

Learning Styles and Academic Performance of Students in Printed Modular Distance Learning

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ABSTRACT

This descriptive-comparative and correlational study examined the significant relationship between learning styles and the academic performance of 60 intermediate modular students of Lag-Asan Elementary School in 2021-2022. The statistical tools used in treating the data are the Frequency and Percentage Distribution, Mean and Standard deviation, and Chi-Square test of Association. An adapted survey questionnaire based on VARK learning styles version 8.0 was utilized during the reliability test and actual survey. The study revealed that there is a significant relationship between learning style and academic performance. The use of SLMs that are linked with the students' preferred learning styles was found to improve academic achievement in the PMDL modality. Aside from the read/write learning style which is the most preferred by students based on sex and grade level, other learning styles should be catered to by providing VARK-based learning resources and MELC-based modular activities that support learning styles and accomplishment of activities of intermediate students in PMDL is produced as the major output of this research.

Keywords

learning styles, academic performance, VARK Learning Style model, Printed Modular Distance Learning (PMDL) Modality, VARK learning style-based resources, MELC-based modular activities

INTRODUCTION

The COVID-19 pandemic has posed significant challenges to the educational sectors, especially at the primary levels (Alea et al., 2020). The current health issue had afflicted over 1.37 billion students (80 percent of the global student population) by 2020, according to the United Nations Educational, Scientific, and Cultural Organization (UNESCO), as cited in Talimodao and Madrigal (2021). As emphasized by Toquero (2020), educational institutions must be more attentive in addressing the learning needs of the students beyond the traditional classrooms.

One of the needs referred to is the learning styles, as defined by Hsieh, Jang, Hwang, and Chen (2011) as cited in Magulod (2018), as the way or preferences of an individual to learn.

Further, the study of Cervera (2015) added that learning styles are cognitive, affective, and physiological behaviors that generally indicate how students respond to their learning environment. In the past years, prominent studies have been conducted about learning styles internationally and locally. The study of Alemdag, Alemdag, and Ozkara (2018) in Turkey showed higher academic success inclined to the identification of learning styles of learners, while

in the Philippines, Busilaoco and Lao (2013) asserted learning styles as an essential factor in delivering instructions with the aid of learning materials and resources.

Meanwhile, Ismaili (2021) professed that distance learning had become necessary for education during this pandemic. Some regions, such as the United States of America and Australia, prefer Modular Distance Education as their learning modality (Ambayon, 2020). According to Ustatı and Hassan (2013), distance learning has become one of the most common educational advances since it allows learners from across all areas to pursue their education. They further stated that the effectiveness of a distance learning education is determined by the program's aim of maximizing students' capabilities and the teachers' ability to address students' demands in a distance learning environment.

In the study of Talimodao and Madrigal (2021), the World Bank (2020) reported that printed modular learning implemented in countries like India and the Philippines was an effective education process. Distance Learning Delivery Modalities (DLDM) are being utilized in the Philippines and imposed by the Department of Education to provide for the educational needs of the students. Modular Distance Learning has two types: Printed and Offline Digital. The learning modality preferred in rural areas is the printed modular since the internet connection in selected areas is unavailable (Anzaldo, 2021). Printed Modular Distance Learning (PMDL) has been proven to significantly improve academic performance (Bedaure, 2012) and academic success (Sadiq & Zamir, 2014).

Similarly, in Printed Modular Distance Learning, one of several distance learning modalities, both teachers and parents can also provide assistance and guidance using self-learning modules (SLMs) as the core tool for teaching and learning without engaging face-to-face (Natividad, 2021). One of the many public schools

in Bago City, Negros Occidental, implemented the PMDL modality. In this modular distance learning, the teachers and parents can also provide instructional support to the students. Parents and guardians act as learning facilitators, assisting kids in comprehending the teachings presented in the SLMs. Natividad (2021) explained that because the SLM is designed for independent learning, content quality and usability are important. According to Aksan's study (2021), PMDL affects the educational process and students' academic achievement.

Furthermore, in the modular setting, para-teachers plays a crucial role. Para-teachers could be any members of the family who understand the instruction. According to Estrada (2021), as cited in Aksan (2021), the teacher must keep track of the pupils' progress, give feedback, and support those who need assistance. While there are no face-to-face sessions, parents or guardians must work well with teachers and the school to help pupils with their modules.

In line with that, the study by White (2005), as cited in Talimodao and Madrigal (2021), stated that the most crucial element of remote learning, notably printed modular learning, should influence the development of students in any condition. Padmapriya (2015), as reported in Aksan (2021), supplemented the previous study, indicating that modules assisted students in developing self-learning abilities. Although the content is the most important aspect of the module, its implementation determines its efficacy. Modular instruction, according to Toquero (2020), strives to individualize learning by allowing students to master a specific topic using an instructional strategy that will enable them to grow. She further said that the printed module is a self-instructional material that may be utilized as a reinforcement to aid learners' mastery.

On the other hand, (Cabual, 2021) suggested utilizing methods, theories, and models to identify

the students' preferred learning style, particularly the VARK. Neil Fleming proposed the VARK model in 1987, a perceptual, pedagogical preference model that classifies learning based on sensory preferences (Chaudhry et al., 2020). This VARK model of Neil Fleming categorizes the learning styles into visual, auditory, read/write, and kinesthetic (Prithishkumar & Michael, 2014). Harahap, Sugiharto, & Syarifah, (2021) defined visual learners as individuals who learn best through seeing the information, while auditory learners learn best through hearing and listening.

Moreover, Mozaffari et al. (2020) differentiated the read/write learners who acquired learning through reading textual materials and writing down, while kinesthetic are the ones who prefer the hands-on approach. On the other hand, if the students choose more than two learning styles, teachers and other researchers can categorize them into multimodal learners (Joshi, Upadhyay, Ganjiwale, and Patel, 2020). Also, (Cabual, 2021) suggested that teachers might utilize non-linguistic presentations such as visual organizers, graphics, figures, and illustrations to help students improve their learning styles and engage students in practical experience activities. This VARK model is the main foundation of this study and aids in discovering the relationship between learning styles and how the modular students perform academically.

In relating VARK Learning Theory and the Printed Modular Distance Learning, Aksan (2021) mentioned that modules are adequate for individual learning styles and accept full responsibility for the learners to suit their demands. In addition, learning style is an important aspect of the modular approach to education, according to Halili and Villajuan (2021). Understanding the various learning styles can be helpful, particularly when it comes to modifying the educational materials to accommodate the learners better. In this academic environment, teachers should understand what students need and how they want to learn (Khan, Arif & Yousuf, 2019). The use of modules

to explain diverse academic areas aids students in developing their learning styles (Lim, 2016). Modules also increased the teacher's flexibility and ability to adapt to the diversity of the student demands without compromising the quality of the education or taking into account the students' learning styles (Nardo, 2017).

Concurrently, concerning what this study seeks to answer, researchers believe that the students' learning styles are vital in attaining good learning outcomes. Failure to address their learning style can lead to several problems. Thus according to Yang and Lynch (2017), one of the most important aspects affecting students' academic achievement is their learning style and motivation. They said that if the teacher did not address these learning styles and motivation, the student's comprehension and performance would worsen. As a response, teachers should offer a variety of ways to encourage students to explore knowledge through their strengths and then provide positive feedback. Nowadays, teachers are teaching a single approach to students with various learning styles, according to (Danişman & Erginer, 2017).

Additionally, according to Hamidon (2015), gender influences students' learning styles, primarily sensory learning. He claims that males and females learn differently because males seem to be more kinesthetic and visual learners since they engage in more hands-on activities than females, who are much more likely auditory learners. In his study, Ibrahim (2014) found that the read/write learning style is the second most common learning style for both genders. To aid students in achieving higher academic achievement, teachers must be aware of their student's learning styles, preferences, learning needs, and gender disparities.

On the other hand, the theory of Multiple Intelligences by Howard Gardner and learning styles are both continually interchanged. According to Xhomara and Shkembi (2020), multiple intelligences

and learning styles are critical in shaping students' perspectives, interests, goals, and preferences. The multiple intelligence strategies increased students' innovative thinking and academic performances, according to Widiana and Jampel (2016), as quoted in Xhomara and Shkembi (2020). The latter was also attributed to the students' learning styles, with findings depicting those instructional strategies tailored to their learning styles increased understanding, competence, and learning retention (Anbarasi et al., 2015, as cited in Xhomara & Shkembi, 2020).

Several researchers studied the learning styles and face-to-face education internationally (Leasa, Batlolona, Enriquez, & Kurnaz, 2018) and locally in the Philippines (Dayon, 2018). However, only a few studies on the students' learning styles and academic performance are being conducted, especially at intermediate levels in elementary schools in Negros Occidental, Philippines. The latter is the gap that this study had filled.

This study intended to determine the relationship between the learning styles and academic performance in the Printed Modular Distance Learning (PMDL) of intermediate students of Lag-Asan Elementary School during the school year 2021-2022. Specifically, this study aimed to identify the learning styles preference of the intermediate modular students, specifically the visual, auditory, read/write, and kinesthetic. Also, this study seeks to determine the level of preference for visual, auditory, read/write, and kinesthetic when grouped according to sex and grade level.

METHODOLOGY

This quantitative research utilized the descriptive-comparative and correlational research design to describe the ideas of the variables connected to the study and create structured data regarding other theories (Francisco, Francisco, & Arlos, 2016). Caramani

(2017) added that the comparative approach encourages a careful observation and analysis between two variables and intends to compare the learning style preferences of modular students when grouped according to sex and grade level. Francisco, Francisco, and Arlos (2016) affirm that correlational research seeks to determine the relationship of both variables through statistical data since this study will determine how the academic performance of the intermediate students in the PMDL modality affects their learning style preferences.

Meanwhile, the respondents of this study are the grades four, five, and six modular students studying in Lag-Asan Elementary School for the school year 2021-2022. The overall sample size was determined using the Raosoft online calculator and suggested by the statistician, with 20 students in each grade level totaling 60 respondents. The respondent would be every third student in the class identified using the stratified random sampling method.

The survey questionnaire's research instrument is based on Neil Fleming's VARK Learning Style Inventory version 8.01 or younger people version. This adapted questionnaire with Hiligaynon translation has passed validity and reliability tests. The questionnaire was divided into two sections; the first part contains the students' demographic profile, such as name, sex, grade level, and general weighted average (GWA) from the school year 2020-2021. It is optional for the respondents to write their names, and the rest, they are requested to put a check. The second part is the questionnaire for learning styles. In answering, the scale for each statement ranges from zero to four. The scale of four pertains to learning style statements always observed, three for often, two for sometimes, one for rarely, and zero for never.

The researchers then asked approval from the Schools Division of Bago City superintendent and principal of Lag-Asan Elementary School to survey the said school. Through the assistance of each class

adviser, the survey questionnaire attached to their self-learning modules (SLMs) were distributed to the students successfully. The researchers provide notes for each class adviser, which explains the questionnaires and the information of the study, which could aid for the parents to have awareness with regards to the conducted survey.

Further, a letter was presented to the parents to have them sign and choose an option whether their child will remain anonymous or not. After a week, the class advisers gathered all the letters and responses and passed them on to the researchers. After gathering the data, the researchers arranged and analyzed the data solved by the statistician.

In problem one, which is about determining the learning style preference of the intermediate modular students, whether they are visual, auditory, read/write, or kinesthetic learners, the statistical tools used were frequency and percentage distribution, which according to Francisco, Francisco, and Arlos, (2016) it is to determine how often the data occur in the study. While on problem two, mean and standard deviation were used wherein this study wanted to measure the level of preference of VARK learning styles when grouped according to sex and grade level. Thereby, Francisco, Francisco, and Arlos (2016) explained that mean is the average of all scores, and standard deviation shows the level of difference between data and mean. In the third problem, the statistical tool utilized was the Chi-square test of Association to determine the relationship of variables (Sayassatov & Cho, 2020).

On the ethical consideration aspect of this study, the social value of this study serves as relevant in assuring quality education in the PMDL modality through the support learning resources and activities provided. These resources are designed to cater to the learning styles of the modular students as they learn at home through SLMS. Also, informed consent forms were distributed to the parents or guardians

of the respondents. The parents or guardians signed an informed consent form allowing their children to serve as the respondents of this study and permit the researchers to gather pertinent data. The respondents were informed that they could withdraw from the survey if they wished to.

Additionally, no face-to-face interaction was done between the researchers and respondents; hence, their respective class advisers were the ones who distributed; this is to secure the safety of involved persons in this study. Valuing the health and safety of the respondents, class advisers, and researchers, the COVID-19 health and safety protocol has been strictly adhered to during the data collection process. Also, tokens were given to the respondents and class advisers as compensation for being part of the study.

On the other hand, all data gathered were confidential in this study. This consent form allowed the parent or guardian to choose whether to keep the respondents' anonymity or not, and anonymity was preferred by many. The respondents were not required to write their names on the questionnaire. The researchers utilized the gathered data for this study alone and conformed to the Data Privacy Act of 2012.

Moreover, with the result obtained from this study, the school administrators and teachers were informed and consulted in the preparation of the output of the study. Also, the researchers encountered no conflict of interest in accomplishing this study since they did not obtain any financial or administrative benefits.

On the overall data gathering process, the safety and welfare of the participants were the top priority. No threat of harm or coercion existed. Moreover, the researchers shouldered the financial resources and equipment/facilities for the study's conduct.

RESULTS, DISCUSSION, AND IMPLICATIONS

The result of the learning style preference of the

intermediate modular students based on VARK learning styles shows that in a total number of 60 respondents, there are 14 (23.3%) who are visual and 11 (18.3%) auditory. Specifically, 19 (31.7%) are read/write learners, 4 (6.7 %) are kinesthetic learners, and 12 (20.0 %) acquire the multiple learning styles.

Furthermore, the intermediate modular students in Lag-Asan Elementary School have diverse learning style preferences, and based on the result obtained, read/write is the most preferred learning style, followed by visual, auditory, and kinesthetic is the least preferred. For the read/write learners, the majority of modular students prefer material printed and in the form of text. The examples of these learning resources preferred by this type of learner are glossaries, textbooks, and lecture notes (Leasa, Batlolona, Enriquez, & Kurnaz, 2018).

In relation to the PMDL modality, the primary learning resource is the self-learning module (SLM); this is a collection of printed material study composed of lessons, assessments, and activities (Panganiban & Madrigal, 2021). This study indicates that the printed modular distance learning modality is beneficial for the modular students since the read/write learning style is highly preferred among the four learning styles. This study's result is supported by Columbano (2019) as its study recognizes modular students as read/write learners. Concurrently, Singh, Govil, and Rani (2015) also mentioned that kinesthetic is the least preferred learning style, which parallels the result of this study. Conversely, Cabual's (2021) study stated that the read/write learning style is the least preferred.

For the level of preference for visual, auditory, read/write, and kinesthetic learning styles when grouped according to sex, the result indicates that male students attained an average level for visual ($M=2.99$, $SD=0.64$), auditory ($M=2.89$, $SD=0.51$), read/write ($M=3.13$, $SD=0.53$), while for the kinesthetic ($M=2.39$, $SD=0.39$) the male students obtained a

low level of preference. Further, the female students attained a low level for visual ($M=2.51$, $SD=0.83$), auditory ($M=2.43$, $SD=0.71$), kinesthetic ($M=2.13$, $SD=0.67$), while read/write ($M=2.75$, $SD=0.70$) elicited an average level of preference. To sum it up, the result showed that both sexes yielded an average level of preference for reading/writing learning style and a low level for kinesthetic learning style.

When grouped according to grade level, the result also indicated congruence. For the grade six, students attained an average level of preference in visual ($M=2.77$, $SD=0.75$) and read/write ($M=3.05$, $SD=0.59$), while auditory ($M=2.49$, $SD=0.72$) and kinesthetic ($M=2.09$, $SD=0.43$) elicited a low level of preference. In totality, the result showed that the intermediate modular students garnered an average level of preference for reading/writing ($M=2.94$, $SD=0.64$), visual ($M=2.75$, $SD=0.77$), and auditory ($M=2.66$, $SD=0.66$), while kinesthetic ($M=2.26$, $SD=0.56$) attained a low level of preference.

Meanwhile, when grouped according to variables sex and grade level, both sexes of modular students in grades four, five, and six garnered an average level of preference for reading/writing learning style. While on the other hand, the kinesthetic learning style obtained a low level of preference for sex and grade level variables. The result only showed that the read/write learning style suits and favors the majority of the intermediate modular learners. Also, it indicates that teachers and school administrators utilizing SLM in PMDL modality is an effective way since the learning resource matches most of the students' preferences. In totality, similar to the classroom setting approach, each student in the printed modular

modality has a preferred learning style. It does, however, vary in terms of the level of preference, which requires teachers and school administrators to consider inclusiveness when addressing the interests of pupils, specifically their learning styles, especially in this pandemic (Cabual 2021).

Explicitly, on the aspect of gender, Viriya & Sapsirin, (2014) garnered a result that affirms that 78% of male students and 91% of female students preferred read/write learning styles. Also, the study of Ojeh et al., (2017), agrees with the result of this study as their study stated that the read/write learning style is the most preferred sensory modality of females, while the study of Saadi (2012), as cited in Gulnaz, Farooq, and Ali (2018), added that reading/writing is the most dominant learning style for male students. However, this study's findings contradict the study of Nuzhat, Salem, Hamdan, and Ashour (2013), which stated that both sexes who are unimodal learners preferred kinesthetic learning style.

On the aspect of grade level, the study of Alog (2012) stated that the Grade 5 and 6 students' least preferred learning style is kinesthetic, which is congruent with the result of this study. Conversely, the study of Magulod (2018) showed that the kinesthetic learning style is the most preferred learning style among the grades four and five students. Overall, the utilization of grade level as one of the variables of this study is supported by Villanca (2016), as she stated in her study that elementary students could recognize and apply their learning styles based on their grade level.

Furthermore, the result on the relationship between learning styles and academic performance of the intermediate modular students is indicated through the p-value (≤ 0.05), and it showed that there is a significant relationship between the learning styles of the intermediate modular students and their academic performance [$\chi^2 (12) = 23.086, p = 0.027$]. The result only indicates that the learning style of intermediate modular students affects their academic performance, and it opposes the hypothesis of this study, resulting in its rejection. Additionally, in this learning modality, the learning styles impact the students' academic performance once appropriate learning materials are used to accomplish other

learning activities. The result of this study is parallel to Carbonel's (2013) findings, in which she professed that learning style is the primary factor that affects the performance and achievements of the students.

On the other hand, the findings contradict the findings of Awang, Abd, Samad, Faiz, Roddin, and Kankia (2017), in which the study resulted that learning styles have no bearing on academic success. In line with that, Kohan, Janatolmakan, Rezaei, and Khatony (2021) stated that there is no significant association between learning style and academic achievement. They concluded that the approach to instructional delivery is the most influential in students' academic success.

In a nutshell, the read/write learning style is the most preferred, and the kinesthetic learning style is the least preferred among the 60 intermediate modular students. It is consistent with the result on the preference level for VARK learning styles when the respondents were grouped according to variables, sex, and grade level.

Further, the learning styles and academic performance in printed modular distance learning showed a relationship between both variables. Based on the methodology process and the results yielded in this study, it can be concluded that students' learning styles and academic performance in Printed Modular Distance Learning had implications for students, teachers, school administrators, parents, and future researchers. It can be inferred that the PMDL modality meets the learning style preference of the modular students, who are mostly read/write learners. Also, it can be implied that the alignment of the preferred learning style to the distance learning modality signifies for the SLMs for continuous use and improvement in the PMDL modality allowing read/write learners to learn more in the lessons, activities, and assessments as they accomplish their respective SLMs at the comfort of their homes in this time of the pandemic.

On the other hand, other intermediate modular students preferred visual, auditory, and kinesthetic. This result implied a need for teachers and school administrators to give attention to and address these learning style preferences in the PMDL modality. These learning styles, including the read/write learning styles, need to be provided with learning resources and activities that suit their learning style preferences.

In the broader aspect, the study would be relevant to the educational sector, especially during this time of the pandemic. Most of the learners are under the PMDL modality, and with that, the modular students are aided to learn with ease while utilizing their learning styles. Also, aside from PMDL, these learning styles resources and activities would serve as supplementary learning resources aside from SLMs in the Modified In-School Off-School Approach (MISOSA) under the Department of Education Alternative Delivery Mode of education. With this, the utilization of learning resources and activities that address the students' learning style does not serve purposefully only for PMDL modality but also on educational programs that seek to educate the less privileged and marginalized learners.

The collaborative effort and action of the teachers, school administrators, and parents or guardians in infusing learning styles in the PMDL would undoubtedly pave the way for successful results in this modality. The stakeholders' active involvement would guarantee a quality education accessible to the modular students in these challenging times of pandemic.

Moreover, the result of this study strengthens and leverages the numerous previous studies that have tackled the learning style and academic performance in distance learning for educational researchers. In parallel with that, this study can serve as literature and a source of additional information for other researchers who venture to dig deeper into learning

styles and academic performance in distance learning modality.

CONCLUSION AND RECOMMENDATIONS

Learning style is one of the factors that should be considered to improve student-centered learning and ensure that students learn effectively in any modality. Printed Modular Distance Learning is one of the distance learning modalities. It has been concluded that there is a direct connection between the students' academic performance and learning styles. Also, learning resources and activities should be tailored to the student's preferred learning styles.

The results showed that mostly of the students in Lag-Asan Elementary School for the school year 2021-2022 are read/write learners in the PMDL setting. The relevance of aligning learning resources, learning style, and distance learning modality reveals that the self-learning modules used in the PMDL context need to be continuously utilized and improved further. It is designed to meet the needs of reading/writing learners, but other learning styles should also be considered. SLMs should include sufficient learning resources and activities and be resilient enough to accommodate the various learning styles of the modular students. In these pandemic times, this study would benefit the educational sectors, particularly teachers and school administrators, in establishing and ensuring the quality of education for the modular students in PMDL.

Furthermore, the study gap was filled in because no research studies had addressed the learning styles and academic performance of the Negrosanon modular students. Several reasons and constraints arise due to the pandemic, contributing to the several limitations of the study. One of them is the data gathered for the respondents' academic performance through the general weighted average (GWA) from the school year 2020-2021. It is recommended that intermediate

modular students understand and ponder their preferred learning style to learn effectively in the PMDL setting. They must use the learning resources provided to them responsibly in completing activities in their module with the assistance of their parents or guardians.

In addition, as determined by the survey results, teachers should be aware of the preferred learning styles of their students and provide learning materials and activities based on the students' preferred learning styles to enhance the learning performance of each student. It is necessary for teachers to keep in touch with parents or guardians from time to time to track the students' progress in completing learning activities in their modules and utilizing learning resources.

Also, school administrators have a critical role in providing students to receive a high-quality education. The results pose a challenge for them in ensuring the quality of SLMs appropriate for read/write learners. They should highlight the importance of catering to the students' learning styles for PMDL learning to be effective. School administrators should also use the information gained from this study to reproduce and distribute learning resources to the modular students.

On the other hand, parents or guardians must guide their children to accomplish their modular activities and effectively utilize the provided learning resources. The parents or guardians should participate and engage in monitoring their children's progress. The kinesthetic learning style appears to be the least preferred in this study. Also, future researchers should explore why such patterns arise in intermediate students and if this applies to other modalities or just PMDL. Aside from the learning materials and activities established by this study, they should explore doing more studies similar to this one to find additional alternative techniques or resources to assist modular learners. Additionally, they are recommended to

conduct studies parallel to this study that focus on the pre-elementary and primary grades since they are the ones who need assistance in modular learning.

Moreover, based on Neil Fleming's VARK Learning Styles Model and modular activities anchored on DepEd Memorandum CI-2020, often known as MELCs, the researchers designed a research output, *Learn with your learning Styles: PMDL Learning Resources and Activities (VARK Learning Styles Based Learning Resources and MELC Based Modular Activities)*. For grades four, five, and six, each learning style has corresponding learning resources and activities, which the students will alternately utilize as instructed by the teachers. These are versatile learning resources and activities adapted from books and other online sources. Teachers and parents can use these learning resources and activities to assist modular students in achieving their learning style preferences and improving their academic achievement in PMDL. Aside from the MELC-based modular activities, researchers included supplementary web-based activities addressing the computer skills of 21st-century learners. Modular students may utilize these online learning resources when gadgets and internet connections are available.

Lastly, the use of learning resources and activities is not only limited to the PMDL modality but would still be applicable in the face-to-face class setting. The Modified In-School Off-School Approach (MISOSA) of the Department of Education aims for continuous education for marginalized learners (Talimodao & Mardrigal, 2021). The learning resources and activities would serve as the supplementary resources and activities modality in the said program.

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