International Journal of Sciences: Basic and Applied Research (IJSBAR)

ISSN 2307-4531
(Print & Online)

http://gssrr.org/index.php?journal=JournalOfBasicAndApplied


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# Sociodemographic Characteristics and Learning Styles on Academic Performance in Science

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**Abstract**

Learning styles refer to how students process, inculcate, and understand information. In both the traditional face-to-face classes and in the new learning modalities, instances that the students' learning styles have been overlooked are inevitable that may result in their poor academic performance. Challenge was left on teachers in the utilization of appropriate teaching strategies for the students to maximize the functions of their learning styles. Using the descriptive correlational and comparative design, this study was conducted to examine the relationship of selected sociodemographic characteristics and the dominant learning styles of 385 junior high school students from a city in Nueva Ecija, Philippines to their academic performance. Results revealed that the online learning, absence of assistance when answering written works, absence of tutor, number of siblings, place of residence, academic awards in Grade 6, average hours of review, parents' educational background, and monthly family income could make students performed better in science under the new normal education. Moreover, ANCOVA revealed that the students' dominant learning styles have no significant relationship on their academic performance in science. The study concluded that some sociodemographic characteristics may have either positive or negative effect on students' academic performance but have found out that the dominant learning styles have no known influence.

***Keywords:*** Academic Performance; Learning Styles; Modular Learning; Online Learning; Sociodemographic Characteristics; Students' Perception; Teaching Strategies.

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## 1. Introduction

Learning style is a process on how students acquire learning and respond to a new information. Knowing students' learning styles would be a great help for the teachers to think and utilize appropriate teaching strategies. If all students have the same learning styles, teaching strategies would be easily chosen to optimize learning and academic performance. Individual learning, however, is a widely varied process and involves many different factors for receiving and processing information [1]. Hence, this study aimed to determine the significant relationship of selected sociodemographic variables and dominant learning styles on the academic performance.

### *1.1. Statement of the Problem*

Due to the COVID-19 pandemic, the educational systems in the Philippines and in other countries have been greatly affected by school closures and the shift to other modalities such as online and modular learning [2]. Even before the start of the pandemic, its utilization of various teaching strategies has been a concern among teachers. This seems to be more difficult to carry out amidst COVID-19 pandemic because most of the classes were done through online platforms and modular setting. There is a possibility that most of the teachers have difficulties in planning and utilizing appropriate teaching strategies to address the different learning styles of the students in the new normal mode of education. As a result, students have difficulties in maximizing the functions of their learning styles to understand fully the lessons and acquire new information. Since there are limitations in the use of teaching strategies under the new normal mode of education, some learning styles of the students may not be actively used and neglected which resulted in poor academic performance.

### *1.2. Research Objectives*

Generally, this study aims to understand the effect of sociodemographic variables and learning styles on students' academic performance. Specifically, it aims to:

- Describe the respondents' academic performance in science according to the dominant learning style they possess;
- Describe the respondents' perception whether the teaching strategies match with their learning styles;
- Determine the relationship of sociodemographic variables on academic performance based on average grade in science;
- Determine the relationship of respondents' dominant learning styles on academic performance based on average grade in science; and
- Determine significant difference on academic performance based on respondents' dominant learning styles.

### *1.3. Research Hypotheses*

This study tested the following null hypotheses:

- There is no significant relationship between sociodemographic factors and academic performance.

- There is no significant difference on the respondents' average grades to the dominant learning styles they possess.
- There is no significant relationship between respondents' dominant learning styles and academic performance.

### *1.4. Significance of the Study*

Learning styles can be a good predictor of academic performance and it should be taken into account to improve students' performance in science and other areas [3]. According to [4] some of the benefits of increasing students' awareness of their own learning styles are higher interest and motivation in the learning process, increased students' responsibility for their own learning, and greater learning opportunities. Researching learning styles provides data on how students learn and find answers on the effect of inappropriate teaching strategies and may contribute to high academic performance [5]. The result of this study may also help teachers to be more aware of their own performances that affect the teaching-learning process. According to [6], an understanding of the students' learning styles can help educators adjust their teaching strategies to address the students' needs. Therefore, given that understanding how students prefer to learn can help enhance the teaching and learning process [7]. The curriculum planners can use the results of this study as basis in planning new curriculum. Understanding learning styles can make it easier to create, modify, and develop more efficient curriculum and educational programs.

### *1.5. Scope and limitations*

The scope the study has geared on the relationship of the selected sociodemographic variables and dominant learning styles of the students on their academic performance in science class. Concomitantly, the students' perception with regard to the alignment of their learning styles and teachers' teaching strategies was also established, analyzed, and discussed. Furthermore, students were grouped according to their dominant learning styles and their academic performance in science has been analyzed, described, and compared to one another. The limitations of the study have anchored to the types of learning styles being measured, sociodemographic factors that may affect students' academic performance, average grade in science as a model subject in this study, school with online and modular mode of learning, three (3) grading period of the academic year, junior high school students as a source of respondents, and the number of the students who participated within the duration of the collection of the data.

## 2. Review of Related Literatures

### *2.1. Sociodemographic Variables*

In the new learning modalities, poverty has become a challenge among students that makes them miss attending their online classes. Truly, one of the factors that may affect students' academic performance in school is the family's source of income. According to [8], due to the lack of finances and resources, many students struggled to reach the same academic achievement levels of students, who are not living in poverty. This idea was further strengthened by [9] wherein they provide strong evidences that the students from families of higher income levels perform better in their academic assessment as compared to those who come from families of lower

income brackets. Therefore, parents who have stable job and financial income provide better opportunities among children. The parents who have stable job may help students to succeed in their academic battle. Students may be inspired through their parents' magnificent jobs to excellently perform and achieve more in their academic experience. This corroborates the findings of [10] who have revealed that students whose parents have better jobs tend to have higher levels of academic performance. Moreover, the parents' highest educational achievement may affect the performance of the students academically. The learning of the parents may help students in their school works. This is supported by [11] who argue that more educated parents may be more efficient at assisting their children with schoolwork. Researches were also conducted in other parts of the world among students in different levels, found a significant gender and age difference in academic performance. On the basis of the findings of [12] they affirm that gender and age play a significant role in determining students' GPA. On the other hand, [13] concluded that students' age has a positive effect on GPA. In terms of family history, birth order plays a significant role in families of different cultures and race. Every child in the family may differ from other siblings in the concept of scholastic record because of his/her role as a family member. The birth order may have a significant effect in the scholastic performance of the students. A related study conducted in Turkey by [14] has shown that middle born students perform less in schooling compared to the other students. A similar study indicated that the first child or the only child usually performs well in education [15]. Ecuadorian study revealed that later born students attain higher education level [16]. In terms of location, the distance of the students' house area to the location of the school may have affect the performance of the students. According to [17], the house location of the students is positively related to students' academic performance. Moreover, the authors in [18] found out in their study that the location of the house of the students affect their academic performance. Tutoring is a process administered by the hired professional educators to help and support students who are less skilled and have low level of knowledge, to alleviate the low academic performance and improve the scholastic record. Tutoring is very common either through online and offline mode. The hired private tutors may help students to understand well the complexity of the lesson. The study of [19] suggests that private tutoring in middle school, on average, has positive effects on students' academic performance in middle school. The result of the study is consistent with the findings of [20] who stated that the presence of tutor in learning has positive effects on students' academic performance. However, not all students afford paying private tutors which lead them to self-study in reviewing their lessons. Self-study requires longer time in the study table of the students which may result in low average hours of sleep. Adequate sleep plays a very important role in physical, mental, and emotional well-being of both students and teachers. According to [21], students who had more regular sleep patterns had better average school grades. Furthermore, time-management is very vital on the part of the students to maximize their study time table and have adequate sleep. Appropriate time-management allows students to maximize time in reviewing and mastering their lessons for a better learning outcome. Based on the study conducted by [22], spending time on self-study or other study-related activities are positively correlated with grades for almost all students.

### *2.2. Learning Style Preferences*

Learning is one of the most important elements in education that all educators must ensure in every student. Educators know that students have their own ways of processing information and acquiring learning. According to [23] learning style preferences are influential in learning and academic performance, and may explain how

students learn. Authors in [24] stated that learning style preferences are important not only to know about the ways of learning of the students, but also essential to enhance their level of understanding.

Without determining and understanding of students' learning style preferences, educators are not likely to utilize appropriate teaching strategies that match to the different learning styles of the students. The alignment between students' learning styles and teachers' teaching styles lead to better comprehension and understanding of complex lessons in science. Both students' and teachers' awareness about learning styles can be of great help in teaching-learning process. Without sufficient knowledge about students' learning style preferences, teachers are not likely to provide appropriate teaching strategies to match the different learning style preferences of the students [25]. On the other hand, the most effective teaching strategies the teachers could utilize tends to vary based on different learning styles, considering the diversity of learning styles in a given population of students. Furthermore, when the learning styles of the students and teaching strategies complement, it may result in high academic performance. The authors in [26] showed that both low and average achievers gained higher scores on standardized achievement and aptitude tests when they are taught within their preferred learning styles. The same findings were elucidated by [27] who discovered that average and low achievers obtained higher scores on standardized achievement tests when they are taught according to their preferred learning styles. The researcher also added that students' learning styles remained same for all subjects. Hence, educators must consider the learning style test among students at the beginning of the academic year, in order to provide a better scholastic environment and improve their academic performance through utilization of appropriate teaching strategies.

### *2.3. Academic performance*

Students' academic performance is the reflection of their learning, strength, and weaknesses in a certain subject area. It could be a useful indicator on how good they are in their scholastic environment. Educators usually measure it through their average grade in a given academic year. According to [28] the academic performance is one of the facets of students' effectiveness. It is the basis of teachers' evaluation and grading and a sort of information on students' weaknesses and strength- the basis of students' learning skills in his/her study. Amidst COVID-19 pandemic, schools all over the world have shifted from face-to-face classes to online learning modality. Hence, stable internet connection must be properly established in students' houses. Without internet connection, students tend shift to a more challenging option which is the modular learning modality wherein they are force to do self-study in all of their subject areas. The authors in [29] stated that the source and access to useful information on internet can make the academic performance of the students even higher. Moreover, the study conducted by [30] revealed that online media usage for education helps students in improving their academic performance. Since most of the classes are done through online platforms, challenge have seen on the part of the teachers on how to maximize the learning potential and opportunities among students through utilization of appropriate teaching strategies. Consequently, the other learning styles of the students might be turn off or silent in the new learning modalities if not properly address through matching teaching strategies. In terms of the effect and importance of teaching strategies on the academic performance of the students, the authors in [31] found out the teaching strategies have major factor in affecting academic performance of the students. Similarly, [32] also found out in her study that teaching strategies and materials that can help students increase persistence and build a growth mindset are presented as keys to successfully affecting academic

performance. In totality, both teachers and students must have worked collaboratively in this time of pandemic to maximize learning and achieve academic success.

## 3. Materials and Methods

### *3.1. Theoretical Framework*

Dunn and Dunn Learning Style Theory was utilized in this study. This theory was chosen because it is based on knowledge that: (a) students could learn; (b) different teaching strategies or approaches, environments, and resources respond to different learning style strengths; (c) students have strengths, but different students have very different strengths; (d) students' learning style preferences exist and can be measured reliably [33,34]; and lastly, (e) with an appropriate learning styles or approaches, environments, and resources students could achieve higher academic performance [34, 35, 36].

### *3.2. Conceptual Framework*

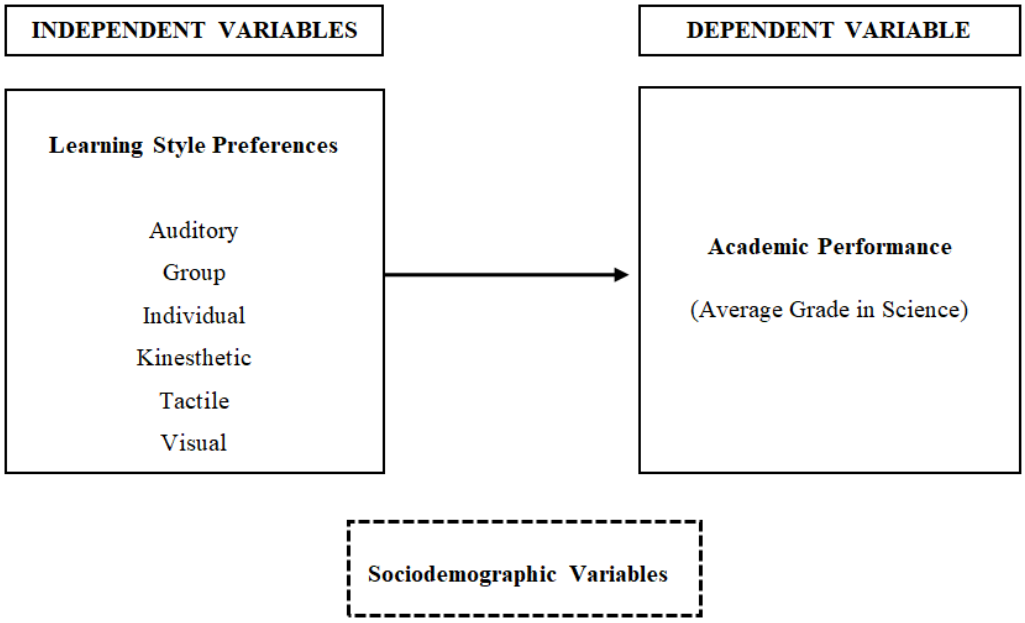


**Figure 1:** Conceptual framework showing the relationship of independent and dependent variable**.**

### *3.3. Research Design*

The study employed a descriptive correlational and comparative design. Descriptive component of the study revolved on students' perception, dominant learning styles, and academic performance. The correlational component was geared to the relationship of sociodemographic and dominant learning styles on the academic performance. Subsequently, the comparative component was centered on the differences on students' perception and academic performance in terms of average grade in science.

### *3.4. Time and Locale of the Study*

The study was conducted during the Academic Year 2020-2021 in a junior high school in San Jose City, Nueva Ecija, Philippines. The respondents were given one (1) month to answer the questionnaire in the Google Form. The school was chosen as a source of respondents of the study since most of the students there were on modular and online classes during the conduct of the study.

### *3.5. Respondents of the Study*

Three hundred eighty-five (385) students served as respondents. Students were from Grade 7 to Grade 10. Only those students who had online and modular learning were involved in the study. The researchers got all respondents by means of quota sampling. The researchers ensured that all students were in full capacity to immerse, facilitate, and do the things needed during the duration of the study.

### *3.6. Research Instrument*

The survey questionnaire, which has three parts, was distributed through Google Form. The first part was sociodemographic profiling of the respondents. The second part aimed to assess the students' perception whether the teaching strategies utilized by their science teachers matched with their learning styles. They answered in Likert Scale wherein there were given parameters and they had to answer from 1 to 5, in which 1 is equivalent to Strongly Disagree and 5 is equivalent to Strongly Agree. The last part was the 30-item Reid's Learning Style Preferences Questionnaire [37] that determined the dominant learning styles of the students.

### *3.7. Methods of Data Gathering*

Data gathering procedures were initiated by sending letters of request to the Schools Division Superintendent and School Principal for the approval of data collection. The participants were oriented on the purpose of the study and consent was distributed to the respondents and they were informed to honestly answer the questionnaire to come up with the valid findings. The collection of data was distributed via Google Form since almost all transactions were online and face to face was not allowed. The researchers also collected the average grades of the respondents from science teachers, after the consent forms from respondents had been properly secured. The sociodemographic variables, means of students' perception, dominant learning style preferences, and average in science were known to the public but the identities of the students were kept confidential.

### *3.8. Methods of Data Analysis*

When all of the needed data were already collected, appropriate statistical tools were used to interpret the findings of the study. Initially, the respondents' score on Reid's Learning Style Questionnaire were calculated and analyzed. Based on the respondents' score, they were grouped according to their Dominant Learning Styles such as Visual, Auditory, Kinesthetic, Tactile, Group, and Individual. To describe the students' perception, dominant learning styles, and academic performance of the respondents in science, descriptive statistics such as means, standard variation, frequency counts, and percentages were used. To determine the differences between of the means of students' perception, Analysis of Variance (ANOVA) was performed. Pearson r Correlation and Spearman's Rho Correlation were used to determine the relationship of sociodemographic variables of the

respondents on their academic performance, in terms of average grade in science. Analysis of Covariance (ANCOVA) was performed to determine the significant differences on academic performance and to determine the effect of dominant learning styles on the academic performance of the students while controlling for the effect of selected sociodemographic characteristics.

## 4. Results

### *4.1. Dominant Learning Styles and the Academic Performance*

The respondents (n=385) were grouped according to their dominant learning style. Among 385 respondents, there are 71 respondents who have Auditory Dominant Learning Style, 87 respondents have Group Dominant Learning Style, 99 respondents have Individual Dominant Learning Style, 45 respondents have Kinesthetic Dominant Learning Style, 29 respondents have Tactile Dominant Learning Style, and 54 respondents have Visual Dominant Learning Style. Based on the analysis, Auditory learners in the study got the highest average grade of 89.94. It was followed by students from Visual, Individual and Group with averages of 89.91, 89.71, and 89.37, respectively. Students from Kinesthetic have 88.05 average while students from Tactile have 87.68 average grade. Based on the criteria of DepEd Order, No. 8 series of 2015 [38] all of the groupings of the students have a Very Satisfactory remarks.

**Table 1:** Students' academic performance according to their dominant learning styles**.**

| Dominant Learning Styles | Frequency | Mean | Std. Deviation | Interpretation |
|---|---|---|---|---|
| Auditory | 71 | 89.94 | 5.461 | Very Satisfactory |
| Group | 87 | 89.37 | 5.531 | Very Satisfactory |
| Individual | 99 | 89.71 | 4.950 | Very Satisfactory |
| Kinesthetic | 45 | 88.05 | 5.827 | Very Satisfactory |
| Tactile | 29 | 87.68 | 5.306 | Very Satisfactory |
| Visual | 54 | 89.91 | 5.144 | Very Satisfactory |
| | **n= 385** | **89.36** | **5.355** | **Very Satisfactory** |

**Table 2**

| **LEGEND** | |
|---|---|
| **Standard Achievement** | **Descriptive equivalent** |
| 90-100 | Outstanding |
| 85-89 | Very Satisfactory |
| 80-84 | Satisfactory |
| 75-79 | Fairly Satisfactory |
| 74 and below | Did not meet the expectations |

***Source:*** DepEd Order, No. 8 s. 2015

### *4.2. Students' Perception on Teaching Strategies and Learning Styles*

Table 3 shows the students' perception with regard to the alignment of teaching strategies and learning styles.

**Table 3:** Students' perception on matching teaching strategies and learning styles

| **Parameters** | **Mean** | **Std. Deviation** | **Interpretation** |
|---|---|---|---|
| 1. My science teacher uses teaching strategies or methods that are organized, helpful, and fit to my learning styles | 4.16 | .918 | Matched |
| 2. The teaching materials my science teacher uses in teaching match my learning styles | 4.05 | .923 | Matched |
| 3. Our classroom assessments in science suits my learning styles | 3.96 | .918 | Matched |
| 4. My science teacher allows us to do science activities aligned with my learning styles | 4.12 | .927 | Matched |
| 5. The performance tasks in science that our teacher allows us to accomplish are aligned with my learning styles | 4.15 | .918 | Matched |
| 6. The group activities we perform in science match my learning styles | 3.92 | 1.003 | Matched |
| 7. The individual tasks in science that our teacher wants us to accomplish are aligned with my learning styles | 4.15 | .919 | Matched |
| **Total Mean** | **4.07** | **.786** | |

**Table 4**

| **LEGEND** | | | |
|---|---|---|---|
| **Range** | **Interpretation** | **Range** | **Interpretation** |
| 1.0-1.79 | Not matched | 3.40-4.19 | Matched |
| 1.8-2.59 | Fairly matched | 4.20-5.00 | Highly matched |
| 2.6-3.39 | Moderately matched | | |

The given data showed that the mean ranges from 3.92 to 4.16 and all of the parameters listed have a total mean score of 4.07. On the basis of students' perception, the Science teachers utilized different teaching strategies that matched with the students' learning styles. According to [39], the teaching strategies are key as they influence effectiveness of student learning process and their performance. [40] explained that the use of teaching strategies by teachers affect preparation of students in schools to acquire necessary knowledge, attitude and skills for future success. According to [41], one of the ways to have effective teaching is for the teachers be conversant with numerous teaching strategies. This is to cater the process of knowledge transmission; teachers should utilize appropriate teaching strategies that best suit specific objectives of the lesson and learning styles of the students [42].

### *4.3. Multiple Comparison of Students' Perception*

Table 5 shows the multiple comparison of the students' perception regarding the alignment of teaching strategies and learning styles.

**Table 5:** Comparison of students' perception on teaching strategies and learning styles.

| Dominant Learning Styles | Frequency | Percentages | Mean | Std. Deviation |
|---|---|---|---|---|
| Auditory | 71 | 18.4 | $4.10_{a,b}$ | .681 |
| Group | 87 | 22.6 | $4.17_{a}$ | .839 |
| Individual | 99 | 25.7 | $4.05_{a,b}$ | .766 |
| Kinesthetic | 45 | 11.7 | $4.12_{a,b}$ | .718 |
| Tactile | 29 | 7.5 | $4.38_{a}$ | .785 |
| Visual | 54 | 14.0 | $3.73_{b}$ | .834 |
| | **n=385** | | **4.077** | **.786** |

***Note: Means with the same subscript do not differ using Bonferroni post hoc analysis***

When the respondents were already grouped according to their dominant learning style, the mean of the respondents' perception were analyzed and compared to one another. There are two (2) subscripts present in the table. Means with the same subscripts did not differ using Bonferroni Post Hoc analysis. Therefore, the students' perception from Group and Tactile Dominant Learning Style (subscript a) is one step higher compared to the students' perception from Visual Dominant Learning Style (subscript b). This means that the students with Group and Tactile Dominant Learning Style have higher perception that their learning styles matched with the teaching strategies utilized by their science teachers compared to the perception of the students with Visual Dominant Learning Style.

### *4.4. Relationship of Sociodemographic on Academic Performance*

Pearson r (***r***) and Spearman's Rho Correlation (***rs***) were performed to determine the relationship of sociodemographic variables to the academic performance in terms of their average grade in science.

**Table 6:** Relationship of sociodemographic variables on students' average in science**.**

| **Sociodemographic characteristics** | **Students' Average** |
|---|---|
| Gender | r= .099 |
| Age | r= .038 |
| Mode of learning | r= -.373** |
| Gadget/s used for attending classes | r= -.096 |
| Presence of assistance when answering Science written works | r= -.208** |
| Number of siblings | r= -.174** |
| Location of respondents' residence | r= -.128* |
| Presence of Science tutor | r= -.105* |
| Average number of sleep hours per day | r= -.073 |
| Average number of review hours per day | r= -.154** |
| Birth order | rs= -.040 |
| Academic Awards in Grade 6 | rs= .374** |
| Father's Highest Educational attainment | rs= .119* |
| Mother's Highest Educational attainment | rs= .157* |
| Monthly Family Income | rs= .281** |
| *** Correlation is significant at the .05 level (2-tailed)** | **n=385** |
| ****Correlation is significant at the .01 level (2-tailed)** | |

#### *4.4.1. Gender*

The statistical analysis showed that the coefficient correlation between gender and students' average was .099, $p>0.05$. Therefore, the gender was not significantly related to the academic performance of the respondents. The results of the study were supported by the findings of authors in [43] who pointed out that there is no significant gender difference in students' academic performance and retention in various subjects.

#### *4.4.2. Age*

Based on the statistical analysis, the coefficient correlation between age and students' average was .038, $p>0.05$. Hence, the age is not significantly related to students' academic performance. The result of the study contradicted the findings of many educational researchers like the findings of [44] that the students' age had a significant effect on the student's academic performance.

#### *4.4.3. Mode of learning*

The mode of learning is divided into online and modular learning. This study found out that the mode of learning is negatively correlated with the academic performance of the students. The coefficient correlation between mode of learning and academic performance was -.373**, $p<0.05$. This means that those students who used to attend online learning gained better grades than those students who used to attend offline or modular learning. The result of the study is supported by [45] and [46] who found out that the online learning could enhance academic performance of the students and provide time flexibility to the students for their learning.

#### *4.4.4. Gadget/s used for attending classes*

This parameter covers whether the gadgets used by the respondents in an online or modular learning is owned or borrowed. The coefficient correlation between gadgets and students' average was -.096, $p>0.05$. This means that whether the gadgets used were owned, shared, or borrowed, it could not affect the average grades of the respondents. According to [47], mobile and other gadgets have been widely accepted by students not merely for social networking but also for the sake of making education more customized as per their learning needs. Students become proficient in harnessing internet and mobile platforms for educational purposes and boosting learning.

#### *4.4.5. Presence of assistance in answering written works and tutor in science*

Surprisingly, the coefficient correlation between presence of assistance and average was -.208**, $p<0.05$ which means that the students with the presence of assistance when answering written works have lower grades compared to those who do not have assistance. The same result has been established as regards the presence of tutor in science which has a negative correlation of -.105*. This also means that the absence of tutor in science would result in a better grade among respondents. On the other hand, a related study of [48] showed that tutoring or presence of assistance when answering written works had a significant impact on retention, but not on GPA or academic performance of the students.

#### *4.4.6. Number of Siblings*

The coefficient correlation between number of siblings and students' average was -.174**, $p<0.05$. The statistical analysis showed that the number of siblings is negatively related to the academic performance. It means that the lower the number of siblings of the respondents, the higher the grades they get, vice versa. A related study of [49] showed that the number of siblings is negatively correlated with the completed years of schooling, educational levels, and likelihood of school attendance.

#### *4.4.7. Location of Respondents' Residence*

This parameter is divided into two types: town area and barrio area. The statistical analysis presented that the coefficient correlation between house area and students' average was -.128*, $p<0.05$. This means that those students residing in the town area have gained better grades than those students who are living in barrio. A similar study was conducted by [50] who found out in her study that town middle school students, compared with their barrio counterparts, reported being more self-motivated during homework.

#### *4.4.8. Average number of sleep hours per day*

The statistical analysis showed that the coefficient correlation between average house of sleep per day and students' average was -0.073, p>0.05. It means that the average hours of sleep per day of the students do not affect their performance academically, whether the students have adequate or deprived sleep hours, it would not matter to their grades. This result is supported by [51] in which the results of their study showed no significant difference between sleep quality and academic performance.

#### *4.4.9. Average number of review hours per day*

The result of the statistical analysis that the coefficient correlation between average of hours of review per day was -.154**, p>0.05. Surprisingly, this negative correlation means that the lesser the time spent by the respondents on reviewing the lesson, the higher the grades they get or the higher the amount of time spent by the respondents in reviewing the lesson, the lower their grades. [52] concluded in her study that students' academic achievement was the outcome of a combination of the study time behavior and other factors in any course of study.

#### *4.4.10. Birth Order*

Coefficient correlation between birth order and students' average was -.40, p>0.05. This implies that the birth order is not correlated to academic performance. A study conducted by [53] is another example corroborating the claim, they showed that there is no significant relationship between the respondents' birth order and academic performance.

#### *4.4.11. Academic Awards in Grade 6*

The statistical analysis for this variable showed that the coefficient correlation between academic awards in Grade 6 and students' average was .374**, p<0.05. It means that the respondents' academic awards when they were in Grade 6 is positively related to their academic performance in science. It can be interpreted that the higher the academic awards of the respondents in Grade 6, the higher the grades they get in High School. Furthermore, a more recent related study of [54] asserted that scholastic standing in high school predicts the performance of students in college.

#### *4.4.12. Parents' Highest Educational Attainment*

This variable is divided into two specific variables: father's highest educational attainment and mother's highest education which are both positively related to students' academic performance. The result showed that the coefficient correlation between father's educational attainment and students' average was .119*, p<0.05 while on mother's educational attainment was .157*, p<0.05. This means the higher the parents' education attainment, the higher the grades the students get. Various researcher supported the result of this study like the recent study conducted of [55] wherein the findings of their study revealed that high educational experience of parents positively contributes to their children's academic performance.

#### *4.4.13. Monthly Income*

The statistical analysis for this variable showed that the coefficient correlation between monthly income and students' average was .281**, p<0.05. Hence, the monthly income is positively correlated with the students' academic performance. The computed significance level showed that the higher the monthly income of the family, the higher the grades of the respondents could get. According to [56], high income families easily manage their children's basic, health, food and educational needs and provide extra facilities and opportunities to their children which could contribute more into the academic performance of their children.

### *4.5. Correlation of Sociodemographic and Learning Styles on Students' Average*

Since there are different sociodemographic factors that could affect academic performance of the students, Analysis of Covariance (ANCOVA) was performed. This time, the covariates or the factors that could affect the academic performance were statistically controlled. This was done to determine if the previous sociodemographic variables that have significant correlation to academic performance would still remain correlated.

**Table 7:** Relationship of sociodemographic characteristics and dominant learning styles on students average in science**.**

| Sociodemographic Characteristics | F value | Significance level |
|---|---|---|
| Mode of learning | 28.152 | .000 |
| Presence of assistance/tutor when answering Science written works | 11.920 | .001 |
| Number of Siblings | 4.679 | .031 |
| Location of respondents' residence | .40 | .842 |
| Presence of Science Tutor | .000 | .997 |
| Academic awards in Grade 6 | 32.519 | .000 |
| Average number of review hours per day | 5.744 | .017 |
| Father's Highest Educational attainment | .881 | .000 |
| Mother's Highest Educational attainment | .539 | .001 |
| **DOMINANT LEARNING STYLES** | **1.676** | **.139** |

Some sociodemographic factors that appeared to be correlated with students' performance were controlled statistically and were treated as covariates to mask their effect on students' performance. Based on the result of Analysis of Covariance (ANCOVA), the location of respondents' residence and presence of science tutor are longer affecting the students' academic performance, provided, that the effect of some sociodemographic factors

was statistically controlled. It also showed that dominant learning style does not affect academic performance, F (5,369) = 1.676, p>.05. Hence, this study accepted the null hypothesis wherein the dominant learning styles of the respondents are not related with the academic performance. Related study was conducted by authors in [57] and they found out that there is no connection between students' preferred learning style and academic performance. Furthermore, [58] revealed that no significant relationship was found between learning styles and academic performance of the students.

### *4.6. Comparative Analysis of Students' Academic Performance*

Table 6 shows the academic performance of the students in science. Note that the students were grouped according to their dominant learning style. Based on the given data, the Dominant Learning Styles of the students has computed F (5,369) = 1.676. This means that the academic performance of the respondents does not significantly differ to one another. The students with Auditory Dominant Learning Style have an average grade of 89.94. This is followed by the students in Visual with an average grade of 89.91. This is followed by students in Individual Dominant Learning Style and Group Dominant Learning Style who have an average grade of 89.71 and 89.37, respectively. The average grade of the students in Kinesthetic Dominant Learning Style is 88.05, while students from Tactile Dominant Learning Style has an average grade of 87.68.

**Table 6:** Academic performance of the students and their dominant learning styles**.**

| Dominant Learning Styles | Frequency | Mean | Std. Deviation |
|---|---|---|---|
| Auditory | 71 | 89.94 | 5.461 |
| Group | 87 | 89.37 | 5.531 |
| Individual | 99 | 89.71 | 4.950 |
| Kinesthetic | 45 | 88.05 | 5.827 |
| Tactile | 29 | 87.68 | 5.306 |
| Visual | 54 | 89.91 | 5.144 |
| | **n=385** | **89.36** | **5.355** |

## 5. Discussion

Based on the analysis of students' perception, it revealed that the teaching strategies utilized by the Science teachers matched with the students' learning styles. It is a good indication that teachers are able to utilize appropriate teaching strategies to maximize the learning outcomes among students in the new learning modalities. The gender and age of the respondents do not significantly correlate to the academic performance of the students. Hence, gender and age have no influence to the scholastic grades of the students. The result of the study revealed that those students in online learning modality performed better academically compared to those who are in modular learning modality. The online learning provides a lot of opportunities for students to maximize the functions of their learning styles and help them succeed in science. The authors in [59] pointed out

that the use of internet in the educational setting has enabled easy access to many resources and information sharing. Hence, the students who attend online learning excellently performed in classes. Surprisingly, the absence of assistance when answering Science written works and the absence of tutor in science allow students to have better academic performance. It means that those students without tutor and assistance when answering written works have better grades in science compared to those students who have tutor and assistance. Moreover, the lesser the number of siblings, the better the performance of the students. The underlying factors would be shared responsibilities and resources of student to his or her siblings. Students from large family tend to have limited learning resources compared to those coming from small families. As a result, students from small families outran students from large families in their academic performance. Correlational analysis showed that students living in town area performed better academically compared to the students who are living in barangay. Cell towers are situated in town; hence, the internet connection is much faster in town area which allows students access a lot of online learning resources. It also revealed that the average hours of sleep per day do not affect the academic performance or grades of the students. Although, sleep deprivation cannot affect the academic performance, students' health must be affected. According to [60, 61], the lack of sleep has been linked to emotional and physical health effects including depression, burnout, obesity, cardiovascular disease, and even death.

This study showed that the lesser the time spent for reviewing the lesson, the better the grades of the respondents. One possible explanation for this lies on the issue of time management. The students tend to focus and allot an ample time in reviewing the lessons. For this reason, other written activities and performance tasks have been ignored which resulted in a low academic performance. The birth orders had no significant correlation to the academic performance. The authors in [62] tested the connection between sibling order and academic performance, they found out that there was no significant correlation between the two variables. This study also showed that academic awards of the students when they were in Grade 6 was positively related to the academic performance of high school students. Therefore, students who had received academic awards when they were in Grade 6 have better academic performance in junior high school compared to those who do not receive. This can be practically explained that scholastic standing in elementary predicts performance in Junior High School. The parents' education has significant relationship on the academic performance of the students. Therefore, the higher the educational background of the parents, the better the students' academic performance. The study of [63] has shown that successful students have strong academic support from their highly educated parents. The result also showed that the monthly family income is significantly related to students' academic performance. Therefore, the higher the monthly income of the family, the higher the grades of the students may get. In the new learning modalities, students need enough number of resources and finances to support the learning process. The family needs to allocate finances for school fees and other related stuff such as gadget, printer, internet bill, electric bill, and books. Hence, for [64] no education is ever cheap; yet, poverty must not be a finite barrier to education, and academic performance must not suffer from no-money-syndrome implications. The dominant learning styles of the respondents were found to have no significant correlation on the academic performance of the respondents, provided, that the effect of some sociodemographic factors was statistically controlled. However, it is very important to understand how the students learn especially in the new learning modalities to maximize the learning. Furthermore, the learning styles of the students deals mainly in the learning

outcomes or learning gains which may not always be reflected with their grades or academic performance. [65] asserted that in order to achieve a desired learning outcome, one should provide teaching interventions that are compatible with the students' learning styles. Thus, learning style is a concept that is important not only in shaping teaching practices, but also in highlighting issues that should help school administrators to think more deeply about their roles in enhancing and facilitating student learning.

## 6. Conclusion

Based on the result, the study concluded that the online learning, absence of assistance when answering written works, absence of tutor, lesser number of siblings, place of residence, academic awards in Grade 6, average hours of review, parents' educational background, and monthly family income could make students performed better in science under the new normal education. It also concluded that the gender, age, average hours of sleep per day, and birth order have no significant effect on academic performance. Moreover, the dominant learning styles among respondents do not significantly affect their academic performance in science, provided, that the effect of some sociodemographic variables was statistically controlled and treated as covariates. Hence, whatever the dominant learning style of the students, it does not influence their academic performance.

## Acknowledgement

The authors acknowledge the financial support from the Department of Science and Technology-Capacity Building Program in Science and Mathematics Education (DOST-CBPSME) for the publication of this study. The authors are also grateful for the support of Central Luzon State University.

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