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The Study of Learning Styles Adopted by First-year Medical Students

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Abstract
Different students have different ways of processing and retaining information. Consequently, taking learning styles into consideration can greatly enhance the student's learning experience and academic success. Learning styles are considered important in learning at University of Medicine and Pharmacy at Ho Chi Minh City because they help teachers understand their students' individual ways of absorbing information. This knowledge can then be used to create personalized educational experiences that cater to each student's strengths and preferences, resulting in better learning outcomes. By recognizing the differences in learning styles, instructors can adjust their teaching methods, instructional materials, and activities to better engage all students and improve their overall education. The VARK questionnaire was used to assess the preferred modes of information presentation among first-year medical students at University of Medicine and Pharmacy at Ho Chi Minh City. Out of 220 students, 90% completed the questionnaire. The results showed that only 34.3% of the students had a preference for a single mode, with the largest group (16.7%) preferring to use all their senses (kinesthetics). The majority of the students (65.7%) preferred multiple modes of presentation, with 25.4% preferring 2 modes, 33.1% preferring 3 modes, and 41.5% preferring 4 modes. Knowing the preferred modes of information presentation can help teachers personalize their teaching methods, avoid a one-size-fits-all approach, and encourage them to use a variety of presentation methods.
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1. Introduction

Continuous learning is a critical aspect of personal and professional growth, but it can be hindered by various challenges. To achieve successful learning outcomes, it is important to understand and address these challenges. One way to do this is by creating a personalized learning plan that takes into consideration the learner's individual needs and preferences. Different students have distinct learning styles and modalities, and it is the responsibility of instructors to recognize and accommodate these differences in their teaching strategies. Some students may have a dominant learning style, while others may switch between different styles depending on the situation. The prevalence and extent of difficulties that medical students experience with learning styles may vary based on individual differences, the educational context, and the specific learning approach of the medical program. Some medical students may face challenges in effectively processing information through their preferred learning styles, while others may need to adapt to a different learning approach in the medical field. It is important for medical schools to assess and address the diverse learning needs of medical students, to support their academic and professional success.

This research aimed to gain a deeper understanding of the different learning modes of medical students at University of Medicine and Pharmacy at Ho Chi Minh City, with the goal of improving teaching methods and enhancing the overall educational experience.

2. Literature Review

Learning is a never-ending process that involves taking actions to achieve a desired outcome. Barriers to learning can slow down or stop this process, but an effective learning strategy can overcome these barriers. One such barrier is a mismatch in the teaching and learning approach, which can occur when methods, techniques, and strategies are used in an inappropriate way. To address this, it is important to recognize the individual learning style of the learner.

Each student has their own unique learning style and preferences that they find most effective and helpful. Some students are able to identify their dominant learning style, while others use different styles in different situations. This makes it crucial for instructors to understand the learning style of their students in order to create a more effective learning environment. By understanding these individual preferences, teachers can match appropriate methods and techniques to the student's learning style, leading to a more productive and successful learning experience. In other words, knowing the student's learning style is the key to unlocking the classroom, and a knowledgeable teacher who is prepared to cater to individual learning styles can make a big difference.

Although most educators are aware of the existence of various learning styles, integrating this into the classroom setting has not been a priority. However, understanding these learning styles can contribute significantly to the success of students in the classroom. The student's success is partly dependent on the teacher's understanding of their learning styles, and adapting the instruction to meet their learning preferences can lead to improved student motivation and performance.

As medical educators, it is our responsibility to evaluate and impart knowledge, attitudes, and skills to our students, and lectures can be made more impactful when we cater to the diverse learning needs of all students (Winn and Grantham, 2005). Motivation and performance of students are known to improve when the teaching method aligns with their preferred learning style.

The concept of "learning styles" has been around in the education literature for the past three decades and is often considered a broad and somewhat ambiguous term (Bedford, 2006). A learning style is defined as a set of stable cognitive, affective, and physiological characteristics that indicate how a student processes and responds to learning information (Lujan and DiCarlo, 2006). Many educational researchers believe that each individual has a unique learning style (Collins, 2004). One way of categorizing learning styles is to determine a student's preferred mode of learning based on the sensory modality they use to absorb new information (Fleming and Mills, 1992).

Fleming and Mills (1992) identified four sensory modalities of learning: visual, auditory, read-write, and kinesthetic. Visual learners tend to prefer visual aids such as diagrams, graphs, and charts while read-write learners prefer written information in the form of textbooks, notes, and handouts. Auditory learners prefer to receive information through verbal means such as lectures and tutorials. Kinesthetic learners, on the other hand, learn best through hands-on experiences, simulations, and real-life examples. Some students may have a clear preference for one modality while others are multimodal learners who benefit from multiple methods (Fleming, 1992).

The field of education has seen a plethora of diverse learning style inventories over time. These inventories are based on information processing models that aim to describe an individual's preferred method of absorbing information (Snelgrove, 2004). One of the most commonly used inventories is the Visual, Auditory, Read/Write, and Kinesthetic (VARK) questionnaire, which was developed by Neil Fleming. This questionnaire can be used to aid instructors in their selection of teaching and assessment strategies. Utilizing VARK preferences can help students develop additional and effective study skills, leading to better examination performance (Zhang, 2002).

The VARK model classifies students into four different learning styles, which include Visual, Auditory, Reading/Writing, and Kinesthetic. Each learning style has a distinct method of interpreting information, referred to as "preferred learning modes." For visual learners, images, maps, and graphic organizers are the best ways to access and comprehend new information. Auditory learners benefit from group discussions and listening to lectures, and they use mnemonic devices and repetition as a study strategy. Read and Write learners learn best through written words, and they may present themselves as avid readers or note-takers, who translate abstract concepts into written words and essays. On the other hand, kinesthetic learners understand information best through a tactile representation of data (Cherry, 2019). These students are hands-on learners and learn best through trial and error.

Identifying students' learning styles through the VARK model can improve their academic confidence by allowing them to access information in a manner that they are comfortable with. It also provides teachers with a better understanding of how to incorporate these learning styles into their lesson plans and study techniques, thereby creating a more effective learning environment for students.

The key concepts of the VARK model, which was developed by Neil Fleming and later expanded upon by authors such as Baume (2006), are centered on the idea that behavior and learning play a significant role in shaping an individual's preferred learning style. The preferred learning modalities should then be matched with appropriate learning strategies for optimal results in terms of comprehension, motivation, and metacognition.

A study by Sun (2009) investigated the impact of attitude formation on individual learners and found that learner's perceptions, personality traits, and situational experiences can all play a role in shaping their attitudes towards learning. Hatami (2012) similarly argued that learning style is not a measure of ability, but rather a preferred method for using one's abilities. The motivations for studying learning styles, as described by Sternberg and Grigorenko, include improving educational achievement, facilitating vocational selection, and enhancing instruction and potential placement.

Reid (1995) highlights that individuals have different learning styles, meaning they naturally and habitually absorb, process, and retain information in different ways. This aspect of learning styles is crucial in helping teachers understand how to effectively deliver lessons that can be easily understood by their students (Busilaoco et al., 2014). In a study conducted by Rezaeinejad (2015) on the relationship between learning styles and educational achievement among Iranian high school students, he found that by understanding the students' learning styles, teachers can adjust their teaching strategies and increase student success.

The central focus of the Philippines' DepEd K to 12 Basic Education Program (2012) is on the learner as the

primary reason for the entire curriculum system. The program is designed to promote holistic learning and growth of the students, with the instructor playing a supportive role in creating a learning environment that is engaging and supportive. This approach aims to empower students to take responsibility for their learning, both in the classroom and beyond, and to make informed choices about their education.

One approach that can foster a strong connection between the teacher and student is the student-centered approach (Lathan, 2021). In this approach, the teacher acts as a facilitator, coach, and mentor, helping the student to navigate their learning journey. For this approach to be successful, it is essential for the teacher to understand the students' preferred learning styles. When students are aware of their learning styles, they are better equipped to take advantage of the opportunities presented by this approach.

The relationship between teaching and learning styles is a critical factor in determining the success of student learning and development. As such, researchers have devoted significant attention to identifying and understanding students' learning styles. By taking into account both teaching and learning styles, educators can create an environment that fosters optimal learning outcomes.

3. Methodology

In October 2022, a study was conducted at the Department of Foreign Languages at University of Medicine and Pharmacy at Ho Chi Minh City. The aim of the study was to assess the preferred learning modes of first-year medical students. To do this, the VARK questionnaire designed by Fleming was distributed to two classes of 220 students during a medical English class. The questionnaire was handed out in a hard copy format and was selected for its brevity and ease of completion.

Out of the 220 students, 198 (90%) participated in the study after being informed about the purpose of the research. The VARK questionnaire, found at http://www.vark-learn.com, posed questions aimed at placing the respondents in a learning scenario, allowing them to omit a question or choose two or more options if they felt that was appropriate.

The questionnaires were evaluated using previously validated scoring instructions and a chart. The results were calculated by dividing the number of students who preferred each mode of learning by the total number of responses to find the percentage of students in each category.

4. Results

The tables and figures presented below display the outcome of the survey on the learning styles of the first-year medical students at University of Medicine and Pharmacy at Ho Chi Minh City.

Table 1. *Students' learning styles*

Learning styles	**N**	**P**
Visual	12	6.0%
Auditory	9	4.5 %
Reading/ Writing	14	7.1%
Kinesthetic	33	16.7%
Multiple modes	130	65.7 %

The data shown in Figure 1 displays the break down of first-year medical students at the University of Medicine and Pharmacy at Ho Chi Minh City in terms of their preferred learning styles. Out of the total 198 students who completed the survey, only 6.0% (12 students) preferred visual methods, 4.5% (9 students) favored auditory approaches, 7.1% (14 students) preferred reading/writing, and 16.7% (33 students) had a kinesthetic preference. The majority, 65.7% (130 students), opted for multiple modes of information presentation. On the other hand, only 34.3% (68 students) of the students preferred a solitary mode, either visual, auditory, reading/writing, or kinesthetic.

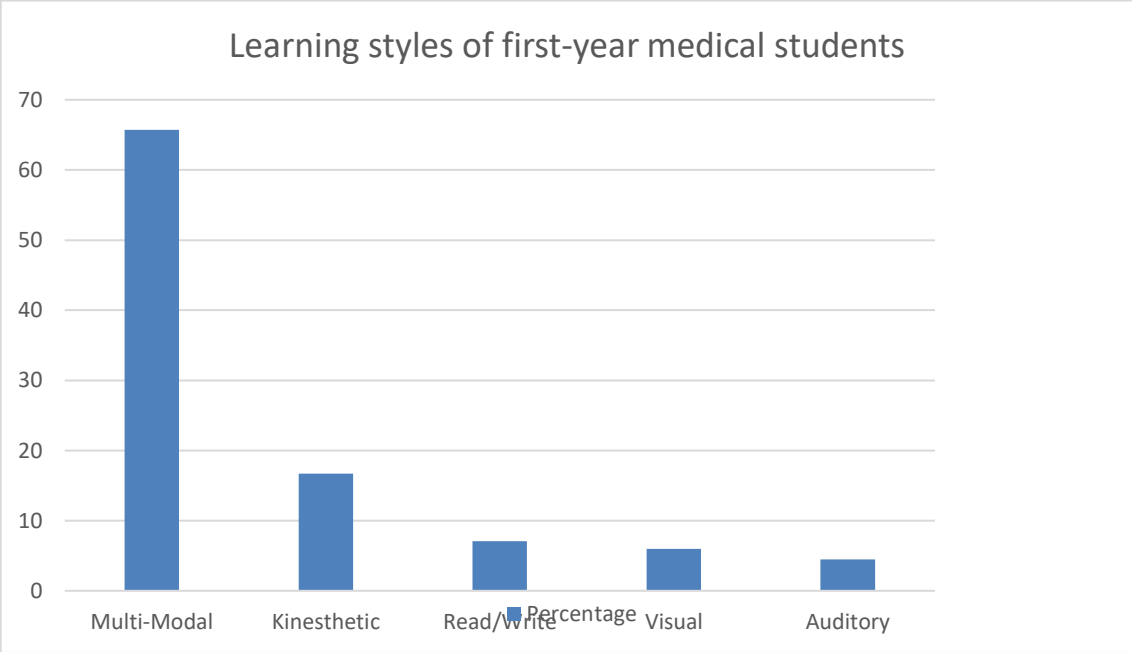

Figure 1. *Learning styles of first-year medical students*

Table 2. *Students' multiple mode of learning*

Learning styles	**Number**	**Percentage**
Two modes (Bimodal)	33	25.4%
Three modes (Trimodal)	43	33.1%
Four modes (Quadmodal)	54	41.5%

Figure 2 displays the percentage of students who preferred using a combination of two, three, or four modes of information presentation. 25.4% (33 students) of the students preferred using two modes, 33.1% (43 students) preferred using three modes, and 41.5% (54 students) favored utilizing four modes. The majority of the students, 74% (97 students), chose to use three or four modes of information presentation.

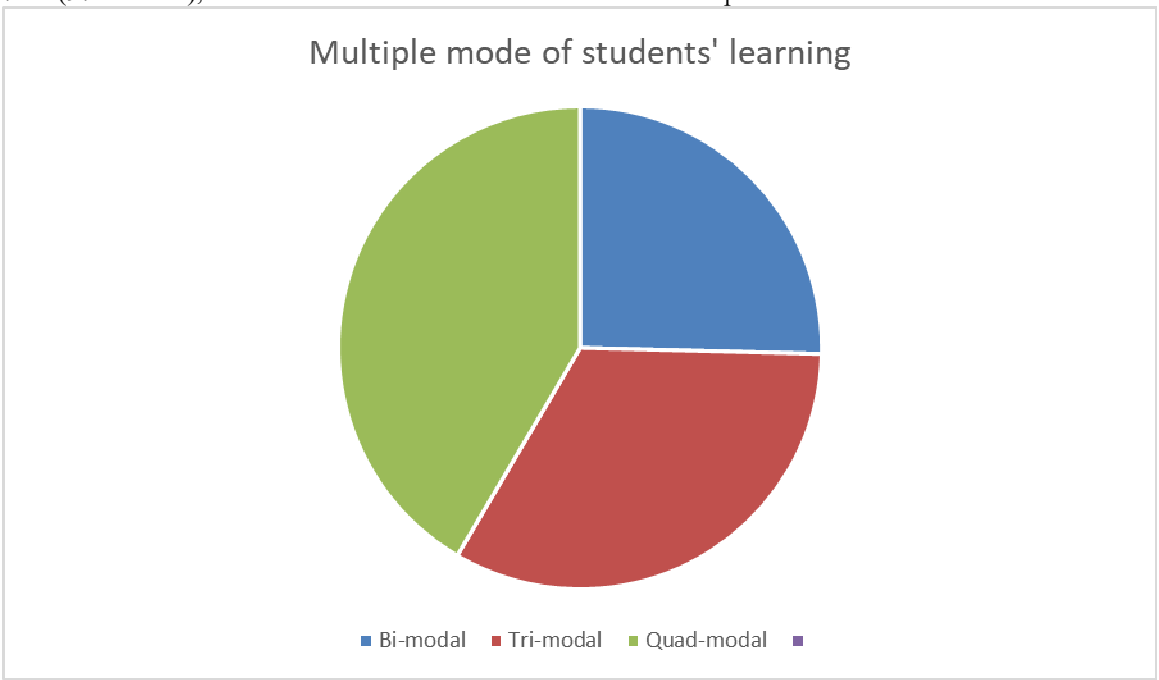

Figure 2. *Multiple mode of students' learning*

Table 3. *Specific multiple mode of learning*

Multimodal	Number	Percentage
Visual, reading/writing, and kinesthetic (VRK)	16	12.3 %
Visual, auditory, kinesthetic (VAK)	12	9.2%
Auditory, reading/writing, and kinesthetic (ARK)	15	11.5%
Visual and reading/writing (VR)	7	5.4%
Visual and kinesthetic (VK)	6	4.7%
Visual and auditory (VA)	2	1.6%
Auditory and reading/writing (AR)	9	6.9%
Reading/writing and kinesthetic (RK)	9	6.9%
Visual, auditory, reading/writing, and kinesthetic (VARK)	54	41.5%

In the group of students who chose three modes of learning, a number of them favored a combination of visual, reading/writing, and kinesthetic (12.3% or 16 students), some selected visual, auditory, and kinesthetic (9.2% or 12 students), and others chose auditory, reading/writing, and kinesthetic (11.5% or 15 students). Among those who preferred two modes, some selected visual and reading/writing (5.4% or 7 students), others chose visual and kinesthetic (4.7% or 6 students), a few preferred visual and auditory (1.6% or 2 students), some selected auditory and reading/writing (6.9% or 9 students), and others chose reading/writing and kinesthetic (6.9% or 9 students). Lastly, in the group that preferred four modes, all students picked visual, auditory, reading/writing, and kinesthetic (41.5% or 54 students).

5. Discussion and Recommendations

In education, it is vital to have a good understanding of the learning styles of students. This understanding can play a critical role in helping educators identify and address learning problems among students, resulting in more effective learning outcomes. One of the frameworks used to uncover the learning styles of students is the VARK model, which categorizes students as visual, auditory, reading/writing, kinesthetic or a combination of these.

Visual learners are those who learn best by watching. They tend to remember information presented in visual forms like pictures, diagrams, flow charts, timelines, and demonstrations. Tools like digital whiteboards and recorded lectures are ideal for this type of learner. According to Felder & Solomon (2007), visual learners find visual representations of course material that is primarily verbal to be very useful in learning. They utilize concept maps that list key points, connect them using lines, and represent them in boxes or circles. They also like to color code their notes using a highlighter so that all information related to a particular topic is the same color.

On the other hand, auditory learners learn best through listening. These students may get bored when they have to watch videos but are able to concentrate on content delivered through audio sources, like podcasts. Auditory learners are likely to enjoy one-on-one discussions where they can ask questions and get answers directly. They also benefit from recorded lectures, as they can focus on the teacher's words without having to look at the speaker.

In conclusion, understanding the learning style of students is a crucial aspect of education that can aid educators in ensuring more effective learning outcomes for their students. The VARK model provides a useful tool to determine the learning styles of students and tailor educational materials and activities to their preferred methods of learning.

Reading has been and continues to be the primary mode of learning in much of the educational world. In the past, learning was based on reading and writing, and even today, many schools still emphasize these skills in their curriculum, with a focus on reading comprehension and writing assignments. While some students may struggle with reading and need to supplement their learning through other means, many students still excel through this method and love to read. Handouts and reading materials are still the best options for these students, and in an online learning environment, they can be easily accessed through the internet.

Another learning style is kinesthetic, which is learning through doing. For these students, hands-on learning experiences in a school or through extracurricular activities would be the most effective method of learning. This type of learning can be achieved through activities such as artistic projects, scenario-based learning, and role-playing to solve real-life problems.

The present study has revealed that most students exhibit multimodality when learning information, which means they use a combination of learning styles. This finding aligns with previous studies that have used the VARK questionnaire as a learning style inventory. For example, Dinakar (2005) found that 58% of the caregivers of asthmatic children were multimodal learners, while Lujan (2006) found that 63.8% of first-year medical students and Murphy (2004) found that 56% of dental students were multimodal. Multimodal students require information to be presented in various modes and do not learn effectively from simply sitting in a classroom listening to the teacher. To facilitate meaningful learning, these students must engage in a variety of activities such as talking about what they are learning, writing about it, relating it to previous knowledge and

experiences, and applying it to their daily lives.

In a passive lecture format, it is commonly assumed that all students are auditory learners, but the present study found that only 7.7% of the students were single auditory learners. It is important to note that students tend to retain more information when they say, hear, see, and do it, as compared to just reading or hearing it. For example, students will only remember 20% of what they read, 30% of what they hear, 40% of what they see, 50% of what they say, and 60% of what they do. This average increases to 90% when they say, hear, see, and do the information.

The impact of teaching on students' learning and achievement has been extensively researched over the years, with a growing body of evidence suggesting that learning styles are crucial to the understanding and retention of material. According to a study by Busilaoco et al. (2014), the way in which materials are presented can have a much greater impact on learners' achievement than what is actually being taught. In a separate study by Rezaeinejad (2015), it was found that when teachers understand their students' learning styles, they can tailor their teaching strategies to better engage and educate their students, leading to increased educational achievement.

Given these findings, it's important for teachers to incorporate active learning strategies into their teaching methods. Active learning strategies are designed to target different learning styles by incorporating a variety of multisensory activities, including visual aids and demonstrations, discussions and peer instruction, role-playing and simulations, and games. These strategies have been shown to increase students' motivation and enthusiasm, while also promoting problem-solving and decision-making skills. For example, medical students can benefit from active learning strategies, as they allow students to adjust to different teaching styles, and to opt in and out of alternative strategies as needed.

In addition to catering to different learning styles, active learning strategies also promote teamwork and collaboration, which will become increasingly important in the future job market. Furthermore, studies have shown that active learning strategies can lead to an increase in students' achievement, and students generally express positive feelings about the experiences. For all these reasons, it's clear that active learning strategies can be far more effective than traditional lecture formats in promoting deep learning and understanding.

It is crucial for teachers to assess the learning styles and preferred learning modalities of their students at the beginning of each class. This baseline information provides teachers with important guidance in terms of how to effectively reach their students. For example, it is essential to address the needs of visual learners by providing instructional materials that allow them to see what they are learning. Additionally, teachers must also attend to the needs of auditory, read/write, and kinesthetic learners by offering a variety of activities that cater to their specific needs. There must be an equitable and equal approach to addressing the interests, conditions, and abilities of all students.

It is important for teachers to align their teaching strategies and approaches with the learning styles and preferred learning modalities of their students. The goal of this study was to provide insight into how to design lesson plans that effectively address the needs of all students and to identify areas for future research. This study raised several questions regarding learning styles, such as whether multiple-mode learners perform better in the classroom than single-mode learners, and if one mode should be used more than another from the instructor's perspective. There is also an interest in exploring the correlation between grades and learning styles for specific classes, such as whether kinesthetic learners perform better in laboratory classes and aural learners perform better in lecture classes. Additionally, there is a question regarding the effects of gender on learning styles.

6. Conclusion

Knowing your students’s preferred learning style is essential in ensuring an effective education. The VARK questionnaire determines a student's preferred mode of information presentation. Different students have varying learning styles and it's the responsibility of the teacher to cater to this diversity by creating appropriate learning approaches. The COVID-19 pandemic has brought about new and exciting opportunities for online learning, making it more important than ever to understand and form a study plan based on your preferred learning style. This can greatly impact the way students study, learn, and view education as a whole. Teachers everywhere have been guiding students in discovering their best learning style from visual, auditory, reading or kinesthetic. It is essential for the educator to address the diverse learning styles of their students and tailor their teaching methods accordingly. Knowing the preferred learning style of each student can enhance the educational experience.

It is not specified in general that medical students have a different learning style compared to other students. Every individual has their own unique learning style and preferences, and this can vary across different subjects and levels of education. However, medical education, especially at University of Medicine and Pharmacy at Ho Chi Minh city, often requires a strong emphasis on visual, auditory, and hands-on learning as it involves complex concepts and practical skills. This could lead to a greater emphasis on these learning styles among medical students compared to students in other fields. However, it's essential to note that every student has unique learning preferences, and these may not necessarily be the same across all medical students.

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