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### Learning Styles and Reading Comprehension in Modular Distance Learning of Grade 12 Senior High School Students

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#### Abstract

The study aimed to find the difference between Grade 12 students' reading comprehension in terms of their learning styles in modular distance learning. Specifically, it aimed to determine the demographic profile of the students in terms of gender, age, academic track and strand; different learning styles of the students based on David Kolb's theory of learning styles; different level of students' reading comprehension; and the significant difference between students' learning styles and their reading comprehension in modular distance learning. This study was conducted at Cavite National High School from February-June 2021 with 30 Grade 12 senior high school students as participants from the said school.

Moreover, this study adopted the descriptive survey design where quantitative data were collected through survey questionnaires. Hence, two validated research questionnaires in checklist form and short-answer form were used in gathering primary data. Purposive sampling was applied in choosing the sample population since only those students

under modular distance learning were selected as participants.

From the analysis of data, the following findings were determined:

In terms of learning style, the results revealed that Reflector was the dominant learning style of the students. However, Critical comprehension had a frequency of 10 participants, equivalent to 33 percent. Thus, in cross tabulation, it is implied that there are four Reflector students described at Critical level of reading comprehension. The significant difference between learning styles and reading comprehension is 0.26 resulting in rejecting the null hypothesis of the study which revealed that there was a significant difference between the two variables. It is therefore concluded that there is a significant difference between learning styles and reading comprehension and that Grade 12 students are described as Critical thinkers on their level of reading comprehension.

**Keywords:** Modular Distance Learning, Students, PISA

#### Introduction

Reading could give a contribution to the students in raising the success of language (Rahayu, 2017) <sup>[21]</sup>. The English language in a university carries out a framework that consists of four basic language skills which include listening, speaking, writing and reading. Reading contains the activity to understand the text and information in the text. Through various reading materials, students could understand English well and get knowledge in the form of writing. This was supported by the study of Cline, *et al.* (2006) that reading is the process of deriving meaning from text, whereas students try to understand the authors' idea, meaning of text and think about what they have read.

Meanwhile, Alderson (2000) in his study, said that reading is the process of constructing meaning through dynamic interaction among readers in written language (cited in Rahayu, 2017) <sup>[21]</sup>. Reading process means not only "reading" but trying to make interaction between the reader and the text. It deals with how the readers convey the meaning through the written symbols and process them into their mind (Rahayu, 2000).

In addition, Ruzgar and Babadogan (2017) <sup>[24]</sup> state that reading comprehension is one of the most essential learning processes. All students need to master it through their formal education, since studies show that students who have poor comprehension abilities do poorly in school or even drop out and get low-income jobs in their adult lives (Kutner et. Al, 2007 cited in

Williams, 2010). It is also believed that individuals without a strong comprehension level negatively affect the whole society socially, economically, and intellectually (Littin, 2001). Thus, comprehension is an important area of study for scholars of education, and it encompasses a wide area in education literature.

According to Hsieh and Dwyer (2009)<sup>[11]</sup>, many studies have found reading strategies useful when implemented before, during or after reading (cited in Brown, 2002; Ediger, 2005; Fagan, 2003; McGlinchey & Hixson, 2004; Millis & King, 2001; Sorrell, 1996). For example, reading strategies include rereading, scanning, summarizing, keywords, context clues, question-answer relationships, inferring, thinking aloud, activating prior knowledge, setting a purpose, and drawing conclusions. Online learning environments are becoming popular for most teachers and students. However, few studies focus on appropriate online reading strategies for different types of learners, and most studies focus only on the effectiveness of text-based reading strategies.

The online learning environment has become more and more popular for educators and learners, due to its multiple visual and audio representations. Online learning is a trend that has the potential to enhance learning and increases the importance of knowledge of new teaching methods which apply to new learning environments (cited in Jung, 2001; Romero, Berger, Healy & Aberson, 2000). According to previous studies, many learners encounter difficulties learning online, since they have difficulty changing their learning habits to accept reading electronic texts (Aragon, 2004; Steinhauer & Friederici, 2001). Learners feel doubtful about their learning abilities and believe that they are not as skilled as readers who can overcome the changes in the learning process.

In addition, students with their own learning styles may process information differently in an online environment (cited in Atkinson & Shiffrin, 1969; Burton, Moore & Holmes, 1995; Huit, 2003). Different online reading strategies may influence the students' information processing methods (cited in Driscoll, 2005; Schunk, 2004). Rachma, *et al.* (2015)<sup>[20]</sup> believed that students have probably noticed that when they try to learn something new inside the classroom, some of them prefer to learn by listening carefully to the teacher who talks about information or prefer to read the information given by the teacher, while the rest might be understood better by seeing a direct demonstration from the teacher. It shows that each student has a different way of responding to new information in the context of learning. This is what many people call a learning style, as a student's characteristic dealing with strengths and weaknesses in taking and processing information. The kind of learning style a student possesses is important for the teacher in order to create an appropriate technique in teaching because students will be more successful in getting information if the teachers match their way of teaching to students' learning styles.

According to Rachma, *et al.* (2015)<sup>[20]</sup> there are three main cognitive styles: Visual, auditory, and kinesthetic; however on David Kolb's (1984) theory of learning styles and experiential theory, learning is viewed as a four-stage cycle. First, immediate and concrete experiences serve as a basis for observation. Next, the individual reflects on these observations and begins to build a general theory of what this information might mean. In the next step, the learner

forms abstract concepts and generalizations based on hypotheses. Finally, the learner tests the implications of these concepts in new situations. After this step, the process once again cycles back to the first stage of the experiential process. Kolb's learning styles are based on two major dimensions; active/reflective and abstract/concrete.

According to the findings of the Program for International Student Assessment (PISA) in 2018, Filipinos aged 15 years old and above scored lower in reading comprehension tests compared to the other nations that participated in their study. Hence, the researchers will determine the difference in the level of reading comprehension of students in terms of their learning styles.

### Statement of the Problem

This study aimed to determine the level of reading comprehension of Grade 12 students and their learning styles in modular distance learning. Specifically, this study answered the following questions:

1. What is the demographic profile of students in terms of gender, age, academic track and strand?
2. What are the different learning styles of the students based on David Kolb's learning style theory?
3. What are the levels of reading comprehension of the students?
4. Is there a significant difference between students' learning styles and their level of comprehension?

### Objectives of the Study

This study aimed to find the difference between Grade 12 students' reading comprehension in terms of their learning styles in modular distance learning. Specifically, it aimed to determine the:

1. demographic profile of the students in terms of gender, age, academic track and strand;
2. different learning styles of the students based on David Kolb's theory of learning styles;
3. different level of reading comprehension of students;
4. significant difference between students' learning styles and their reading comprehension in modular distance learning.

### Research Hypothesis

There is no significant difference between students' learning styles and the grade 12 students' reading comprehension in modular distance learning.

### Significance of the Study

This study was primarily intended to understand the learning styles and reading comprehension in modular distance learning of Grade 12 senior high school students. Gathered data and results were of great significance in improving the teacher's approach in teaching reading comprehension that matches with the students' learning styles. Moreover, this study would greatly benefit the following individuals:

**Teachers:** This study would benefit the teachers by improving their teaching strategies in modular distance learning especially in the areas dealing with reading comprehension and to understand the different learning styles of students in comprehending their reading materials.

**Students:** Particularly the senior high school students would also benefit the study by acquiring techniques that will match their learning styles to easily comprehend their reading materials.

**School administrators:** The result of this study could serve as a guide for school administrators in designing effective teaching strategies in reading comprehension for their faculty members and to acknowledge students with different learning styles.

**Future researchers:** The result of this study would be beneficial to the future researchers who intend to write similar studies. The result of this study could serve as future reference on related parts.

### Time and Place of the Study

This study was conducted at Cavite National High School-Senior High from February to July 2021.

### Scope and Limitation of the Study

This study focused on the reading comprehension of the Grade 12 students in modular distance learning. It covered the learning styles that students have in order to comprehend their reading materials. It also aimed to find the difference between students' learning styles and their level of reading comprehension.

### Theoretical Framework

Reading Comprehension believed to start from Sir Frederic Bartlett's Schema Theory in 1932. In his study, he created the word "schema" in which the use of past experiences of an individual in learning new things. This study was later incorporated into reading comprehension by David E. Rumelhart (1980) [23] and two other researchers. They proposed that a person uses his/her schema or prior knowledge and past experiences in reading. Thus, it proves that the reading comprehension of the students is incorporated with their "schema" or prior knowledge and how they perceived the reading materials as what learning styles suggested.

The 1978 study of Walter Kintsch and Teun A. van Dijk found out that readers often reflect on their thoughts about the text and their pre-existing idea about it. Their study believed that the readers create mental representations of the reading material in their minds then it will be stored as semantic representations while reading. This helps the readers to recall and use their past knowledge about the text they read. Therefore, the mental representations stored in their mind can be triggered and remembered by the user or the reader through their learning styles. Since they are doing it through their comfortability and ways of learning, it makes reading comprehension successful.

Through the years, the level of comprehension varies from one researcher to another as well as the rankings, making the literal comprehension as the lowest level while critical comprehension being the highest. Yet Frank Guszak (1970) [10] refrained from these rankings of comprehension. He proposed to his study to not use hierarchy by the cognitive ability of each level. Thus, he made three specific comprehensions and defined them one by one. According to his study in 1970, literal comprehension is the dealing with facts. He measured it by "student's skill in recognizing some literal elements while reading or recalling such an element after a selection has been read". On the contrary, inferential comprehension was defined by him as "dealing with interpretations and deductions not explicitly stated in the text" or in other words, the ability of the person to go beyond what is written by using inferences. Consequently, critical evaluation is defined by Guszak (1970) [10] as

"dealing with matters of evaluation, worth, acceptability, or probability" which means the ability of a person to go deeper into the text. This work of Guszak leads to other research incorporating reading comprehension to the learning styles of the students.

Based on Magfirah (2017), as cited in Saadi's (2012) study, many students encounter difficulties in reading because they get difficulties in comprehending reading materials. He found that teachers probably do not use an appropriate strategy in teaching English, especially in reading. Gilakjani (2012), as cited by Magfirah, T. (2017) stated that one of the main objectives of foreign language learning settings is to let the students be aware of the personal differences and potential effects on learning process and outcomes. They saw this as one of the main reasons why learners failed to learn foreign language specifically, English language, and also the reason why learners have a difficult time deducing the reading materials. It was also supported by Ellis (1985) which also cited by Magfirah (2017) that learners vary in terms of personality, age, learning styles, motivation, aptitude, and age wherein it determines whether the student will be successful or will fail in learning English language as well as reading materials in English.

Based on Dunn and Griggs (1998), as cited in the study of Vaseghi *et al.* (2012) [28], learning styles consist of attitude, favorites, and the likes in which the learners used in learning. It was also supported by Vaseghi *et al.* (2012) [28] in which they proposed that learners use their past experiences (schema) and cultural background to learn. Thus, most learners learn best through data and facts and some preferred models and theories.

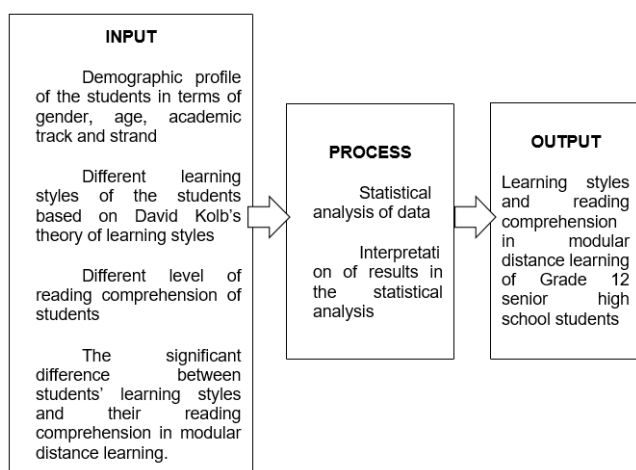
It was also related to the study of David Kolb (1984), as discussed by McLeod (2017), in which he defined learning as a process of transforming experiences into knowledge. It is the reason why Kolb (1984) created the four learning styles of the students. These are: Active Experimentation (doing), Reflective Observation (watching), Concrete Experience (feeling) and Abstract Conceptualization (thinking). Active experimentation refers to the learners who are able to understand a lesson by doing it first-hand. On the other styles such as reflective observation, it refers to a learner who learns best through visual representations and observation. They also learn by asking their peers about their understanding of the text and other experiences, and either comparing it to their existing understanding of the text or adding to their knowledge. In concrete experience, learners acquire knowledge through their five (5) senses. Lastly, the abstract conceptualization in which the learners compare their learnings to theories or logical concepts that they have learned before.

According to the study of Vester (1998), as cited by Rachma *et al.* (2015) [20], students can understand the reading text with the use of stored knowledge in the brain coming from what they perceived to hear (auditory), see (visual) and move or touch (kinesthetic). In the study of Rachma *et al.* (2015) [20], they believed that the student's learning style has an impact on the reading comprehension since students are most likely to understand a given literary text once they have done it in their preferred way. Hence, Rachma *et al.* (2015) [20] concluded that kinesthetic learners have a higher level of comprehension than other learning styles such as visual and auditory. Other studies that were also made believed that visual learners are the best readers in comprehending texts.

According to Rujani (2019)<sup>[22]</sup>, visual learners tend to read textbooks, journals, articles and newspapers to increase their knowledge. Hence, auditory learners experience difficulty in understanding the text when they read it silently and with speed. It makes them memorize the text or even the verbal discussion of the teacher faster than other learners. Meanwhile, kinesthetic learners like to read books, especially action-oriented books. Yet they are unable to sit still and listen for more than four minutes. While reading, they also jot down and use effective strategies to focus since they are more on moving. Rujani (2019)<sup>[22]</sup> also cited Kolb (1984) said that a kinesthetic learner often “jumps in” and is often interested in reading and discussing adventure, field trip, visiting new places, and others.

As also proposed by Magfirah (2017), when an instructor considers the way the students learn, it helps the learners to enjoy learning and be comfortable in gaining new information in their own preferred way. Thus, he discussed that learning style is not centered with what the learners learn but how learners prefer to learn the materials presented to them. Furthermore, each student has their own way to learn. The instructors must govern how they prefer to learn and how to process the knowledge. Thus, the level of reading comprehension of students may still vary from their learning styles.

### Conceptual Framework of the Study



**Fig 1:** Process flow of the study on reading comprehension and learning styles in modular distance learning of Grade 12 senior high school students

As shown in Fig 1, the data that were considered for this research includes the demographic profile of the participants, learning styles, the different level of reading comprehension of Grade 12 students, and the difference between students' learning styles and their reading comprehension in modular distance learning.

The process includes the procedure applied in analyzing and evaluating the information obtained such as results acquired from reading comprehension questionnaires, surveys and observation with the target participants, statistical analysis of data and interpretation of results.

The output of the study was the desired end-goal of the research which is the learning styles and reading comprehension in modular distance learning of Grade 12 senior high school students.

### Definition of Terms

The following concepts needed to be defined so as to prevent any ambiguity that may result from their misinterpretation. These terms are operationally defined:

**Learning Styles** refer to a range of competing and contested theories that aim to account for differences in an individual's learning.

**Reflector** refers to people who learn through observation and deep thinking about what happened, and one of the learning styles David Kolb created.

**Pragmatist** refers to people who preferred lessons that they could incorporate or use in the real world.

**Activist** is a type of learner who likes to manipulate things by putting themselves in the process.

**Theorist** refers to the use of theories and concepts to understand a lesson. They prefer models, facts and concepts to be incorporated in the learning process.

**Reading Comprehension** refers to the understanding and interpretation of what is read. To be able to accurately understand written material, children need to be able to decode what they read; make connections between what they read and what they already know; and think deeply about what they have read.

**Literal** is a type of reading comprehension in which refers to a person that comprehends what is exactly stated in the text.

**Inferential** is an ability of a person to use inferences to prove their claims or understanding about the text.

**Critical** refers to the use of your experiences and opinion to answer the questions related to the reading material you were reading.

**Module** refers to a set of standardized parts or independent units that can be used to construct a more complex structure.

**Modular Distance Learning** refers to individualized instruction that allows learners to use self-learning modules in print or digital format/electronic copy, wherever is applicable to the learner. Learners under modular distance learning can also use other resources such as learner's material, textbooks, activity sheets, study guides and other study materials.

**Students** refers primarily to a person enrolled in a school or other education institution and who is learning with goals of acquiring knowledge, developing professions and achieving employment in a desired field.

### Review of the Related Literature

This chapter presents various findings and ideas taken from different studies, books, and websites on the internet which serve as background information of this research.

### Studies related to Reading Comprehension

Reading comprehension is a measurement of the student's capacity to comprehend, apply, and reflect on the reading text in order to develop knowledge, achieve the goals and to participate in the society (Program for International Student Assessment, 2018).

In a study conducted by PISA (2018), findings revealed that the Philippines got 340 points which made it one of the nations with low reading comprehension. The assessment was conducted among high school students. They mentioned that over 80 percent of Filipino students are unable to get the minimum level of reading proficiency.

According to Elleman A. and Oslund E. (2019)<sup>[8]</sup>, reading comprehension is one of the most complex in terms of cognitive activities as people engage into it, making reading comprehension difficult to teach, measure and a subject for research.

In the study of Papatga and Ersoy (2015), it was mentioned that reading comprehension skills, if acquired, can make the person successful not only in school courses but also in life. They also cited May and Rizzardi's (2002) definition of reading comprehension process as to comprehend what the author wants to convey to the readers intentionally. Papatya and Ersoy (2015) believed that this skill can also be used by individuals throughout their lifespan.

Bloom (1995), as cited in Papatga and Ersoy (2015) argue that reading comprehension is a skill which can be used in all courses and students' success in it can predict their achievements in their chosen course. Regardless of the course or track of the students, they can be successful once they have mastery of reading comprehension.

The National Reading Technical Assistance Center (2015) conducted a review of the current research in the field of comprehension instruction. They cited the Sweet and Snow (2003), which revealed that reading comprehension became relevant to the students after elementary school. NRTAC (2015) reasoned that reading comprehension skill became the students' foundation to learn further in secondary schools. In addition, NRTAC (2015) believed that the academic progress of the students can be explained through their ability to read. Thus, the inability of the students to understand what they are reading is more unlikely due to in-acquisition of skills needed in the job they wanted which led to the inability to join the 21st century workforce.

As cited in Bayat (2020)<sup>[4]</sup>, there is a process and a required skill to successfully comprehend a certain text. During reading, a person will decode the text. As defined by Hoover and Gough (1990) and Bayat (2020)<sup>[4]</sup>, decoding is an ability to form meaning out of what was written in the text; hence, comprehension is a by-product of decoding.

A lot of researchers and psychologists defined reading comprehension and thus, form hierarchy in its types. Meanwhile, Guszak (1970)<sup>[10]</sup> stated in his study entitled, "Strategies of Measuring Students' Understanding of Written Materials" to not rank the level of comprehension. The cognitive skills of a person must not be thought of as lower or higher than others. He made three specific levels of comprehension such as, literal which means dealing with facts or what was written in the text; inferential is the making of interpretations and deductions of the reader in the text explicitly; and critical comprehension is done through evaluation, worth and probability.

Rujani (2017) defined comprehension as the reason for people to read. In order to comprehend the text, they need to interact with it by determining the purpose of reading the text and finding the message. He mentioned that it is relevant for a senior high school student to master reading comprehension to understand the text they will read while learning English.

### Studies related to Learning Styles

According to Kolb (1984) as cited by Mcleod (2017), "Learning is the process whereby knowledge is created through the transformation of experience" Kolb focused on four distinct learning styles he believed being influenced by

various factors such as Active Experimentation or doing, Reflective Observation or watching, Concrete Experience or feeling and Abstract Conceptualization or thinking. He believed it can be used by teachers to critically evaluate the students' abilities and to create more appropriate opportunities in learning.

As mentioned by Chick (2015), everyone has a specific learning style or preference in learning. Individuals often learn best once the information is given to them through their styles. Instruction must be aligned to the individual's learning style (Pashler, et.al., 2009).

Dunn and Griggs (1998) as cited by Vaseghi, *et al.* (2012)<sup>[28]</sup> stated that learning styles are composed of attitudes and favorites that learners use in learning. Learning styles are influenced by the learner's past experiences and culture. Thus, other learners learn best through data and facts, while some prefer models and theories.

Neil Fleming (2001) proposed the VARK (visual, auditory, reading/writing and kinesthetic) model to provide definition to learning styles as a person's characteristics and comfortable way to gather, organize and think about information.

Ahghar and Mehrdad (2013)<sup>[15]</sup> conducted a study about the language preferences of English as Foreign Language (EFL) students and they found that most students prefer to learn by listening. Thus, teachers often want the students to copy what is written on the board. According to these two researchers, listening is an alternative because they argue that having heavy emphasis on taking notes forces the students to learn. Instead of listening to learn, they would have to copy lectures being discussed. They also stated that assessing students' learning styles and considering it as a basis for teaching are teacher's dual responsibility. A teacher needs to determine the student's learning preferences and afterwards, select from a variety of options on how to address them. On the latter part, teachers need to teach the students about their strengths based on their learning styles. This will help them to focus, process, and recall new and complex information. Both researchers proposed that learning styles have been encouraging researchers, be it in general or ESL and EFL learners' learning styles to understand each learner and to develop an effective way for a person to learn.

Meanwhile, Zeybek and Senturk (2020)<sup>[29]</sup> mentioned a person realizes his/her learning styles through interaction with other people. The researchers also cited Senemoglu (2012) stating learning styles were designed because people need to learn how to adapt with the surroundings to survive. Hence, learning styles need to be explained to unfold the behavior of students, how they behave in a situation, to reflect learning.

Keefe (1984) cited in Antelm-Lanzat, *et al.* (2020)<sup>[1]</sup> said that learning style is a cognitive, affective and psychological personality trait that indicates how a learner learns and adapts to the environment. Learning style can serve as the learners' primary source of knowledge. Learning style is essential to develop the teaching and learning process (Gomez and Gil, 2018; to respond to the student's needs (Kulinna & Cothran, 2003; Hacıomeroglu, 2016; Antelm-Lanzat *et al.*, 2020<sup>[1]</sup>); improve school performance (Kim et.al, 2016; Antelm-Lanzat et.al., 2020<sup>[1]</sup>) and to serve as guide to the students.

## Studies related to Learning Styles and Reading Comprehension

According to Rahayu (2017)<sup>[21]</sup>, as stated in Hilliard (2001); Naning and Hayati (2011), “learning styles are the characteristic ways in which an individual acquires, perceives, and processes information”. It means that the learning styles of learners influence the way they think of the text they are reading; thus, it helps them to understand the literary piece better..

Psychological Science published a study in 2019 in which the researchers found out about the “knowledge threshold” which is incorporated into reading comprehension. It means that the students with 59% unfamiliar with the terms used in the topic, their understanding of the text will be compromised. Hence, it is also stated that the students’ past experiences as well as preferences in learning can also affect the way they learn (Terada, 2019)<sup>[26]</sup>. Zeybek and Senturk (2020)<sup>[29]</sup>, argue that once individuals have determined their learning style, it will be easier for them to arrange their learning experiences that would help to comprehend a text.

In the study of Balci (2017), findings revealed that learning-style based activities were seen as more accurate and effective in achieving reading comprehension than doing activities in traditional reading comprehension. It was proven that learning style can be predicted through reading comprehension.

Sulisawati *et al.* (2019)<sup>[25]</sup> observed students have mannerisms while reading based on their learning styles. Visual learners often write what they understand and think about the text; write systematically, scribble, and read the text 2 to 3 times while underlining the information seen in the text. Meanwhile, auditory learners read the follow-up question 4 times to understand the problem, occasionally read the texts while moving their lips, cross out the writings or the product of their understanding which are incorrect. But this type of learner is unable to distinguish the parts and answer correctly. Furthermore, kinesthetic learners found out that they do not write what they understood; instead, they scribbled corrections from wrong understanding, gave signs on the writing that seems relevant, read the question 2-4 times and often performed specific movements which showed that they are thinking such as pointing the questions, playing fingers and nails, and rubbing their hands. These greatly show that the students do things in accordance to their learning styles to comprehend the text.

Rachma, *et al.* (2015)<sup>[20]</sup> argue teachers should know the learning styles of the students and choose the best way to teach the students in reading. Students are able to read a reading text but it was difficult for them to comprehend it. Hence, they concluded that the best learning style on reading comprehension is Kinesthetic because this type of learners can develop an appropriate strategy to comprehend a reading text through discussing the topic together. This is also because of the habit of Kinesthetic learners to remember and jot down notes while reading and use reading strategies to help them focus. The second-best learning style was auditory because they memorize the text through reading it loud and sometimes, listening to tapes to understand the text better. Also, they added that people who have more than one learning style tend to be the worst in comprehension; thus, making them find what is the more dominant learning style.

According to Rujani (2017), visual learners tend to read textbooks, journals, articles and newspapers to increase their

knowledge while auditory learners have a hard time understanding the text when read silently and with speed. They memorize the text or even the verbal discussion of the teacher faster than other learners. Kinesthetic learners like to read books, especially action-oriented ones. Yet, they are unable to sit still and listen for more than 4 minutes. While reading, they are also jotting down notes and using effective strategies to focus since they are more on moving.

Kolb (1984) cited in Rujani (2017) states a kinesthetic learner often “jumps in ” and is often interested in reading and discussing adventure, field trips, and the likes. This means that learners have their own set of preferences depending on their learning style which they may use for comprehending a reading material.

## Methodology

This chapter discusses the operational plan of work. A number of activities in the plan of work include the following operations: Research design, research hypothesis, sources of data, participants of the study, sampling technique, research instrument, data gathering procedure, and statistical treatment of data.

## Research Design

This study adopted the descriptive-survey design where quantitative data were collected through survey questionnaires. Quantitative emphasizes systematic investigation of events by gathering numerical facts and applying mathematical, statistical and computational methods in the research study (Babbie, E.R., 2010). Descriptive-survey aims to accurately and systematically describe a population, situation or phenomenon (Mc Combes, S., 2019).

This method was used in this study since the researchers gathered the data through questionnaires and did not manipulate the presented variables. Survey questionnaire was administered to the participants to gather data about their learning styles and reading comprehension skills. Thus, the researchers described the difference between the learning styles and reading comprehension of the participants. The gathered data were tallied, analyzed, and interpreted to answer the statement of the problem and to prove the hypothesis raised in the study.

## Sources of Data

Primary data came from the responses of the participants using the survey questionnaires and secondary data were taken from reliable websites on the internet.

## Participants of the Study

The participants of this study were the Grade 12 senior high school students of Cavite National High School under the modular distance learning.

## Sampling Technique

Purposive sampling technique was applied in choosing the Grade 12 senior high school students in modular distance learning because their grade level has a high number of students experiencing the current modality and with the researchers’ belief that senior high students have the capability to express their views about their learning preferences. Thus, only students who qualified based on the stated requirements were selected as participants of the study.

### Data Gathering Procedure

Before the initial part of the data gathering, the research proposal was validated by the Ethics Review Board (ERB) to ensure that this paper follows the ethical guidelines of the institution regarding academic research. Hence, once the study was approved by ERB, the researchers had prepared the letter of request that was presented to the principal of Cavite National High School-Senior High School Department and to the participants who are the Grade 12 senior high school students of Cavite National High School along with the certificate of validation from ERB and the validated questionnaire signed by the campus psychometrician. The letter of request was signed by the campus administrator of Cavite State University-Cavite City Campus along with the researchers and thesis adviser. Upon the approval of the letter of request, researchers proceeded in conducting their research study.

Since the participants were difficult to reach due to pandemic and the mode of learning of the students was in modular distance learning, the researchers requested the principal to inform and disseminate the research study to the teachers handling Grade 12 students in order for them to pass it through to the students.

The questionnaires were sent to the teachers online; after which, they forwarded to the students who qualified as participant. The students were not forced to answer the questionnaires provided to them - it is in their own will to fill and complete the survey form.

Henceforth, it took five days for the researchers to collect the responses. Upon completion of the responses of the 30 participants, the researchers proceeded in tallying; hence, the researchers started off by counting the number of students who were under the Science, Technology, Engineering and Mathematics (STEM), Accountancy and Business Management (ABM), Humanities and Social Sciences (HUMSS), and Technological-Vocational-Livelihood (TVL) program as well as the students' age. After finding the tally of the students' stand and track and their age, the researchers began to tally the learning styles by identifying what is the highest learning style of the students based on their responses in the questionnaire. Moreover, in examining the reading comprehension of the students, a rubric that was adapted from the internet was also provided by the researchers. Thereafter, the researchers analyzed and organized the results and then proceeded to the statistical treatment of data.

Finally, after gathering and organizing the results, the used questionnaires were deleted from the devices of the researchers to prevent the students' demographic profile and responses from spreading.

### Research Instrument

Two validated research questionnaires in checklist form and short-answer form were the data gathering instruments for this study. The researchers adapted the Learning Style questionnaire designed by Honey and Mumford (1982) [16] and the Reading Comprehension questionnaire created by Course Hero (2019) [7]. The former measured the participants' level of reading comprehension. The first part of the questionnaire consists of the demographic profile of the participants while the second part consists of identifying the participants' learning style. The third part consists of questions to measure the participants' level of comprehension in reading.

### Statistical Treatment

The following statistical tests were applied to answer the specific problems and hypothesis of the study.

**Frequency and percentage** count were used to determine the demographic profile of the participants. Frequency is the number of occurrences of a certain data while percentage is a translation of frequency as a proportion of a whole which is 100.

$$\text{Formula: } \% = \frac{f}{N} \times 100$$

Where:

f = frequency

N = number of cases

**Mean** is the average of the summation of all data divided by the total number of population. It was used to measure the learning styles and level of comprehension in reading of Grade 12 senior high school students.

Formula for the mean:

$$\bar{x} = \frac{\sum fx}{n}$$

Where:

$\sum fx$  = is the summation of the product of the frequency and class mark

$n$  = is the total number of the population.

**ANOVA or Analysis of Variance** was used to determine the difference between the learning styles and reading comprehension of grade 12 senior high school students in terms of their learning style and level of comprehension in reading.

Formula for ANOVA:

$$F = \frac{MSB}{MSW}$$

Where:

MSB = Mean-Square Between

MSW = Mean-Square Within.

**T-test** was used to determine the significant difference between the learning styles and level of comprehension in reading of Grade 12 senior high students in modular distance learning.

Formula for T-test:

$$t = \frac{m - \mu}{\frac{s}{\sqrt{n}}}$$

Where:

$t$  = Student's t-test

$m$  = mean

$\mu$  = theoretical value

$s$  = standard deviation

$n$  = variable set size

**Results and Discussion**

This chapter presents the outcomes of the study in illustrative tables and their corresponding analysis with the interpretations derived from the statistical treatment of data.

**Demographic Profile of the Participants**

The demographic profile of the participants was measured through age, gender, and academic track and strand.

Table 1 shows the distribution of participants according to age. The age of participants tallied according to the frequency of age input by the participants.

As the table shows, 18 years old got a frequency of 17 or 57 percent; followed by 17 years old with a frequency of 5 or 17 percent. Participants who are 20 years old got a frequency of 4 or 13 percent; 19 years old got a frequency of 3 or 10 percent. and a participant aged 21 years old got a frequency of 1 or 3 percent. It indicates that Grade 12 students are mostly 18 years old and the least common age is 21 years old.

**Table 1:** Distribution of participants according to age

Age	Frequency	Percentage
17	5	17.00
18	17	57.00
19	3	10.00
20	4	13.00
21	1	3.00
<b>Total</b>	<b>30</b>	<b>100</b>

Table 2 shows the distribution of gender among Grade 12 students in which the majority of them are male with a frequency of 21 or 70 percent, followed by the females with 9 or 30 percent. This indicates that male participants outnumbered the female participants.

**Table 2:** Distribution of participants according to gender

Gender	Frequency	Percentage
Male	21	70.00
Female	9	30.00
<b>Total</b>	<b>30</b>	<b>100</b>

Table 3 consists of participants' academic track and strand. Arts and Design got the highest number with a frequency of 15, equivalent to 50 percent; followed by Science, Technology, Engineering and Mathematics (STEM) with a frequency of 10, equivalent to 30 percent. Technical-Vocational-Livelihood (TVL) track scored 4, equivalent to 13 percent. The least strand, Accounting and Business Management (ABM) got a frequency of 1 or 3 percent. Hence, it suggests that the participants are mostly under the Arts and Design strand.

**Table 3:** Distribution of participants according to academic track and strand

Track & Strand	Frequency	Percentage
Arts and Design	15	50.00
Accounting and Business Management (ABM)	1	3.00
Science, Technology, Engineering and Mathematics (STEM)	10	33.00
Technical-Vocational-Livelihood (TVL)	4	13.00
<b>Total</b>	<b>30</b>	<b>100.00</b>

**Learning Styles**

Table 4 shows the learning styles of the Grade 12 students. The result showed that Reflector had a frequency of 7 or 23 percent; followed by Activist-Reflector, All learning styles, and Theoretical with a frequency of 4 each, equivalent to 13 percent. Consequently, Reflector-Pragmatist and Reflector-Theoretical-Pragmatist got a frequency of 3 each or equivalent to 10 percent. The least learning styles are Activist, Activist-Pragmatist, Activist-Theoretical, Pragmatist, and Pragmatist-Theoretical with a frequency of 1 each or equivalent to 3 percent. Therefore, the dominant learning style of Grade 12 students is Reflector.

**Table 4:** Distribution of participants according to learning styles

Learning Style	Frequency	Percentage
Activist	1	3.00
Activist-Pragmatist	1	3.00
Activist-Reflector	4	13.00
Activist-Theoretical	1	3.00
All learning styles	4	13.00
Pragmatist	1	3.00
Pragmatist-Theoretical	1	3.00
Reflector	7	23.00
Reflector-Pragmatist	3	10.00
Reflector-Theoretical-Pragmatist	3	10.00
Theoretical	4	13.00
<b>TOTAL</b>	<b>30</b>	<b>100.00</b>

**Reading Comprehension**

The level of reading comprehension of participants is shown in Table 5. Results showed most Grade 12 students are under Critical level of reading comprehension with 10 out of 30 participants or 33 percent; followed by Inferential with 9 participants or 30 percent. Literal comprehension got 8 or 27 percent. Inferential-Critical got 2 or 7 percent. There was only one Literal-Inferential with 3 percent. This is the least level of reading comprehension among Grade 12 students. Thus, it indicates that students are able to judge a certain reading material critically and logically since most of them are at Critical thinkers.

**Table 5:** Distribution of participants according to reading comprehension

Reading Comprehension	Frequency	Percentage
Critical	10	33.00
Inferential	9	30.00
Inferential-Critical	2	7.00
Literal	8	27.00
Literal-Inferential	1	3.00
<b>Total</b>	<b>30</b>	<b>100</b>

**Learning Styles and Reading Comprehension**

The cross tabulation of reading comprehension and learning styles is shown in Table 6. Cross tabulation indicated that those students with a learning style of Reflector got a score of 4 with reading comprehension of Critical; followed by Activist-Reflector with a cross tabulation score of 2 with reading comprehension of Literal. All Learning Styles got two with reading comprehension of Inferential and Literal; Reflector-Pragmatist got a score of two with reading comprehension of Inferential; Reflective-Theoretical-Pragmatic got a score of two with reading comprehension of Critical; and Theoretical got a score of two with reading comprehension of Inferential. The following scored 1 in cross tabulation: Activist with reading comprehension of



Literal; Activist-Pragmatist with reading comprehension of Critical; Activist-Reflector with reading comprehension of Critical and Literal-Inferential; Activist-Theoretical with reading comprehension of Inferential-Critical; Pragmatist with reading comprehension of Inferential; Pragmatist-Theoretical with reading comprehension of Literal; Reflector with reading comprehension of Inferential, Inferential-Critical, and Literal; Reflector-Pragmatist with reading comprehension of Critical; Reflector-Theoretical-Pragmatist with reading comprehension of Inferential; and Theoretical with reading comprehension of Critical and Literal. Thus, it indicates that the most dominant learning style is Reflector and they also have the Critical level of reading comprehension.

**Table 6:** Distribution of participants in cross tabulation according to the level of reading comprehension and learning styles

	A	AP	AR	AT	ALS	P	PT	R	RP	RTP	T	Total
Critical	0	1	1	0	0	0	0	4	1	2	1	10
Inferential	0	0	0	0	2	1	0	1	2	1	2	9
Inferential-Critical	0	0	0	1	0	0	0	1	0	0	0	2
Literal	1	0	2	0	2	0	1	1	0	0	1	8
Literal-Inferential	0	0	1	0	0	0	0	0	0	0	0	1
Total	1	1	4	1	4	1	1	7	3	3	4	30

Description:

A- Activist	PT- Pragmatist-Theoretical
AP- Activist-Pragmatist	R- Reflector
AR- Activist-Reflector	RP- Reflector-Pragmatist
AT- Activist-Theoretical	RTP- Reflector-Theoretical-Pragmatist
ALS- All Learning Styles	T- Theoretical
P- Pragmatist	

Table 7 shows the significant difference between reading comprehension and learning styles. The significant difference of .026 with margin of error of .122 suggested that there was a significant difference between learning style and reading comprehension.

**Table 7:** The difference between learning styles and reading comprehension

		Value	Asymp.Std. Error <sup>3</sup>	Approx. T <sup>b</sup>	Approx. Sig.	
Nominal by Nominal	Symmetric	.279	.122	2.221	.026	
	Lambda	Reading Dependent	.450	.144	2.566	.010
		Learning Dependent	.130	.122	1.017	.309
	Goodman and Kruskal Tau	Reading Dependent	.356	.065		.414 <sup>c</sup>
		Learning Dependent	.137	.032		.480 <sup>c</sup>

**Summary, Conclusion and Recommendations**

This chapter presents the summary of findings, conclusions drawn, and recommendations based on the data analyzed in the previous chapter.

**Summary**

The study entitled, "Learning Styles and Reading Comprehension in Modular Distance Learning of Grade 12 Senior High School" was conducted at Cavite National High School-Senior High School from February to July 2021 to determine the difference between learning styles and reading comprehension of Grade 12 senior high school students. Specifically, this study aimed to determine the following

variables: 1. demographic profile of the participants in terms of age, gender and academic track and strand; 2. students' learning styles; 3. students' level of reading comprehension; and 4. significant difference between learning styles and reading comprehension.

The researchers used the descriptive survey design to determine the difference between learning styles and reading comprehension of Grade 12 senior high school students. Furthermore, the researchers used two valid questionnaires adapted from Honey and Mumford's (1982) <sup>[16]</sup> learning style survey questionnaire and Course Hero's (2019) <sup>[7]</sup> NVM Gonzalez's Bread of Salt reading comprehension questionnaire.

Purposive sampling was applied in choosing the sample population. The researchers used frequency and percentage to determine the demographic profile of the students; mean was used to measure the learning styles and level of reading comprehension; ANOVA was used to determine the difference between the two variables, while T-test was used to know the significant difference between learning styles and reading comprehension.

After thorough analysis of gathered data, results revealed that out of 30 participants, 17 were 18 years old, equivalent to 57 percent and male with a frequency of 21 or 70 percent. Consequently, among the tracks and strands, Arts and Design students got the highest frequency of 15, equivalent to 50 percent. For the learning styles, Reflector was dominant with a frequency of 7 or 23 percent. Critical comprehension had 10 participants, equivalent to 33 percent. Thus, in cross tabulation, it implied that there were four Reflector students who are at Critical level of reading comprehension.

The significant difference between learning styles and reading comprehension is 0.26 with margin of error of .122 resulting in rejecting the null hypothesis of the study in which there was indeed a significant difference between the two variables.

**Conclusion**

Based on the results of the study, the researchers therefore conclude that there is a significant difference between learning styles and reading comprehension; thus, it gives sufficient evidence to reject the null hypothesis. It is just an indication that the level of reading comprehension of the students differs in every learning style. Likewise, the Grade 12 students are Critical thinkers based on their level of reading comprehension.

**Recommendations**

In view of the summary of findings and conclusions drawn, the following recommendations are offered:

**Teachers:** They should cater to every learning style and at least do activities that could help the students to comprehend the reading material easily and effectively through the application of their learning styles.

**School Administrators:** They may conduct seminars and trainings for the teachers to gain knowledge about students' learning styles and how it can be used for improving students' reading comprehension.

**Students:** In regards to the findings of the study, it suggested that students may use the way they wanted to learn in reading a reading material for inferential to critical comprehension.

**Future Researchers:** They can use this study as their guide for further research. They may conduct study about learning styles and reading comprehension by using different methodology. Thus, the researchers suggest for future researchers to include observations and increase the number of participants, since this study was conducted during COVID-19 pandemic.

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