

# LEARNING STYLES AND ACADEMIC PERFORMANCE IN SCIENCE 4: DIFFERENTIATED INSTRUCTION LESSON GUIDE

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**Abstract:** This study assessed the learning styles and academic performance of Grade 4 students to inform the development of a differentiated instruction lesson guide. This study made use of descriptive correlational research to assess the learning styles of students using the VARK Learning Style Inventory. The researcher utilized universal sampling technique with 34 learners as respondents. Their grades in Science from quarters 1-4 were extracted from learner's report card or form 9 of the Department of Education for the documentary analysis. Based on the findings, it revealed the different learning styles in the group of 34 individuals, Verbal learning is the most prevalent learning style, while Kinesthetic learning is the least common. Data study of how well Grade 4 pupils performed in their science class shows that the majority of students in this group performed "Fairly Satisfactory" in science. The findings also revealed that there is a significant relationship between learning styles and academic performance in science; the way students prefer to learn (their learning styles) has a meaningful impact on how well they perform in science. The results also underscore the importance of instructional strategies, particularly inquiry-based learning, in enhancing science outcomes. Thus, it can be concluded that educators shall implement differentiated instruction, utilize diverse teaching methods, and active learning approaches to accommodate varied learning preferences and improve science performance. Students' preferred learning techniques have a significant impact on their performance in science.

**Keywords:** Differentiated instruction, learning styles, academic performance, descriptive-correlational, universal sampling technique, science education, inquiry-based learning, grade 4 learners, Maloray Elementary School, Matatag Curriculum, Philippines.

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## I. INTRODUCTION

In a Grade 4 Science classroom at a public elementary school, a significant variation in student engagement and academic performance is observed. While some students excel in science assessments, demonstrating a strong grasp of concepts, others struggle to keep up, often showing signs of disengagement and frustration. This disparity is particularly evident during lessons on topics such as ecosystems and the water cycle, where students are expected to understand complex processes and relationships. The current instructional approach predominantly relies on lectures and textbook readings, which may not cater to the diverse learning styles present in the classroom. This one-size-fits-all method has led to varying levels of understanding and retention among students. As a result, there is a noticeable gap in academic performance, with some students achieving high grades while others consistently perform below expectations.

This discrepancy raises concerns about the effectiveness of the current teaching strategies in meeting the needs of all learners. The observed challenges highlight the need for an instructional approach that recognizes and addresses the diverse learning styles of students. Implementing a differentiated instruction lesson guide in Science 4 could provide a more inclusive learning environment, foster better engagement and improve academic performance across the student population.

The connection between teaching and learning styles has long been recognized as a crucial factor influencing student academic performance (Pashle,2019). When teachers employ instructional strategies that resonate with students' preferred learning styles, learning becomes more engaging, effective, and ultimately, leads to improved academic outcomes (Dunn & Dunn, 2019). Conversely, a mismatch between teaching and learning styles can hinder comprehension, motivation, and overall academic achievement (Azida, et.al 2019).

Despite extensive research on teaching and learning styles, a comprehensive understanding of their interplay with academic performance remains elusive. While numerous studies have investigated the individual impact of teaching styles and learning styles, fewer have explored the synergistic effects of these variables. By triangulating these factors, this study aims to delve deeper into the complex relationship between teaching and learning, and its implications for learners' academic performance. (Catherine L. Tomas, 2019)

By identifying the optimal alignment between teaching and learning styles, educators can tailor their instructional approaches to better meet the diverse needs of their learners. Moreover, the results can inform the development of teacher training programs that emphasize the importance of understanding and adapting to different learning styles. Ultimately, this research contributes to a more nuanced understanding of the factors that influence student success, thereby fostering a more equitable and effective learning environment for all (Dewi,2022).

Some experts believe that learning and teaching styles should be well-matched to increase students' enthusiasm for studying. Recent research found that there was a favorable connection between self-efficacy and instructors' teaching thinking practices, but a negative relationship between personal model teaching style and teaching thinking skills. Separate research undertaken by certain writers on the analysis of common learning styles among secondary school students attempted to determine the link and influence of various learning styles on students' academic performance. The study's findings suggested that kinesthetic learning styles were more widespread than visual and auditory learning styles among secondary school pupils (Angela, 2022).

According to the findings, students revealed a preference for kinesthetic learning modes as their primary learning style, with visual and auditory learning styles as secondary learning styles. Thus, the data demonstrated that there is a mismatch between the learning and teaching styles (Kiblasan et al., 2016).

Meanwhile, a study found that teachers created the learning environment based on their own learning styles, and that there was a close relationship between teachers' learning styles, students' learning styles, and students' achievements in mathematics classes, with students' achievements increasing when teaching was done based on their learning styles. Furthermore, the study found that there was a substantial association between instructors' teaching style and students' learning style and students' academic performance if they match each other's learning style (Ilcin et al., 2018).

Based on observation, the researcher felt the need to address the learning gaps of Grade 4 learners. As reflected in their Form 9 of first quarter and Second Quarter of School Year 2024- 2025, out of 34 learners 19 of them got an average of 80 below. With the transition stage from key stage 1 to key stage 2; coping with the learning activities are challenging in the upper elementary grades, learners who do not read proficiently by the end of the early elementary grades (K-3) may face serious consequences. Teachers need to do something to address and intervene before the gap widens even more.

Thus, this study is to be conducted to assess the learner's learning styles and the academic performance in Science among Grade 4 learners. With the findings, a differentiated instruction lesson guide was designed. By identifying the optimal alignment between learning styles and their academic performance in science, researcher can design a differentiated instruction lesson guide to better meet the diverse needs of the learners.

### **Research Questions**

This study assessed the learning styles and academic performance of Grade 4 students for the school year 2024-2025 as the basis for a differentiated instruction lesson guide.

Specifically asked to answer to the following questions.

1. What is the grade 4 students' learning styles in terms of:
  - 1.1. Auditory;
  - 1.2. Visual;
  - 1.3. Verbal and
  - 1.4. Kinesthetic?

2. What is the average academic achievement in science of grade 4 students from quarters 1 to 4 of the School Year 2024-2025?
3. Is there a significant relationship connecting academic success and learning styles?
4. What type of differentiated instruction lesson guide may be created based on the findings?

## **II. RESEARCH METHODOLOGY**

### ***A. Design***

This study primarily made use of quantitative method of research. According to Creswell (2018) research method is a systematic and scientific approach to research in where the researcher employs descriptive correlational research design. A descriptive correlational research design, as explained by Creswell, is a quantitative research method that aims to describe variables and their relationships. It's used to investigate the association between two or more variables without manipulating any of them. Data was interpreted quantitatively using statistical approaches such as correlation analysis, weighted mean, and the ranking method. The quantitative research approach involved gathering and analyzing numerical data such as using percentage and frequency to describe and make generalizations, investigate relationships, and study the cause-effect of phenomena. Moreover, to assess student's academic performance, their report cards are also a necessary tool. Grades in Science from first quarter to fourth were extracted in their narrative report card or form 9 of DepEd. Learner's Report Card served as a document for documentary analysis. Documentary analysis is a research method used to systematically analyze documents to understand a particular topic or phenomenon. It involves examining existing documents, such as texts, images, audio and video recordings to identify patterns, themes and meanings. The goal is to gain insights into the context, creation and impact of these documents.

### ***B. Environment***

This study was conducted in an identified Elementary School of Cebu Province Division, specifically to the Grade 4 learners, which is directly under the justification and direct supervision of the Department of Education, Cebu Province Division. The school is a medium-sized elementary school which is composed of a principal, nine teachers, and a total population of 215 learners for this school year 2024-2025. The school has been an active participant of DepEd's academic and co-curricular activities which made it to accumulate the following awards respectively; Most Outstanding Brigada Eskwela 2022 & BE Jingle Program Implementer Elementary School (medium) Category, 1st runner up in medium school category in Brigada Eskwela 2019, Outstanding School Implementer in Brigada Eskwela 2019.

### ***C. Respondents***

The participants of the study are the grade 4 learners. The researcher used the universal sampling technique to answer the survey questionnaires. The inclusion criteria set was currently enrolled, no failing grade in science from first quarter to fourth quarter, and at the right school age.

### ***D. Instrument***

The researcher used an adopted tool, the VARK Questionnaire by Neil Fleming of New Zealand. The VARK Questionnaire is a short, multiple-choice survey that explores an individual's preferred sensory modalities for learning. It assessed four learning styles; Visual that is, learners prefer to learn through visual aids, charts, diagrams and images. Aural preferring to learn through listening to lectures, discussions and music. Verbal/Linguistic preferring to learn through reading, writing and taking notes and Kinesthetic preferring to learn through hands-on activities, experiments and movement.

### ***E. Data Analysis Plan***

The researcher utilized statistical measures used to analyze the data gathered by the researcher were weighted mean was used to analyze the Teaching Styles inventory data, ranking was used to prioritize items or options based on their relative importance or desirability, percentage and frequency were used in interpreting the academic performance of the learners, and pearson r was used to determine the significant relationship among the variables being considered.

## **III. RESULTS AND DISCUSSION**

### **Learning Styles of Grade 4 Learners**

A learning style is an individual's preferred way of absorbing, processing, and retaining information. Understanding the learning style can help teachers to design differentiated activities to address. The table shows the frequency (f) and percentage (P) of students with each of the four identified learning styles: visual, auditory, verbal, and kinesthetics. Furthermore, the learning styles are ordered according to the percentage of learners that exhibit each preference, offering a clear picture of the prevailing learning styles within the group.

**Table 1: Learning Styles of Grade 4 Learners (n = 34)**

Learning Styles	F	P	Rank
Visual Learners	8	23.53	2.5
Auditory Learners	8	23.53	2.5
Verbal Learners	14	41.18	1
Kinesthetic Learners	4	11.76	4
<b>Total</b>	<b>34</b>	<b>100</b>	

Table 2 presents the preferred learning styles of grade 4 learners wherein 41% are verbal learners, 24 % are visual and auditory and only 12% are kinesthetic learners. It shows that majority of the grade 4 learner preferred verbal learning style and least preferred kinesthetic learning style.

This means that learners likely to perform well in activities that involve reading, writing and verbal communication. They are proficient in reading comprehension, writing skills and enjoy engaging in discussions and debates. On the other hand, they struggle with activities that needs physical movement and hands-on experience.

It implies that learners who favour verbal learning and have less interest in kinesthetic learning have specific challenges and opportunities. As a result, effective instruction requires a balanced approach. While making the most of verbal learning capabilities (lectures, discussions, reading) is crucial, the study proposes methods to include kinesthetic elements to boost engagement and comprehension for individuals less naturally drawn to this learning style. This could include brief, targeted kinesthetic tasks within lessons or alternative assignments that incorporate movement and hands-on activities.

The finding of this study is supported by Nancekivell, et al. (2019), explored beliefs about learning styles and found that a significant portion of the population, including educators, holds strong beliefs that individuals learn better when taught according to their perceived learning style. Specifically, the study revealed that some people believe learning styles are inherent, neurologically based, and predictive of academic and career success.

**Academic Performance in Science**

The academic performance in science measures how well the students understand and apply scientific concepts, principles, and skills in educational settings. The grades of the learners were based on the 1<sup>st</sup> to 4<sup>th</sup> quarter final grade in this subject. This was obtained through their written tasks, performance task and quarterly examination. It details the distribution of students across different grade ranges, along with the corresponding verbal interpretations of these grades. The result is presented in Table 3.

**Table 2: Academic Performance in Science (n = 34)**

Grades	Average Grade		Verbal Interpretation
	F	P	
Below 75	0	0	Did Not Meet Expectations
75 – 79	19	55.88	Fairly Satisfactory
80 – 84	3	8.82	Satisfactory
85 – 89	8	23.53	Very Satisfactory
90 and above	4	11.77	Outstanding
<b>Total</b>	<b>34</b>	<b>100</b>	

Table 2 reflects the academic performance of Grade 4 learners in science wherein 56% have a fairly satisfactory performance in science, 24% have a very satisfactory performance, 12% have outstanding performance and only 9% have a satisfactory performance in Science. It shows that most of the respondents have a *fairly satisfactory* academic performance and there were minimal number of Grade 4 learners who obtained a *satisfactory* academic performance in science.

This means that the educational setting may not always meet the demands of verbal learners. If education excessively prioritizes visual or kinesthetic learning styles without including verbal involvement, students may feel alienated or unmotivated, which can lead to disengagement and poor academic achievement.

It implies that a learner's poor performance in science leads to lower grades, which can have a detrimental impact on their total GPA and academic status. Repeated struggle in science can lead to a loss of confidence and motivation, making it

difficult to engage with the topic and perhaps affecting performance in other areas. They failed to satisfy the expectations established by the Department of Education. Parents must consistently monitor their children's progress in completing assignments, projects, and other prescribed tasks.

Results of this study are supported by the findings of Lee et al. (2022), who explored the association between several learning elements and elementary students' science ability. The study discovered that student engagement and prior knowledge significantly influenced academic achievements in science, demonstrating the complex interaction of factors that lead to student performance (Lee et al., 2022). Factors that affect academic achievement in primary science education. *Journal of Educational Science*, 24(1), 45–62). The findings also support Herbert Walberg's theory of educational productivity, which states that academic performance or student achievement is influenced by a variety of factors, including student traits and environmental situations.

**The Relationship Between Learning Styles and Academic Performance in Science**

Pearson Product Moment Correlation Coefficient was used to assess the statistically significant association between Learning Style and Academic Performance in Science. The hypothesis was evaluated at the 0.05 level of significance.

**Table 3: The Relationship between Learning Styles and Academic Performance in Science**

Variables	r-value	P-value	Decision	Interpretation
Learning Styles and Academic Performance	0.82	0.00	Reject H <sub>0</sub>	Significant

Level of Significance = 0.05

Table 3 presents the significant relationship between learning styles and Academic Performance in Science. It was found out that the p-value of 0.00 is less than the level of significance of 0.05, therefore reject the null hypothesis. This means that there was a significant relationship between learning styles and Academic Performance in Science. The way students prefer to learn (their learning styles) has a meaningful impact on how well they perform in science. In other words, differences in learning styles were linked to differences in academic achievement in that subject. In simple terms, this section of the text describes how a statistical test was carried out to determine if there is a connection between how pupils learn and how well they perform in science.

It implies that the relationship between learning styles and academic performance in science doesn't always connote equal predictive power. The study found a statistically significant relationship, but this doesn't mean learning styles can be used to accurately predict how well a student will do in science. It simply means there's a connection, but not a predictive one. Students with different learning style preferences like verbal, visual, auditory can all achieve high levels of success in science. This suggests that science learning is multifaceted and doesn't rely on one specific learning style. The implication is that educators should employ diverse teaching methods that cater to various learning preferences, as students can excel regardless of their dominant learning style. The finding opens the door for more research into what factors *do* predict science performance, if not learning styles.

The finding is supported by a recent study by Garcia and Patel (2023) further supports the complexity of factors influencing science achievement. They examined the impact of inquiry-based learning approaches on science performance in elementary classrooms. Their findings suggest that active learning strategies, where students engage in hands-on investigations and problem-solving, are strongly associated with improved science outcomes. This highlights the importance of instructional methods in fostering a deeper understanding of scientific concepts (Garcia, A. & Patel, P. (2023). The effect of inquiry-based learning on science achievement in elementary education. *Journal of Educational Research*, 117(3), 289-302).

**IV. CONCLUSION**

Based on the findings of the study, it can be concluded that the way students prefer to learn (their learning styles) has a meaningful impact on how well they perform in science. In other words, differences in learning styles were linked to differences in academic achievement in that subject. Moreover, teachers should employ differentiated instruction with a variety of teaching methods and materials that cater to diverse learning preferences and emphasize active learning

approaches to maximize student understanding and performance in science. This is supported with Kolb's Experiential Learning Theory which states that people learn best when their experiences match their dominant learning style and supported with Dunn's Learning Style Theory that when teachers employ instructional strategies that resonate with students' preferred learning styles, learning becomes more engaging, effective, and ultimately, leads to improved academic outcomes (Dunn & Dunn, 2019).

## **V. RECOMMENDATIONS**

Based on the findings of this study, the following recommendations are made:

1. Parents shall support their children's learning by providing a variety of resources and opportunities that cater to different learning styles. They should also encourage active engagement in learning activities and emphasize the importance of developing a strong foundation in science.
2. Teachers shall implement differentiated instruction in their classrooms, using a variety of teaching methods and materials to address the diverse learning needs of their students. They may also prioritize the use of active learning strategies, such as inquiry-based learning, to promote deeper understanding and improve academic performance in science;
3. School heads shall provide teachers with the necessary resources and professional development opportunities to effectively implement differentiated instruction and active learning strategies. They should also foster a school environment that values and supports diverse learning needs.
4. Future research may explore additional factors that may influence the academic performance of Grade 4 learners in science, such as student motivation, self-efficacy, and the home learning environment. Further investigation into the effectiveness of specific differentiated instruction strategies in science classrooms is also recommended.
5. Parallel study will be conducted with the proposed titles:
  - *The Impact of Differentiated Instruction on Science Achievement Among Elementary Students*
  - *Exploring the Relationship Between Teaching Strategies and Learning Outcomes in Grade 4 Science*
  - *Comparative Analysis of Learning Styles and Academic Performance in Science Education*

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