



# Visual, Auditory, Read/Write and Kinesthetic (VARK) Model-Based Peer Teaching Approach

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## Abstract

Peer teaching has been researched as an effective strategy to engage pupils and promote academic success. In this research study, we recommend a new approach on peer teaching and the purpose is to assess the integration of the VARK model within a peer-teaching framework designed for science subject. Survey and test questionnaires were administered to elementary learners specifically Grade 6 level and data collected were subjected to descriptive statistics and hypothesis testing. VARK model of Neil Fleming was employed to determine pupil's learning preferences and the finding revealed that the multimodal learning preference-Visual and auditory was the most preferred among the pupils. Meanwhile, pupil's learning preference was integrated within a peer-teaching framework through a developed activity. The results demonstrate that the implemented intervention may significantly affect the learning acquisition of the pupils. Therefore, tailoring instructional strategies to students' preferred learning styles can lead to improved learning outcomes, as revealed by the positive influence of the peer-teaching approach on the pupil's performance. The findings of this study provide practical insights and recommendations that suggest further method to investigate long term impact of the proposed peer-teaching approach.

**Keywords:** *Peer Teaching, VARK Model, Multimodal Learning Preference*

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## INTRODUCTION

The Philippine education system has made various reforms like the K-12 program to address the system deficiency, improve access to education and meet the global standards. As the Department of Education is committed to continuous learning development and a learner-centered public institution, its public institutions try to make notable strides in education for all, but despite the continuing trials to uplift the current system, challenges still hinder the development of education. One of the challenges is to adapt to the needs and diverse learning preferences of students. In the diverse landscape of education, it is essential to recognize that not all students prefer the same learning style (Reddy, 2023). In the article George Higgins 'How Schools Can Accommodate Different Learning Styles' (2023), The more students a teacher has to work with, the more varied the types of learning styles are and the more that teacher is stretched trying to manage them all.

To cater every student's academic needs, it is vital to have knowledge about pupil's learning preference as a first step in the method designed to enhance learning outcomes. It is important to identify students learning preferences in order to design an effective educational curriculum (Akhlaghi et al., 2018). The idea of accommodating the learning preferences of every learner is supported by Zhao & Potter (2016), students and learners have different ways of acquiring knowledge and have different preferences. Further study by Mirza & Khawar (2020) noted that students' motivation improves when they recognize their learning

style. However, while learning styles are important, students must also participate in active, collaborative learning experiences, such as peer teaching, to improve their comprehension and problem-solving skills.

Peer teaching has long been used in academia as a way to improve learning outcomes. Research shows that peer teaching measurably improves learning gains and knowledge retention. Peer teaching shifts the focus from the teacher to the student. Peer teaching aligns with student-centered-learning philosophies by: Focusing on individual learning needs: Peer teaching allows personalized learning experiences tailored to individual student needs, preferences, and learning styles. Stigmar (2016) explored peer-to-peer teaching in higher education and noted that University teachers identify and esteem other pedagogical benefits such as improving students' critical thinking, learning autonomy, motivation, collaborative, and communicative skills. Additionally, Nieto, (2013) in his dissertation research at the University of Carolina founds students' self confidence rose with the implementation of peer teaching instruction. That peers working together can bring their social skills into the classroom and connect their experiences or knowledge to new subject content.

Corral (2018) also indicates that a generally positive response to the idea that peer-teaching encourages active participation in class discussion. Moreover, pupils receiving explanations can fill in gaps in their own understanding, correct misconception, and construct new, lasting knowledge. The pedagogical belief and theory that supports peer teaching and were incorporated as a model within peer-teaching framework in other research study are social-constructivism (Stigmar, 2016) sociocultural theory of Zone of proximal development (Chun & Cennamo, 2022).

In this current research study, the concepts of the Zone Proximal Development (ZPD) are central here; it suggests that learners can achieve higher levels of understanding with guidance from more knowledgeable peers. It gives a clear understanding that learners tend to have better academic achievement while being accompanied by more knowledgeable and adult peers. This theory holds a significant role by supporting the researchers' study about the essence of having a strategy that will help to boost cooperative learning.

Jean Piaget's Constructivist learning theory also support the importance of interaction in constructing ideas. This theory emphasizes the importance of interaction in the learning process which gives support to the researchers' study. Another theory that is highly relevant to the research study which is the Visual, Auditory, Read and Write, and Kinesthetic learning style theory of Neil Fleming. This theory is highly relevant to the study as it provides a model that will serve as a basis on determining the common learning preference of the grade 6 learners.

Nevertheless, to address the diverse needs of the students, we incorporate the principle of Neil Fleming's Visual, Auditory, Read and Write, and Kinesthetic learning style theory in the peer-teaching framework. According to Hussain (2019), psychologists first proposed the VAK (Visual, Auditory, and Kinesthetic) theory of learning in 1920 as a pedagogical approach to describing how people learn best. This theory, however, came to light in 1992, when Neil D. Fleming modified it by adding another letter to the original acronym and renamed it VARK (Visual, Auditory, Read/Write, and Kinesthetic. According to Hussain (2019), this theory is regarded as a well-known method of learning because it simplifies the relationship between the learner's interests and retention of new information. It also facilitates the most effective interaction with the teacher because they are the providers of tricks and strategies that make the learner feel comfortable while learning.

This research study, therefore, contributes new approach on peer teaching and provides insightful investigation in relation to the proposed strategy. The researchers came up with this idea to address current challenges faced by the pupils as well as the teachers. By investigating how the peer-teaching approach implemented in the instruction, researchers gained valuable understanding to the broader discussion on peer-teaching. It also provides practical insights and recommendations for future research and key stakeholders especially teachers in enhancing the learning process.

Three research objectives have been outlined for this research study. The first objective is to identify the learning preferences of the pupils, to be used to look at the best ways to assist each learning style in the classroom. Recommend an intervention that promotes peer teaching technique as the second objective to address the learning gaps and assess students' individual needs. Lastly, is to determine the significant difference between the pre-test and post-test result of integrating peer-teaching techniques in Grade 6 learners, to show how peer teaching techniques increase the engagement of the students and help them increase learning outcomes. The creation of this study lies in examining the integration of Visual, Auditory,

Read/Write and Kinesthetic model within peer-teaching framework, to analyze if it significantly affects the learning acquisition of the elementary pupils.

## METHOD

This study applied descriptive and experimental research design. The descriptive research design was utilized to analyze the results from the Visual, Auditory, Read/Write and Kinesthetic questionnaires and be able to interpret data for validity testing as well as to state the narrative result of the observation from the peer teaching experience. Conversely, the experimental design was employed to analyze the results of the pre and post-test. Prior to the conduct of the intervention, the researchers administered a pre-test to assess the pupils' prior knowledge of the Human Digestive System. Subsequent to the intervention, which incorporated a peer-teaching approach based on the Visual, Auditory, Read/Write and Kinesthetic model, a post-test with the same set of questions was administered. The analysis of the pre-and post-test results aimed to determine whether there was a significant difference in the test scores after integrating the Visual, Auditory, Read/Write and Kinesthetic Model-based peer-teaching approach.

In the current research study, participants were comprised of Grade 6 pupils from identified elementary school in the Bula District for the school year 2024, with a total of 38 participants. The roles of the participants were crucial for realizing the objectives of the study, specifically their participation and involvement in the peer-teaching experience highlights how the recommended intervention implemented in a classroom setting and affects the learning acquisition of the students. Moreover, participants were distinguished as peer tutor and tutees based on the pupil's academic performance records. Through constant coordination with the cooperating teacher, the researchers obtained a list of pupils and identified appropriate pairs where one is considered as advance learner and the other one is a struggling learner. Both survey and test questionnaires were distributed among the participants through a printed copy of questionnaires, administered during face-to-face class. Survey questionnaires involved the use of VARK questionnaires created by Neil Fleming and was given from the online site where it provides useful tool for instant feedback of the learning preference of the grade 6 pupils.

In the course of the intervention, pupils engaged in peer-teaching session and activity where a total of 19 pairs were formed from the 38 participants of the study. Data collection involved administering of survey and test questionnaires as well as the implementation of the intervention. The Visual, Auditory, Read/Write and Kinesthetic questionnaire is composed of 16 statements with four options in each statement (Each choice inclined to Visual, Auditory, Read and Write, and Kinesthetic), which pupils chose one or two choices that best explains pupil's learning preference. Data on Visual, Auditory, Read/Write and Kinesthetic learning styles were summarized using frequency (count) and relative frequency (percentage) (El-Saftawy et al., 2024). This initial process is crucial in the identification of the most common learning preference of grade 6 pupils.

Following this, the researchers started crafting the activity for intervention and later on underwent content validation from master and science teachers. Subsequently, another set of questionnaires were administered to conduct pre-test about Human Digestive System and 38 pupils have participated and completed the 25-items standardized test. Thereafter, grade 6 pupils were engaged to peer-teaching as part of the conduct of the current research study. Observation was carried out to directly monitor, record behaviors of the pupils, and make insights during the peer-teaching experience which covers almost 45 mins. teaching session. The next day, another session was conducted for the implementation of the validated peer-teaching activity titled "Watch, Discuss, and Share", this is to further reinforce understanding of the pupils and accommodate well their learning preferences. The activity included watching instructional video, answering worksheets attached with diagrams and Higher Order Thinking Skills questions, and lastly, sharing collaborative ideas to other pairs of peer tutors and tutees. The last phase was the conduct of a post-test wherein the same set of questions was administered to the grade 6 pupils.

Furthermore, thorough and constant data collection was done and the highest ethical consideration and clearance was sought to achieve the desired outcomes. This includes asking for permission to conduct the research study in the identified elementary school with the composed letter of request, particularly to the school principal and the cooperating teacher who allowed and provided valuable time in coordinating with the researchers. As the researchers have undergone validity testing of the proposed peer teaching activity, another approval process was administered to the validators with the use of a composed letter noted by the research adviser and the Dean of the education department.

## RESULTS AND DISCUSSION

The research study utilized Social Science Statistics Software to perform Homogeneity of Variance Calculator-Levene's Test. Weighted mean was used for descriptive statistics. On the other hand, Homogeneity of Variance Calculator-Levene's Test was used to test hypotheses while applying Wilcoxon signed rank test. Results have been presented in the following sections.

### Grade 6 Pupils Learning Preference Results from Visual, Auditory, Read/Write and Kinesthetic Questionnaire

The table 1 presents descriptive statistics results including Frequency(count) and relative frequency (Percentage). The results indicate that learning preferences involve two classifications: unimodal and multimodal which inclined with various learning style modes from Visual, Auditory, Read/Write and Kinesthetic questionnaire.

The table 1 below revealed the descriptive statistical results of the participants in the conduct of the study. It can be gleaned that mild aural has the highest percentage among others with 13.2% while strong visual obtained 2.6% correspondingly. Furthermore, if pupils exhibit a high preference for mild aural learning, it means they likely thrive in environments where auditory input is significant but not overwhelming. Tailoring learning experiences to accommodate mild aural preferences, educators can enhance these students' engagement and academic success.

Table 1. Results of Descriptive Statistics of Unimodal learning preferences

Unimodal Learning Preference	Frequency	Percentage
Strong visual	1	2.6%
Strong aural	2	5.3%
Mild aural	5	13.2%

For table 2, it focuses on the results of descriptive statistics of multimodal learning preferences of the pupils. It highlighted that the visual and auditory has the highest percentage with 42.1% in terms of the multimodal learning preferences of the participants. If pupils have high visual and auditory learning strengths, they are likely to excel in situations where information is presented through images, diagrams, videos, charts, spoken instructions, or discussions.

Table 2. Descriptive Statistics of Multimodal Learning Preferences

Multimodal Learning Preference	Frequency	Percentage
(Aural, Kinesthetic)	Same	Same
(Visual, Kinesthetic)	frequency	percentage
(Visual, Read, Kinesthetic) (Visual, Auditory, Read)	2	5.3%
Visual, Auditory, Read/Write and Kinesthetic (Visual, Auditory, Read and Write, and Kinesthetic)	6	15.8%
Visual and Auditory	16	42.1%

Learning style theory posits that learners have distinct preferences for how they assimilate new information (Kim, Kurtzman, Collier, Shabahang 2016) and information processing, retention in memory, and recall (Fahim, Rehman, Fayyaz, Javed, Alam, Rana, Jafari, 2021). Several methods have been developed to measure learning styles, including the validated visual, aural, read/write, and kinesthetic (Visual, Auditory, Read/Write and Kinesthetic) questionnaire created by Fleming. He defined the 4 sensory aspects as follows; Visual learners learn by seeing figures, diagrams, films, and maps; Aural learners learn by listening to lectures, discussions, and speeches; Learners with a reading/writing style learn by reading books, course, and notes; Kinesthetic learners learn by touching and experience, physical actions, and working with their hands (Akhlaghi et al., 2018). In this study, the researchers utilized Visual, Auditory, Read/Write and Kinesthetic questionnaire found in online site used it for instant feedback of the learning preference of the grade 6 pupils.

Among the learning style modes, Visual and Auditory was the highest with obtained rate of 36.8% and was identified as most preferred learning style of Grade 6 pupils. In a recent study conducted by these researchers (Fahim et al., 2021) suggests that Academics need to adapt their teaching methods according to student preferences in order to get better graduates. In light of this fact, the researchers came up with the idea to integrate pupils' learning preference within peer-teaching framework. Thereby, the researchers focused on developing peer-teaching activity that catered the identified common learning preference of the grade 6 pupils and was implemented after peer-teaching session.

### Validity Testing of the Developed Activity in Science 6 that Promotes Peer-Teaching

Weighted Mean is the sum of all the data entries divided by the number of entries. This was used to get the average of the 5-point Likert Scale results of the survey-validation tool. The results depict that the average mean value using weighted mean is 4.82; therefore, the developed activity is considered valid to conduct for this research study.

Table 3. Results on the validation of the developed Peer-teaching activity

Content Criteria	Mean/Adjectival Rating				Mean
	Item 1	Item 2	Item 3	Item 4	
Alignment with Objectives and Educational Standards	5.00/SA	5.00/SA	5.00/SA		5.00/SA
Practicality and Clarity	5.00/SA	4.33/SA	4.67/SA	4.67/SA	4.67/SA
Understanding of the Lesson	5.00/SA	4.67/SA	4.67/SA		4.78/SA
<b>Total Average</b>					<b>4.82/SA</b>

Table 3 shows the summary on the validation of the master and science teachers with the developed peer-teaching activity anchored in the subject matter-The Human Digestive System. This ensures that the activity recommended and intended for the students are valid in content and reliable to conduct. Further research on peer-teaching by Chun (2016) also develop and validate a model of peer learning that incorporates scaffolding strategies learning and the results revealed that the model was useful for peers in providing structure and guidance for the design of their peer-learning activities and the selection of appropriate peer learning strategies for learners who had different backgrounds and skills.

As shown in the matrix above, the developed peer-teaching activity obtained a number of Strongly Agree ratings regarding the Alignment of Objectives, Practicality and Clarity, and Understandability of the lesson. The total average of the matrix comprising three content criteria is interpreted as Strongly agree with a numerical rate of 4.82. From the data, it can be noted that the developed peer-teaching activity are high quality as shown by total average mean value rating of the three teacher-validators. Overall, the results indicate adequate validity of the developed activity.

### Narrative Result of the Implemented Peer-teaching approach

To examine the conduct of peer-teaching to the Grade 6 pupils, the researchers lived with the students in the classroom observing and keeping notes of behavior and activities, so the researchers could directly experience the phenomenon being studies (Annum, 2019). It was considered as the third session of the conduct of the study when the researchers exposed the Grade 6 pupils to peer-teaching. The role of the advance learner was clearly introduced by the teacher-researchers through orientation. A teacher-researchers was the role of the researchers and they were the facilitators that managed the whole class. The pupils were instructed with the procedures, rules, and even the objectives of that peer-teaching.

At the onset of the Peer-teaching experience, pupils were most excited to know their partner. However, at the beginning of peer-teaching experience, the researchers observed that there were pupils that lack self-confidence to teach their peers as the teacher-researchers asked whether they are up for the challenge. Based on the perceived class observation, pupils are more likely dependent in acquiring learning from the teacher's instruction but they thought that peer-teaching was interesting, pupils took on the challenge and the peer tutor put their very best on teaching their peers. As part of the preparation of the Peer-teaching approach, planning of the lesson involved interaction with the peer-tutors that were responsible in teaching the struggling learner. The researchers provided learning materials that helped them understand the lesson before teaching to their peers. The participants were elementary pupils and to consider their capacity to teach

their classmates based on the observations that we had during the discussion of the cooperating teacher, the teacher-researchers administered mentorship to address concerns or any difficulties in understanding the lesson.

According to Gal & Fallik (2022), Students are interested in continuing to study through peer-teaching, provided the presence of accompanying teacher is more significant. The researchers as teacher and facilitator provided support or guidance in the peer-teaching experience of the grade 6 pupils, ensuring that pupils encouraged to participate and took responsibly their role in peer teaching. All throughout the implementation of Peer-teaching approach, the researchers observed that good collaboration and bonding were developed with many of the students. Similarly, in a current study of Barahona et al., (2023) the results indicated that the strength of the peer-tutoring program included the development of positive emotions and relationships among students and a classroom environment that fostered warm and supportive relationships.

### Hypothesis Testing

The contemporary research study employed the Homogeneity of Variance Calculator-Levene's Test for hypothesis testing while performing Wilcoxon signed rank test. This was carried out for the analysis of the significant difference between the pre-test and post-test results on the Human Digestive System Test. The Wilcoxon test was applied because the data scores of the 38 grade 6 participants were determined as a non-parametric data Table 4 exhibits test statistics and results details of the Wilcoxon signed rank test. After running the test, the data below was revealed.

**Table 4. Results details on the conduct treatment in the study**

Source	Results Details			F-4.59339
	SS	df	MS	
Between treatments	11.0658	1	11.0658	
Within treatments	178.2712	74	2.4091	
<b>Total</b>	<b>189.337</b>	<b>75</b>		

*Note:* The  $F(1,74) = 4.59339$ ,  $p = .035$ . The assumption of homogeneity of variance is **not met** ( $p < .05$ ).

Table 5 presents the results of Wilcoxon test. Wilcoxon signed rank test was used to test the null hypothesis  $H_0$ - there is no significant difference between the Pre-test and Post-test results in the Human Digestive System test. Since the computed p-value is .035383 which is less than the p-value .05, the researchers reject  $H_0$  (null hypothesis) in favor of  $H_a$  (alternative hypothesis). Hence, there is enough statistical evidence which shows that there is a significant difference between Pre-test and Post-test results on Human Digestive System Test.

**Table 5. Wilcoxon Signed-Rank tests for Pre- and Post-Test Scores**

Measure 1	Measure 2	W	Z	P
Pretest	- Posttest	741.000	5.373	<.001

*Note:* The results indicate a statistically significant difference ( $W = 741.000$ ,  $Z = 5.373$ ,  $p < .001$ )

The significance and implications of the study findings by presenting an encompassing exploration. Peer teaching is an educational technique where collaborative learning takes place, pupils teach each other instead of teacher-student set-up. It can be an effective approach that supports various learning frameworks and theories. (Vygotsky's Sociocultural Theory) this theory emphasizes the importance of social interaction and the role of other or the more knowledgeable peers in the learning process.

This technique fits well within this framework of study, as it encourages active participation, collaboration and communication between students. Social interaction helps shape the cognitive development of every learner. Ideally in peer teaching a more knowledgeable peer (the advanced learner) should be paired to less knowledgeable peer (the struggling learner) through the Zone of Proximal Development (ZPD), so that the advance learner guides the struggling throughout the learning process. Enabling both of the learners to grow and help each other instead of competing with each other.

## CONCLUSION

The current research study has explored the integration of the Visual, Auditory, Read/Write and Kinesthetic model within a peer-teaching framework. Data were collected from 38 Grade 6 participants in Bula District. Wilcoxon signed rank test was applied for hypothesis testing. The study exhibits the key role of the Visual, Auditory, Read/Write and Kinesthetic model by Neil Fleming in developing peer-teaching activity to tailor instructional strategy to pupils' preferred learning styles. The results demonstrate positive impact of the peer-teaching approach when it comes to pupil's understanding of the subject matter based from the statistical evidence presented from the study.

Similarly, this research study is supported by previous study where it also incorporates instructional strategy in peer learning where the results indicate that this model of peer learning was useful for peers in providing structure and guidance for the design of their peer learning activities and the selection of appropriate peer-learning strategies for learners who had different backgrounds and skills. The present research study provides a valuable opportunity for peer teaching which leads to the enhancement of the learning experience of the grade 6 pupils in Bula district, Philippines. Furthermore, the study offers a comprehensive method and practical insights that may contribute to further investigation of related studies, particularly to work out the limitations of the study to obtain more practical implications in the learning process.

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