availability of adequate textbooks and instructional resources; science teacher preparation and training; political and religious resistance to cutting edge science instruction; the need to meet expectations and prepare students for standardized examinations; and the dramatically increasing use of the internet are just a few of the emotional problems in science education. Given these and other concerns, it is critical to recognize, respect, and build on adolescent learners' talents while also tailoring instruction to meet the particular challenges that this age group faces. Educational psychology may make a significant contribution to science education. There have been many significant recent advances in the study of adolescent cognition and motivation, and this new awareness will help improve science education. Science learning necessitates the coordination of a diverse range of cognitive, affective, and motivational strategies and skills (National Research Council, 2007).

According to Anderman (2012), science education faces three general problems or distinctions. For starters, science educators face particular challenges due to adolescents' developing cognitive abilities. Second, unlike K-8 science teachers, who are typically trained in general teacher education systems, secondary science teachers are generally trained in a particular scientific discipline. The third one is that the depth and breadth of science content available to late adolescents allow them to build on previous learning progressions through advanced electives and concurrent enrollment in multiple science courses. These distinctions between young science learners and adolescents enable educators to foster a greater understanding of science as a discipline and encourage students to consider careers in science.

3.2. What are the factors that can affect the Reading Comprehension skill of the Senior High School Students?

Figure 4 shows that there is 5% from the academic strand under the category of Mastery Level readers while there is 9% from the technical-vocational track. Most of the students from the academic track are under poor mastery reader with 56%. This is high compared with the 36% from the technical-vocational students.

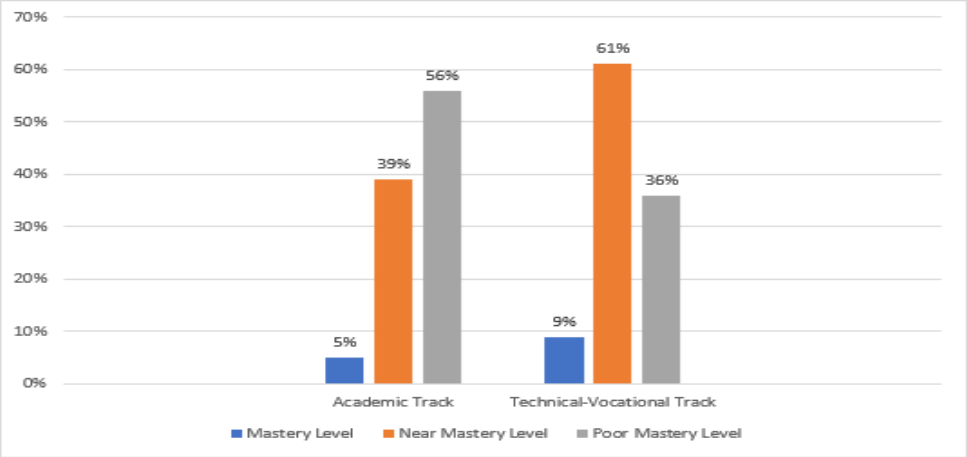


Figure 4: Reading Comprehension comparison between academic track and technical-vocational track

This result is interesting because academic tracks have more subjects in terms of reading, writing, and computation, while technical-vocational students are more on practical use and application of their learning. In this study, the strands belonging to the academic track are Accountancy, Business and Management, General Academic Strand, and Science, Technology, Engineering, and Mathematics. While ITMAWD, Culinary Arts, and Hospitality Operations are under the technical-vocational track.

It turned out that more readers at the mastery level are enrolled in the technical vocational program. This contradicts the research of Pilar (2017), which finds out that

technical-vocational students do poorly in reading competence in English, likewise in technical performance because maybe they cannot understand well the instructions given or written in the English language. This problem might be one of the reasons for students' incompetence in future employment. Some students in technical-vocational schools are skilful in terms of practical skills. However, their reading competence in English is very poor, especially in comprehending the texts from books.

The researcher can see a possible reason behind this as seen in Figure 8. Since all respondents classified as mastery level readers preferred an online platform, the use of technology and computer plays a significant role in easy access to reading materials that can enhance their skills in reading. Since most of the respondents who are enrolled in the technical-vocational program are in Information Technology/Computer-related studies, it can help them develop their reading skills. This is supported by an article from an IT website by Marshable (2020) which indicates that; since computer studies are full of codes or computer language, it can be a possible reason why technical-vocational students are good at reading. They are surrounded by computer language that not all people can understand and comprehend. It is so powerful that it looks like IT students have a deep communication to understand the complex language of technology, specifically computers. Since online learning started when the Philippines practiced the "New Normal" of education, it can also be a possible reason that they are now using technology to develop their reading skills.

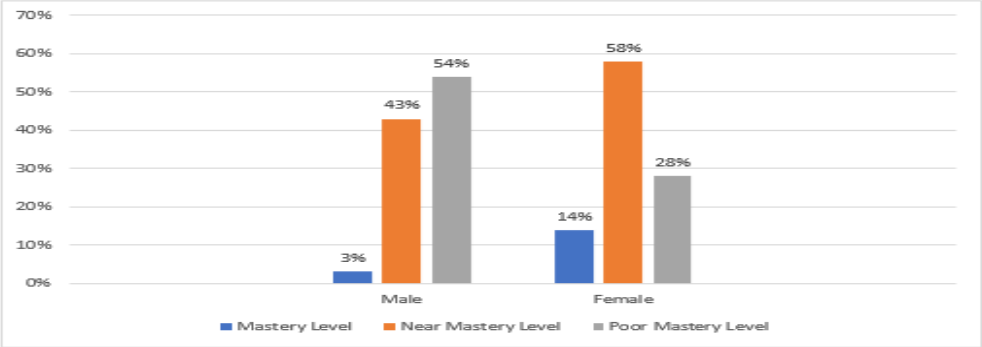


Figure 5: Reading Comprehension comparison between Male and Female Students

Figure 5 shows that most respondents classified as Mastery Level Readers are female with 14% compared to the 3% of male readers. Most male readers fell under the Poor Mastery Level Readers and hence, are considered poor readers with a whopping 54%. In contrast, the majority of the female readers are near mastery level. It shows that those female readers are competent in reading.

The result is supported by the research of Lin (2010), which shows that in reading comprehension, the females increased their score by 6.5% from their pre-test to the post-test, wherein the boys got only 2.68% from pre-test to post-test. This result is coherent to the research of (Logan et al., 2009), which states that female readers have more patience in reading. They always take their time to read and enjoy every word that leads them to a higher reading comprehension. In terms of the time spent in reading, the females spent less time than male readers. Longer time in reading does not always result in a high score in reading comprehension. Female readers are excellent in using word, sentence, and word knowledge and consequently perform reading efficacy. In terms of the result for the Reading Strategies, each gender uses the word Meaning strategy but primarily female readers. Word Meaning strategy is how to translate unfamiliar English words to the readers' mother tongue to be much easier for the readers to understand the whole concept and context of the reading materials.

According to Schwanenflugel (2018), girls outscore boys on early tests of general verbal ability; in same-age comparisons, they tend to have somewhat greater verbal fluency and more extensive vocabularies than boys during the preschool years, though these differences all but disappear as children grow older. This early verbal advantage is particularly pronounced in phonological awareness and letter recognition; that is, the ability to separate, identify and analyze the sounds of language and connect these sounds to written letters. These early verbal differences can give girls an advantage in reading, especially in languages like English with built-in letter-sound correspondences, especially when instruction is heavily phonics-based.

One of the possible reasons why female loves to read goes in our history. According to Taylor (2019), the love of females to books and learning can be traced back to when women are not allowed to study, vote, and have an opinion on how the world will go. Reading books and studying are considered as a rebellion and fight against discrimination amongst women. Female academicians or intellectual females are considered a threat, and these strong women proved that they could also read, learn, and lead. This practice has been passed on from generation to generation.

Figure 6 shows that 100% of the mastery-level readers preferred reading on an online platform. This finding is in line with the results in Table 7. Since the facilitation of the instrument in this research was conducted online, it is possible that it gave an advantage to the mastery-level readers since they preferred to use online platforms in reading, unlike those respondents who preferred to use printed materials.

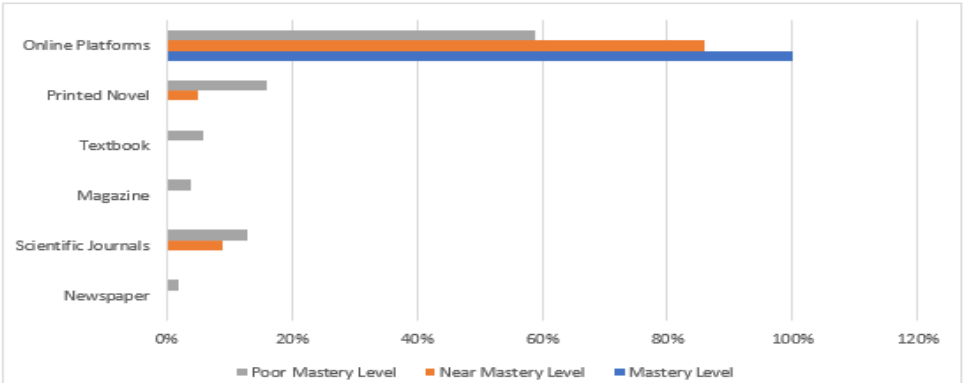


Figure 6: Reading Comprehension comparison based on the respondents' preferred reading material/platform

Technology can be used to help students improve their reading comprehension. Educators and students alike are heavily reliant on technology. Over the past decade, technology has advanced dramatically, and it is now being used in schools worldwide. When used appropriately, technology will improve many aspects of the curriculum. The use of technology in the classroom will help students improve their reading comprehension. Technology is most beneficial when it is integrated into the curriculum and regularly used in the classroom. Many technological options are available today to help students improve their learning skills, expand their learning, or promote their learning (Edutopia Team, 2008). When used as a guide, technology applications have been shown to aid reading comprehension. Students are inspired by technology devices and want to use something already part of their everyday routine. According to " (Murphy, DePasquale & McNamara, 2003) "Technology is, after all, a tool, and it should be chosen because it is the best tool for the job. It is a handy tool for English language learners, and it can also help children with disabilities participate more fully. Students need the opportunity to use and learn from a motivating method. Allowing students to guide their learning and select materials to read begins with providing opportunities for students to practice their reading skills using available technology resources (Jeffs & Castellani, 2001). If technology is regularly and efficiently integrated into the curriculum, it can improve students' reading comprehension skills. Students may use technology to access software that provides them with context information on a text. Apps can also assist students in determining the meaning of vocabulary words, and technology can read text aloud to them, both of which have been shown to improve comprehension skills provides. Technology has proven to be an effective method for improving students' reading comprehension.

Figure 7 shows that most respondents, regardless of what category of readers they belonged to, chose a noisy environment as the factor that can affect their mood in reading. Connolly et al. (2019) in the Journal of the Acoustical Society of America, studied the impact of different classroom noise levels on adolescents' performance on reading and vocabulary-learning tasks. They presented that a total of 976 English high school pupils completed reading tasks on laptop computers while exposed to different

classroom noise levels played through headphones. The tasks consisted of reading Science texts, followed by multiple-choice questions, probing comprehension, and word learning. Several questions were attempted, times taken to read the texts and answer questions were recorded, and correct answers to different types of questions. It turned out that a noisy environment harms the scores of the readers. Regardless of whether the reader is a good or poor reader, a noisy environment will target the readers' focus to comprehend what is being read.

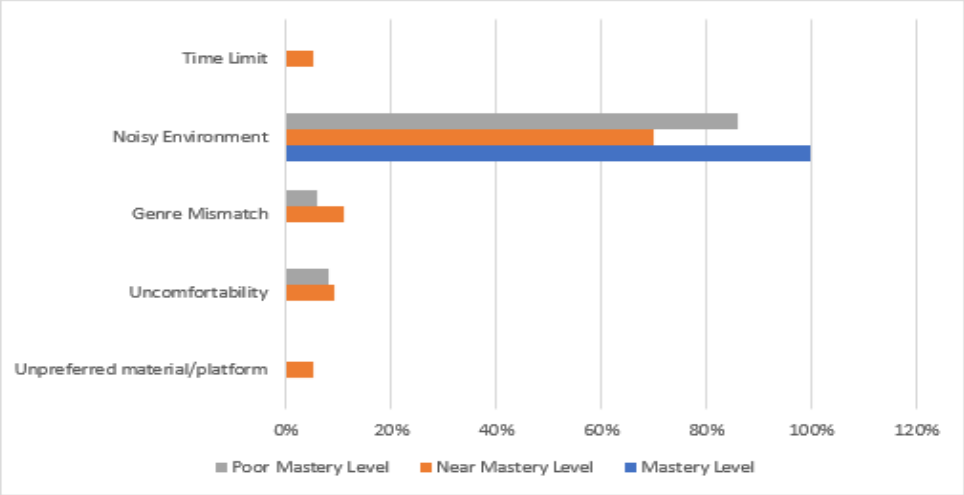


Figure 7: Reading Comprehension comparison based on the reading distraction

In line with this, as per the research of Evans et al. (1997), long-term exposure to a noisy environment will lead to a permanent loss of interest in reading. It will also result in noise resistance, where readers will have a negative mood in reading when placed in a quiet environment because their ears are used to a noisy environment. According to Clark et al. (2006), the relation between noise exposure and reading comprehension may be mediated by other cognitive abilities essential in developing children's reading ability, such as attention, episodic memory, and working memory. While environmental stressors can have a substantial impact on the degree to which information is processed, retained, and recalled.

3.3. What is the Perceived Confidence Level in Reading of the Senior High School Students?

Figure 8 shows that 100% of the respondents classified as mastery-level readers perceived themselves as "good" readers. In contrast, respondents considered themselves as either level 3 or level 2 readers. It says a lot about how we perceived ourselves as readers. Confidence can help readers to be good readers because lack of confidence in reading which can lead to an inability to comprehend what is read due to lack of self-esteem, and they are afraid to be judged.

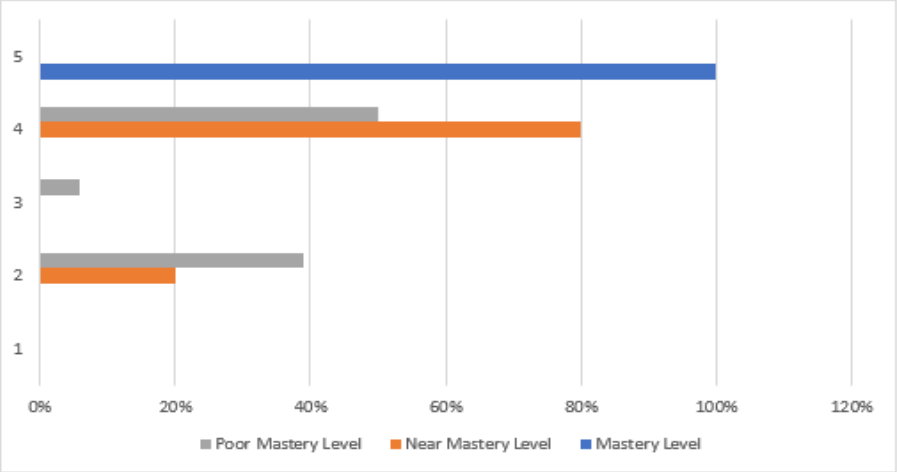


Figure 8. Reading Comprehension comparison based on the respondents' perceived confidence level in reading

According to Lyon (2000), good readers are phonemically aware, and they do understand the concept and principles of the alphabet. They also possess strong vocabulary skills and grammatical skills, which learners can apply to their reading ability. This means that difficulties in any of these areas can be a hindrance to their reading comprehension development. It also boils down to the tutoring of parents while the learners are in homes since these essential skills are being taught even before learners enter formal schooling. Consistent with Rues (2019) study, reading comprehension should be viewed on a multi-faceted continuum that considers the student's skill level in decoding words, their willingness to take on a text, and their exposure to the content. When readers approach the page, they bring their schemas and personal experiences to that work. These students know what area they are confident in reading and understand. For example, a kid who is a dinosaur expert will likely have much higher comprehension in a challenging book about dinosaurs than she might if she attempts to tackle a problematic biography of Martin Luther King, Jr. or a student who spends many fall weekends in a deer stand in the woods with his uncle should be allowed to attempt to read an above-his-level novel that centers around hunting. Meaning, reading comprehension should be a holistic approach. It should be developed using proper materials and should be applied in every life

4. Discussion

Significant findings of this study show that most of the respondents are in the age bracket of 16-17 years old, with 79%. Majority of the respondents are male with 63% of the total sample size. On the other hand, most of the respondents showed love for the

subjects in computer studies and information technology. Online platforms got 75% of the total preference of the respondents as their preferred reading material or platform. In terms of reading genre, the respondents showed favoritism for the horror genre with 42%. The majority of the respondents showed that a factor that can negatively affect their reading mood is the noisy environment, with 79%, and 63% of the respondents said that they perceived themselves as a level 4 reader. In terms of reading comprehension skill result it shows that only 7% of the total respondents are classified as Mastery Level readers. The result is trifling compared to the 49% near mastery level and 44% poor mastery level. This result is supported by the research conducted by PISA (2018), which showed that the Philippines ranked second to the lowest in the fields of Science and Mathematics and lowest in reading comprehension. This is also aligned with the research conducted by Imam (2014), which suggests that students seemed to be struggling with both the content of science as well as the skills needed to be a proficient readers. The poor performance of Filipino students in science, which contributed to the bad image of Philippine education both locally and abroad, can be well expounded by other relevant factors. Thus, the government and other concerned agencies can initiate some bold steps towards improving students' reading and science achievements.

Majority of the respondents classified as Mastery Level Readers are female, with 14% compared to the 3% of male readers. In terms of Poor Mastery Level Readers, most male readers are considered poor readers with a whopping 54%, while most female readers are considered near mastery level. This is evident that female readers are competent in reading. Based on the respondents' favorite subject. It showed that most respondents classified as Mastery Level readers preferred IT/Computer-related subjects with a whopping 75%, while most of the respondents who are classified as Poor Mastery level readers preferred Science subject with a total of 42%. It also showed that 100% of the mastery-level readers preferred reading on an online platform. Since the facilitation of the instrument in this research was conducted online, it possibly gave an advantage to the mastery level readers since they preferred to use online platforms in reading, unlike those respondents who preferred to use printed materials. It is also evident that most of the respondents, regardless of their category of readers, chose a noisy environment as the factor that can affect their mood in reading.

The data gathered also shows that 100% of the respondents classified as mastery-level readers perceived themselves as "good" readers. In comparison, respondents considered themselves as either level 3 or level 2 readers. It says a lot about how we perceived ourselves as readers. Confidence can help readers be good readers because lack of confidence in reading can lead to an inability to comprehend what is read due to lack of self-esteem, and they are afraid to be judged.

5. Conclusions

Based on the indicated findings, the following conclusions were drawn:

1. The result of the reading comprehension test for the senior high school students revealed that only 7% of the total respondents are classified as Mastery Level reader, 49% Near Mastery Level, and 44% Poor Mastery Level
2. Majority of the respondents who are classified as Mastery Level Readers are female with 14% compared to the 3% of male readers. This is evident that female readers are competent in reading.
3. Majority of the respondents who are classified as Mastery Level readers preferred IT/Computer related subjects with a whopping 75% while the majority of the respondents who are classified as Poor Mastery level readers preferred Science subject with a total of 42%.
4. All or 100% of the mastery-level readers preferred reading in an online platform.
5. It is also evident that majority of the respondents regardless of what category of readers they belonged to, chose noisy environment as the factor that can affect their mood in reading.
6. The findings also showed that 100% of the respondents who are classified as mastery-level readers perceived themselves as "good" readers. It is evident that confidence can help readers to be a good readers because a lack of confidence in reading can lead to an inability to comprehend what is read due to lack of self-esteem and they are afraid to be judged.

It was concluded that Filipino students lack comprehension, especially in science. Since the preferred learning/reading materials of the students is an online platform, the research states that it would be helpful to use online mode of remediation to enhance the reading comprehension skills of the students in science. This can be a module that can be distributed online. In line with this, the research also concluded that aside from enhancing the reading skills of the students, teachers should also need to develop students' confidence in reading because it is evident that students tend to have higher scores if they are confident enough to read.

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