

The Analysis of Learning Model By “Vark” on Students’ Satisfaction: The Case of Mongolian National University of Education

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Abstract

The aim of this study is to analyze the VARK model based on the idea that different people have different preferences for how they learn best, and it includes four different styles: visual, aural, reading/writing, and kinesthetic. By incorporating teaching methods that appeal to these different learning styles, teachers can create a more engaging and effective learning environment.

Firstly, our study designed that the study design was based on existing research from international sources and the main theory of cognition in higher education institutions. This suggests that the researchers reviewed prior studies and theories to develop their own study design.

Secondly, we analyzed four hypotheses, and all of them had a positive relationship with considered impacts. The result of data was determined online between January and March of fiscal 2023. There were 168 students who study at Mongolian National University of Education participated in our study.

Thirdly, we used two different software programs to analyze their data: SMART PLS 3.0 and SPSS 25.0. By using these tools, we were able to analyze and interpret their data to draw conclusions about their hypotheses.

Finally, we analyzed that the researchers conducted a study based on existing research and theories, developed and tested hypotheses, collected data online, and analyzed that data using statistical software. The results of our analysis suggest that four hypotheses were supported in this study.

Keywords: VARK model /Visual, Aural, Reading and writing, Kinesthetic/, Teaching methods, students' satisfaction, Mongolian National University of Education (MNUE).

1. Introduction

In the knowledge era, where information is readily available and technology is advancing at a rapid pace, e-learning has become a vital component in education. Education is the process of transferring knowledge, values, methods, skills, and beliefs from one individual to another.

Teachers have a role in ascertaining the implementation of quality lessons. As such, teachers are required to have capacity to create a learning process which stimulates students, in order to attract attention to the subject taught. This working paper will discuss on the advantages of VARK (Visual, Aural, Reading or Write and Kinesthetic) model as an effective learning style.

The VARK model can be an effective learning style for teachers to use because it allows them to create a more engaging and effective learning environment by incorporating a variety of teaching methods that appeal to different learning styles. Teachers who are familiar with the VARK model can use it to identify their students' learning styles and adapt their teaching methods to better suit their students' needs.

We tried to establish the significant impact such as: visual, aural, reading/writing, and kinesthetic mode on students' satisfaction in our study. So, we have studied the impacts of teaching methods, VARK model on satisfaction and students' satisfaction in higher education institutions in this study.

2. Conceptual Theoretical Framework

2.1 Students' Satisfaction

When discussing students' satisfaction, it is important to have a clear understanding of what satisfaction means. Satisfaction can be defined in different ways depending on the context and the perspective of the person using the term.

Without a clear definition of satisfaction, it can be difficult to accurately measure or understand students' satisfaction levels and to develop effective strategies for improving it. Therefore, clarifying what satisfaction means is a crucial step in any discussion about students' satisfaction.

In Cambridge dictionary, Satisfaction is a pleasant feeling that you get when you receive something you wanted, or when you have done something, you wanted to do.

Firstly, Satisfaction refers to the positive emotional state that arises when a person's needs or desires are fulfilled. This definition is often attributed to Abraham Maslow (1908-1970), who is American psychologist and developed a hierarchy of needs. According to Abraham Maslow's theory, individuals must satisfy lower-level needs before they can progress to higher levels of the hierarchy. In other words, the satisfaction of lower-level needs is a prerequisite for the fulfillment of higher-level needs [1].

The hierarchy of needs proposes that human behavior is motivated by five distinct categories of needs arranged in a hierarchical order as below:

At the first of the hierarchy are physiological needs, which are basic biological requirements for human survival, such as food, water, shelter, and warmth. These needs are considered the most fundamental, as they must be satisfied before an individual can move up to higher levels of the hierarchy.

The second level of the hierarchy is safety needs, which include physical safety, security, stability, and protection from harm. This level includes needs such as job security, financial stability, and protection from physical threats.

The third level is love and belonging needs, which involve social interactions and relationships with others. This level includes needs such as love, affection, friendship, and a sense of belonging in a community or group.

The fourth level is esteem needs, which involve a desire for self-esteem, respect from others, and recognition for achievements. This level includes needs such as self-confidence, achievement, reputation, and prestige.

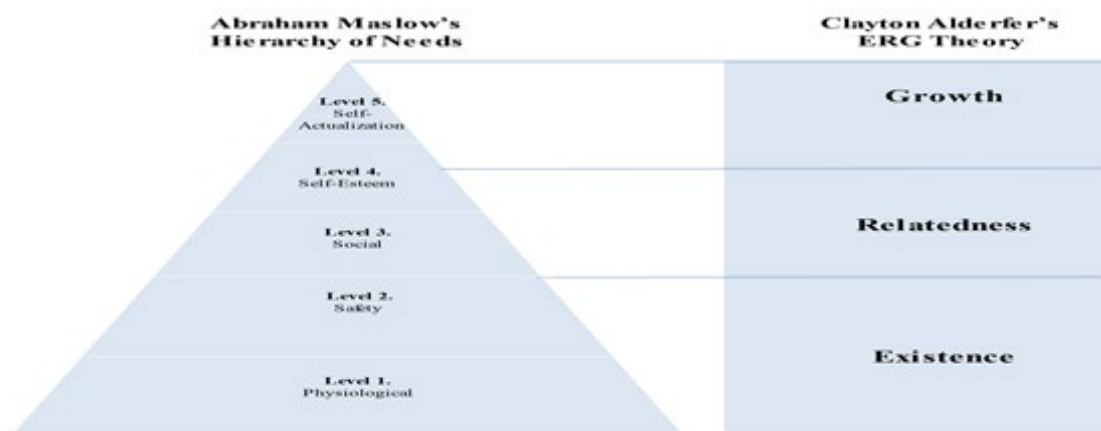
The fifth and final level of the hierarchy is self-actualization needs, which involve a desire to reach one's full potential and achieve personal growth and fulfillment. This level includes needs such as creativity, spirituality, self-expression, and personal development.

Secondly, satisfaction is the feeling of contentment or fulfillment that results from achieving a desired outcome or goal. This definition is often associated with Clayton Alderfer, a psychologist who expanded upon Maslow's hierarchy of needs to create the Existence Relatedness and Growth (ERG) theory of motivation. According to this theory, individuals may experience frustration and regression if their needs in one category are not being met, which can impact their overall satisfaction. Therefore, satisfying needs across all three categories is important for achieving satisfaction and motivation.

At a basic level, people have existence needs, followed by relatedness needs for satisfying interpersonal relationships, and finally growth needs for personal development through high-quality and meaningful work. Alderfer's theory builds on Maslow's hierarchy by simplifying the number of needs and broadening their scope. While there is a general order for pursuing needs, Alderfer's theory acknowledges that priorities can change depending on the person and situation [2].

The flexibility of ERG Theory makes it practical for leaders to address a variety of need levels for everyone. Organizations should provide good working conditions, positive working relationships, and development opportunities to satisfy existence, relatedness, and growth needs. Personal circumstances can cause a shift in a person's needs and motivations, and short- and medium-term priorities may change. Even if a person is satisfied with their work and relationships, major life events like a divorce can shift their focus to existence needs while still valuing relatedness and growth needs [3].

In our study compared the main theory between Abraham Maslow's Hierarchy of needs and Clayton Alderfer's ERG theory in our study as below.



Model 1: The comparison of models of Maslow's and Alderfer's of needs

Noted: The results of study

Maslow's Hierarchy of Needs and ERG Theory share similarities as both are content theories that focus on basic needs and have a similar structure of need categories. Alderfer's ERG theory built on Maslow's hierarchy by grouping the five needs further. Also, both theories also emphasize upward movement of motivation based on hierarchy.

There are dissimilarities between Maslow's Hierarchy of Needs and ERG Theory proposed by Alderfer are as below:

Maslow's theory emphasizes a hierarchy of needs, while Alderfer's ERG Theory focuses on a continuum of needs without strict hierarchical levels. But ERG Theory does not maintain sharp boundaries between different types of needs, whereas Maslow's theory has a clear hierarchy of needs. Also, Alderfer's ERG Theory allows for downward movement in the hierarchy, including frustration regression, whereas Maslow's theory suggests that once a need is satisfied, it no longer motivates behavior. Next, Alderfer's theory recognizes the influence of an individual's personal background and environment, which can cause related needs to take precedence over basic existence needs, whereas Maslow's theory assumes a universal hierarchy of needs.

Higher education has experienced significant transformations in the last two decades, including the emergence of online learning as a viable alternative for institutions to provide flexible and interactive education. Ahmad El Zein, Nisreen Hilal and et all (2023), identified and studied that an opportunity that would grant them a greater access to a larger body of students who have difficulties in accessing on-campus education such as during crises and pandemics.

Also, online learning is usually defined as an electronic learning environment where instructors meet with their students to deliver, share and discuss any material that was previously delivered through an offline face to face educational environment (Coman et al., 2020).

The scholars defined that there are lots of factors, models contribute to contribute to students' satisfaction with online learning include accessibility, quality of instruction, flexibility, social interaction, and assessment and feedback. Students are likely to be satisfied if they have easy access to course materials, user-friendly platforms, and technical support.

We clarified three concepts such as pedagogy, curriculum and assessment in our study. Pedagogy refers to the methods and strategies used to teach and facilitate learning. It involves how educators deliver instruction, engage students, and provide opportunities for active learning. Curriculum refers to the planned learning experiences and activities designed to achieve specific learning outcomes. It encompasses what is to be taught, the order in which it is taught, and how it is taught. Assessment refers to the process of collecting and analyzing information about student learning, using a variety of tools and techniques such as tests, exams, projects, and portfolios. Assessment is used to evaluate student progress, identify areas of strength and weakness, and guide instructional decisions.

Also, we pointed Virtual Reality (VR) Training. The VR training method that uses virtual reality technology to create realistic simulations of real-world situations and can be particularly useful for training in high-risk or dangerous environments.

VR Training is a type of training that utilizes virtual reality technology to simulate real-world situations for training purposes. VR training typically involves the use of a VR headset and specialized software that creates a 3D environment that mimics real-world conditions.

One of the key advantages of VR training is that it can provide a high degree of realism and immersion, which can enhance the learning experience. Trainees can interact with the virtual environment in a way that is similar to how they would interact with the real-world environment, which can improve their ability to trans-

fer learned skills to real-world situations.

Another advantage of VR training is that it can provide a safe and controlled environment for trainees to practice skills that are difficult to train in real-world situations. For example, pilots can practice emergency procedures in a simulated environment without risking the safety of the crew or passengers.

VR training is a valuable training method that can enhance the effectiveness and efficiency of training programs in high-risk or dangerous environments. It provides a safe and controlled environment for trainees to practice skills and develop expertise, which can improve their performance in real-world situations.

The quality of instruction can be improved using engaging multimedia tools and techniques that are aligned with learning goals. Flexibility in scheduling and pacing can be appealing to students with other commitments, and asynchronous learning can allow students to complete assignments at their own pace. Providing opportunities for social interaction through discussion boards, group projects, and online office hours can help mitigate the lack of face-to-face interaction. Regular assessment and feedback can help students track their progress and understanding of course materials. Then, we collected and chose VARK model in our study.

2.2. VARK Model and Students' Satisfaction

The concept of learning style refers to the different ways in which individuals perceive, process, and retain information. The learning style have a complex combination of cognitive, affective, and psychological factors that influences how learners interact with and respond to their learning environment.

We collected three styles of learning in our study such as cognitive aspect, affective aspect and psychological aspects. The cognitive aspect of learning style refers to the mental processes that individuals use to acquire, process, and apply knowledge. The affective aspect relates to the emotional and motivational factors that impact learning, such as attitudes, beliefs, and values. The psychological aspect includes personality traits, learning preferences, and other individual differences that can influence how learners' approach and engage with their learning. In summary, learning style is a multifaceted construct that can provide insights into how individuals learn and how to design effective learning experiences for them.

Therefore, we aim to explore the relationship between the VARK model of learning styles and students' satisfaction with their learning experiences. The VARK model is a widely used framework for understanding individual differences in learning styles, which categorizes learners as visual, auditory, reading/writing, or kinesthetic [4]. By examining how students' learning preferences align with their satisfaction levels, we hope to provide insights into how educators can design more personalized and effective learning experiences that meet students' diverse needs and preferences in this study.

3. The VARK Model

VARK learning style model is a learning style that has been modified from VAK model, to VARK learning style by Neil Fleming in 2006 [5].

Based on Fleming (2006), aural mode students tend to attain information by discussion and listening. For reading mode, these students can accept and interpret printed information. For visual mode, the students are more prone to accept learning through interpreting charts, graph figures, and pictures. While kinesthetic mode leans more towards accepting learning based on behavior such as touch, feel, see, and listen. Based on each mode's tendency, researchers hope to conduct a study to obtain students' feedback on computer-based learning.

This learning style is modified by classifying students to four different modes. The modes based on different senses, namely visual, aural, reading, and kinesthetic, and the name of the model itself, originated from those senses prefix letters (V, A, R, and K). According to Ismail (2010) dividing students according to mode is necessary so that the effectiveness of each lesson to different VARK learning mode can be observed.

• Visual (V)

Visual learners prefer to learn through visual aids such as diagrams, videos, and images. They tend to remember information better when it is presented in a visual format.

Visual learners are individuals who prefer to learn through visual aids such as diagrams, videos, and images. They find it easier to understand and remember information when it is presented in a visual format. This means that they are more likely to be engaged in learning when there are visual aids to support the material being taught.

Visual learners often have strong spatial awareness and are able to visualize concepts in their mind's eye. They are also able to pick up on subtle visual details and patterns that others may overlook. This makes them particularly good at tasks that require attention to detail and the ability to notice patterns.

Visual learners tend to enjoy activities such as reading books and watching videos that contain rich visual content. They also tend to be strong at remembering faces and locations, and may use visual cues such as mental images or maps to help them remember information.

In a learning context, instructors can use visual aids such as diagrams, charts, and videos to help visual learners understand and remember the material being taught. This can be particularly useful in subjects such as science, math, and geography where visual representations can be used to illustrate complex concepts. In addition, visual learners may benefit from using tools such as mind maps or graphic organizers to help them organize information and create visual connections between concepts [6].

• **Aural (A)**

Aural learners prefer to learn through sound and music. They enjoy listening to lectures, discussions, and music to help them remember information. Aural learning, also known as auditory learning, is a learning style where individuals prefer to learn through sound and music. People with this learning style typically enjoy listening to lectures, discussions, and music to help them remember information.

Aural learners are often able to remember information better when they hear it rather than read it. They may benefit from audio books or podcasts, and they may prefer to listen to recordings of lectures rather than taking written notes.

In order to maximize their learning potential, aural learners may find it helpful to study in a quiet environment to reduce distractions and to use tools like earplugs or noise-cancelling headphones to block out external noise. They may also find it helpful to listen to recordings of lectures or discussions multiple times to reinforce the information.

Aural learners may also benefit from using mnemonic devices or music to help them remember information. For example, they may create a song or rhyme to remember a list of items or use a catchy phrase to help them remember a concept.

Overall, aural learners can be very effective learners when provided with the right tools and resources to support their learning style. By incorporating sound and music into their study routine, aural learners can enhance their retention of information and improve their overall academic performance [7].

• **Read/Write (R)**

Read/write learners prefer to learn through reading and writing. They enjoy reading textbooks and taking notes, and they tend to remember information better when they write it down.

Read/write learners are individuals who prefer to learn through reading and writing. They enjoy reading textbooks and taking notes, and they tend to remember information better when they write it down. This means that they are more likely to be engaged in learning when there are text-based materials to support the material being taught.

Read/write learners often have strong verbal skills and enjoy expressing themselves through writing. They also tend to be good at organizing information and creating outlines or summaries of what they have read. This makes them particularly suited to tasks that require strong written communication skills and attention to detail. Read/write learners tend to enjoy activities such as reading books, writing essays or reports, and taking detailed notes during lectures. They also tend to be strong at remembering written information such as names, dates, and facts.

In a learning context, instructors can use text-based materials such as textbooks, handouts, and lecture notes to help read/write learners understand and remember the material being taught. This can be particularly useful in subjects such as history, literature, and law where written communication skills are important. In addition, read/write learners may benefit from using tools such as flashcards or creating their own study guides to help them organize information and review key concepts [8].

• **Kinesthetic (K)**

Kinesthetic learners prefer to learn through physical activity and hands-on experiences. They enjoy doing experiments, participating in group projects, and taking part in role-playing exercises.

Kinesthetic learners are individuals who prefer to learn through physical activity and hands-on experiences. They enjoy doing experiments, participating in group projects, and taking part in role-playing exercises. This means that they are more likely to be engaged in learning when there are opportunities to be physically active and interact with the material being taught.

Kinesthetic learners often have strong motor skills and enjoy using their bodies to express themselves. They tend to be good at sports, dance, and other physical activities that require coordination and balance. They also tend to be good at solving problems by using trial-and-error methods [9].

A hypothesis is an educated guess or prediction about the relationship between two or more variables, based on prior knowledge or observation. It is a tentative explanation for a phenomenon or problem, which can be tested through empirical research. The conceptual model of factors on students' satisfaction is drawn in Figure 2.1.

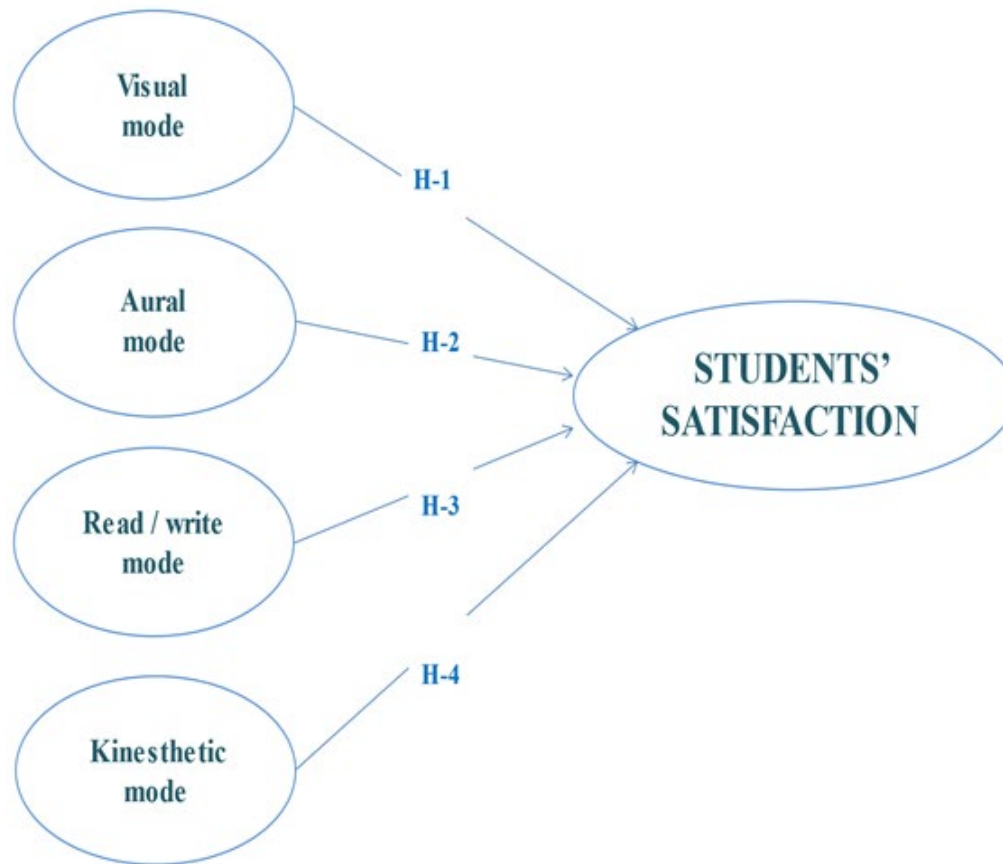


Figure 2.1: Conceptual models of factors on students' satisfaction

Source: Own diagram

Thus, according to the literature reviews and concepts, we were hypothesized as below:

Hypothesis 1. Visual mode will a positive influence on students' satisfaction.

Hypothesis 2. Aural mode will a positive influence on students' satisfaction.

Hypothesis 3. Read/write mode will a positive influence on students' satisfaction.

Hypothesis 4. Kinesthetic mode will a positive influence on students' satisfaction.

3. Research Methodology

3.1 Data Collection and Design of Questionnaire

Research methodology refers to the process of designing, planning, and conducting a research study, using appropriate methods and techniques to gather and analyze data. A sound research methodology is crucial for ensuring the validity and reliability of research findings and conclusions, and for ensuring that the research meets ethical and professional standards.

Data collection is a critical component of any research study, and involves the process of gathering information or data on a specific topic or research question.

The qualitative survey is a research method used to gather information about people's attitudes, opinions, and experiences. In our study, the questionnaire method was chosen to collect primary data for our research question.

Firstly, we have identified your target population as students who study at Mongolian National University of Education. The questionnaire method allows you to reach a large number of respondents within this target population, making it an efficient way to gather data.

Secondly, we have chosen to use an online platform, specifically Google Forms, to collect your questionnaires. This method allows you to distribute the questionnaires quickly and easily, and it also allows respondents to complete the questionnaires at their convenience.

Finally, using an online platform helped to reduce costs associated with printing and distributing paper questionnaires in our study.

There are many different scales used in social science research, each designed to measure different constructs or variables as below:

Likert scales: These are used to measure attitudes, opinions, and beliefs. Respondents rate their level of agreement or disagreement on a scale ranging from 1 to 5 or 1 to 7.

Thurstone scales: These are similar to Likert scales but use a more precise method of rating. Respondents rate a series of statements on a scale of 1 to 11 based on how strongly they agree or disagree, and the responses are used to calculate a score for each statement.

Semantic differential scales: These measure the connotative meaning of a concept or object by presenting bipolar adjectives and asking respondents to rate the object on each dimension.

Guttman scales: These measure the extent to which individuals endorse increasingly extreme statements. Respondents indicate agreement or disagreement with a set of statements that become progressively more extreme [10].

Visual analogue scales: These are used to measure subjective experiences such as pain or mood. Respondents mark a point on a line or scale that corresponds to their level of the experience being measured.

We used in our study, **Likert five-point scales**, a commonly used method of measuring attitudes, opinions, and beliefs. The Likert scale consist of a statement or question followed by a range of

responses that individuals can choose from to indicate their level of agreement or disagreement with the statement/question. Also, it has the response options usually range from strongly agree to strongly disagree, with a neutral midpoint.

In our study being discussed, we chose to use two software programs, SPSS and SmartPLS-3.0, for their data analysis. SPSS (Statistical Package for the Social Sciences) is a commonly used statistical software program that allows for the analysis of quantitative data. Another one is SmartPLS-3.0.

The SmartPLS-3.0 is a more advanced software program that is specifically designed for structural equation modeling (SEM) analysis. SEM is a statistical method used to test complex theoretical models and relationships between variables [11].

SmartPLS-3.0 have advantages allow to us construct and test SEM models, and also it had been providing visualization tools to help interpret the results.

In the research study being discussed, the authors collected data from 106 male and 96 female students. This is basic demographic information that provides an overview of the sample population being studied.

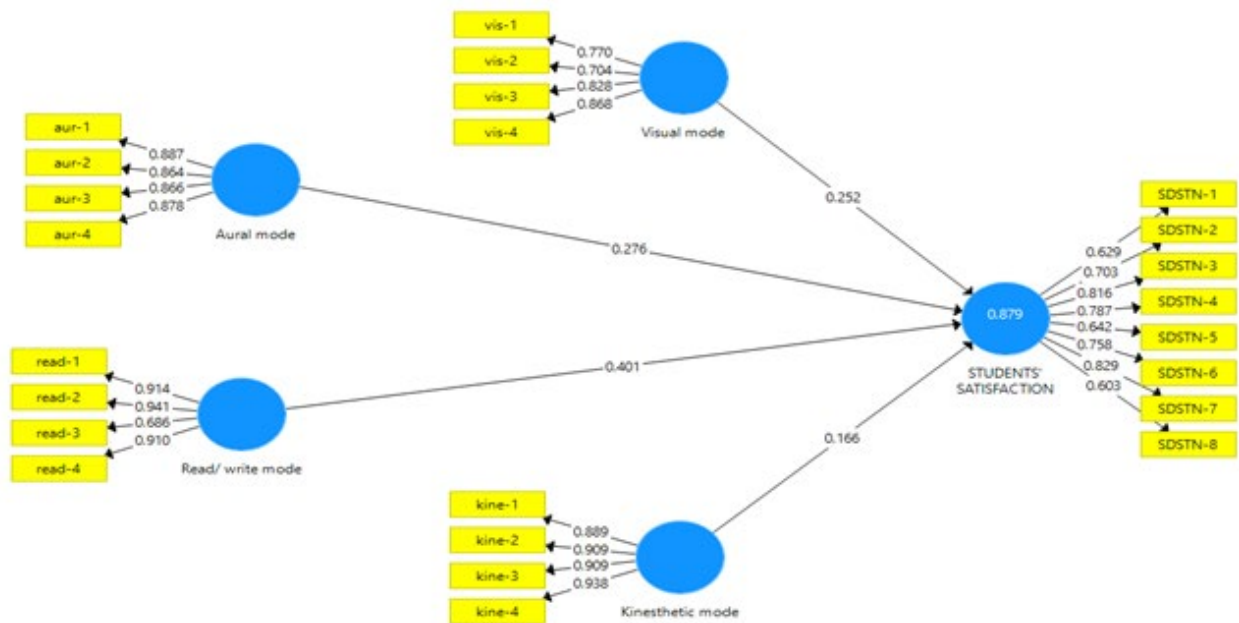


Figure 3.1: Results of Structure Analysis of students' satisfaction (algorithm)
 Noted: vis-visual mode, aur- aural mode, read-read/write mode, kine-kinesthetic

Factor	item	Results of item	Cronbach's alpha	Composite Reliability	Average variance Extracted
Visual mode	vis-1	0.770	0.804	0.872	0.632
	vis-2	0.704			
	vis-3	0.828			

	vis-4	0.898			
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Table 3.1: List of items of visual mode for each Construct of respondents
Noted: vis-visual mode

Table 3.1 in the research result presents the results of analysis for a set of four items that were used to measure a construct. A visual mode of four items measuring ranged from 0.704-0.898, A value indicates good internal consistency for the four items in question as Cronbach's Alpha of 0.804, A value indicates good internal con-

sistency for the four items in question as Composite Reliability (CR) of 0.872 and A value indicates moderate to good convergent validity for the four items in question as Average Variance Extracted (AVE) was 0.632.

Factor	item	Results of item	Cronbach's alpha	Composite Reliability	Average variance Extracted
Aural mode	aur-1	0.887	0.804	0.872	0.632
	aur-2	0.864			
	aur-3	0.866			
	aur-4	0.878			

Table 3.2. List of items of aural mode for each Construct of respondents
Noted: aur- aural mode

Table 3.2 in the research result presents the results of analysis for a set of four items that were used to measure a construct. A visual mode of four items measuring ranged from 0.864-0.878, A value indicates good internal consistency for the four items in question as Cronbach's Alpha of 0.897, A value indicates good internal con-

sistency for the four items in question as Composite Reliability (CR) of 0.928 and A value indicates moderate to good convergent validity for the four items in question as Average Variance Extracted (AVE) was 0.763.

Factor	item	Results of item	Cronbach's alpha	Composite Reliability	Average variance Extracted
Read/write mode	read-1	0.914	0.887	0.924	0.924
	read-2	0.941			
	read-3	0.696			
	read-4	0.910			

Table 3.3. List of items of read/write mode for each Construct of respondents
Noted: read-read/write mode

Table 3.3 in the research result presents the results of analysis for a set of four items that were used to measure a construct. A visual mode of four items measuring ranged from 0.696-0.910, A value indicates good internal consistency for the four items in question as Cronbach's Alpha of 0.887, A value indicates good internal con-

sistency for the four items in question as Composite Reliability (CR) of 0.924 and A value indicates moderate to good convergent validity for the four items in question as Average Variance Extracted (AVE) was 0.755.

Factor	item	Results of item	Cronbach's alpha	Composite Reliability	Average variance Extracted
Kinesthetic mode	kin-1	0.889	0.932	0.952	0.831
	kin-2	0.909			
	kin-3	0.909			
	kin-4	0.938			

Table 3.4. List of items of kinesthetic mode for each Construct of respondents
Noted: kine-kinesthetic

Table 3.4 in the research result presents the results of analysis for a set of four items that were used to measure a construct. A visual mode of four items measuring ranged from 0.909-0.938, A value indicates good internal consistency for the four items in question as Cronbach's Alpha of 0.932, A value indicates good internal con-

sistency for the four items in question as Composite Reliability (CR) of 0.952 and A value indicates moderate to good convergent validity for the four items in question as Average Variance Extracted (AVE) was 0.831.

Factor	item	Results of item	Cronbach's alpha	Composite Reliability	Average variance Extracted
Students'satisfaction	SDSTN-1	0.629	0.869	0.898	0.526
	SDSTN-2	0.703			
	SDSTN-3	0.816			
	SDSTN-4	0.787			
	SDSTN-5	0.642			
	SDSTN-6	0.758			
	SDSTN-7	0.829			
	SDSTN-8	0.603			

Table 3.5. List of items of students' satisfaction for each Construct of respondents

Noted: SDSTN- student satisfaction

Table 3.5 in the research result presents the results of analysis for a set of four items that were used to measure a construct. A visual mode of four items measuring ranged from 0.603-0.829, A value indicates good internal consistency for the four items in question as Cronbach's Alpha of 0.869, A value indicates good internal con-

sistency for the four items in question as Composite Reliability (CR) of 0.898 and A value indicates moderate to good convergent validity for the four items in question as Average Variance Extracted (AVE) was 0.526.

№	Items	Cronbach's alpha	Composite Reliability	Average variance Extracted
1	Visual mode	0.804	0.872	0.632
2	Aural mode	0.897	0.928	0.763
3	Read and write mode	0.887	0.952	0.831
4	Kinesthetic	0.932	0.952	0.831
5	Student satisfaction	0.869	0.898	0.526

Table 3.6. The comparison for each Construct of respondents

Noted: The compared results

In the table 3.4, based on the information provided, it appears that each set of statistics (visual mode, aural mode, read and write mode, kinesthetic, and student satisfaction) referred to the reliability and validity of a different measurement instrument used in the study.

Comparing the values for each set of statistics, we can make the following observations:

Aural mode has the highest Cronbach's alpha (0.897) and Composite Reliability (0.928), indicating the highest internal consistency reliability among the five measurement instruments.

Read and write mode has the highest Average Variance Extracted (0.831), indicating the highest convergent validity among the five measurement instruments.

Visual mode has the lowest Average Variance Extracted (0.632), indicating the lowest convergent validity among the five measurement instruments.

Kinesthetic mode has the highest Cronbach's alpha (0.932) and Composite Reliability (0.952), indicating high internal consistency reliability and also high convergent validity.

Student satisfaction has the lowest Average Variance Extracted (0.526), indicating the lowest convergent validity among the five measurement instruments. However, its Cronbach's alpha (0.869) and Composite Reliability (0.898) values suggest good internal consistency reliability.

Hypothesis	Mean	Standard deviation	T Statistic	P value	Remarks
Hypothesis 1. Visual mode will a positive influence on students' satisfaction.	0.261	0.083	3.039	0.002	Supported
Hypothesis 2. Aural mode will a positive influence on students' satisfaction.	0.263	0.089	3.089	0.002	Supported
Hypothesis 3. Read/write mode will a positive influence on students' satisfaction.	0.402	0.065	6.125	0.000	Supported
Hypothesis 4. Kinesthetic mode will a positive influence on students' satisfaction.	0.160	0.068	2.442	0.002	Supported

Table 3.6. Estimated Path Coefficients of respondents
Notes: The result of study

Table 3.6, as visual mode had positive related om students' satisfaction (mean 0.261), (Standard deviation 0.083), (T statistic 3.039) and (P value 0.002). Aural mode had positive related om students' satisfaction (mean 0.263), (Standard deviation 0.089), (T statistic 3.089) and (P value 0.002). Read/write mode had positive related om students' satisfaction (mean 0.402), (Standard deviation 0.065), (T statistic 6.125) and (P value 0.000). Kinesthetic mode had positive related om students' satisfaction (mean 0.160), (Standard deviation 0.068), (T statistic 2.442) and (P value 0.002) in our study.

4. Conclusion

We are describing a research project or survey that was conducted in the fiscal year of 2023. The paper collected data using an on-line form questionnaire, which is a common method for gathering quantitative data. The questionnaire likely included questions that were designed to collect both quantitative and qualitative data, which can provide a more comprehensive understanding of the research topic.

According our results, all four modes of learning - visual, aural, read/write, and kinesthetic - had a positive correlation with students' satisfaction. The mean values for satisfaction were relatively similar for visual and aural modes, with means of 0.261 and 0.263, respectively. The standard deviations for these modes were also quite similar, at 0.083 and 0.089, respectively.

The read/write mode had a higher mean satisfaction value than the other three modes, with a mean of 0.402. This mode also had a lower standard deviation of 0.065, indicating that satisfaction ratings were more tightly clustered around the mean for this mode. The t-statistic for read/write mode was also higher than the other three modes, indicating a stronger relationship between this mode of learning and student satisfaction.

The kinesthetic mode had the lowest mean satisfaction value, at 0.160, and a standard deviation of 0.068. The t-statistic for this mode was also lower than the other three modes, indicating a weaker relationship between kinesthetic learning and student satisfaction.

Finally, the study suggests that all four modes of learning are pos-

itively correlated with student satisfaction, but read/write mode may have a stronger relationship with satisfaction compared to the other three modes.

Let we break down our recommendations and provide more explanation:

- To study annual year result in the future: This recommendation suggests conducting a longitudinal study where you gather data over several years to understand how student performance changes over time. By studying annual results, you can identify trends and patterns that may inform interventions to improve student outcomes.

- To study and compare with other higher education institutions' model: This recommendation proposes conducting a comparative analysis of your institution with other higher education institutions. By examining the models of other institutions, you can identify best practices and areas for improvement. This can inform your institution's strategic planning and decision-making.

- To study and compare with international study in the future: This recommendation suggests conducting an international study to understand how your institution compares with higher education institutions in other countries. This can help you identify strengths and weaknesses and potentially learn from successful practices in other countries.

- Finally, we could examine how cognitive theories, such as those related to motivation or attention, impact students' satisfaction with their educational experience. This could inform interventions to improve student satisfaction and ultimately improve student outcomes.

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EVIDENCE

The screenshot displays two main sections from the SmartPLS software interface: 'Construct Reliability and Validity' and 'Discriminant Validity'.

Construct Reliability and Validity

Matrix	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
	Cronbach's Al...	rho_A	Composite Rel...	Average Varian...
Aural mode	0.897	0.899	0.928	0.763
Kinesthetic mode	0.932	0.932	0.952	0.831
Read/ write mode	0.887	0.911	0.924	0.755
STUDENTS' SATISFACTION	0.869	0.878	0.898	0.526
Visual mode	0.804	0.814	0.872	0.632

Discriminant Validity

	Aural mode	Kinesthetic mo...	Read/ write m...	STUDENTS' SA...	Visual mode
Aural mode	0.874				
Kinesthetic mode	0.478	0.911			
Read/ write mode	0.782	0.533	0.869		
STUDENTS' SATISFACTION	0.843	0.663	0.851	0.725	
Visual mode	0.691	0.601	0.579	0.774	0.795

Path Coefficients

	Original Sampl...	Sample Mean (...)	Standard Devia...	T Statistics (O/...	P Values
Aural mode -> STUDENTS' SATISFACTION	0.276	0.263	0.089	3.089	0.002
Kinesthetic mode -> STUDENTS' SATISFACTION	0.166	0.160	0.068	2.442	0.015
Read/ write mode -> STUDENTS' SATISFACTION	0.401	0.409	0.065	6.126	0.000
Visual mode -> STUDENTS' SATISFACTION	0.252	0.261	0.083	3.039	0.002

R Square

	R Square	R Square Adjusted
STUDENTS' SATISFACTION	0.879	0.873

Final Results

- [Path Coefficients](#)
- [Indirect Effects](#)
- [Total Effects](#)
- [Outer Loadings](#)
- [Outer Weights](#)
- [Latent Variable](#)
- [Residuals](#)

Quality Criteria

- [R Square](#)
- [f Square](#)
- [Construct Reliability and Validity](#)
- [Discriminant Validity](#)
- [Collinearity Statistics \(VIF\)](#)
- [Model Fit](#)
- [Model Selection Criteria](#)

Interim Results

- [Stop Criterion Changes](#)

Base Data

- [Setting](#)
- [Inner Model](#)
- [Outer Model](#)
- [Indicator Data \(Original\)](#)
- [Indicator Data \(Standardized\)](#)
- [Indicator Data \(Correlations\)](#)

Outer Loadings

Matrix	Aural mode	Kinesthetic mo...	Read/ write m...	STUDENTS' SA...	Visual mode
SDSTN-1				0.629	
SDSTN-2				0.703	
SDSTN-3				0.816	
SDSTN-4				0.787	
SDSTN-5				0.642	
SDSTN-6				0.758	
SDSTN-7				0.829	
SDSTN-8				0.603	
aur-1	0.887				
aur-2	0.864				
aur-3	0.866				
aur-4	0.878				
kine-1		0.889			
kine-2		0.909			
kine-3		0.909			
kine-4		0.938			
read-1			0.914		
read-2			0.941		
read-3			0.686		
read-4			0.910		
vis-1					0.770
vis-2					0.704
vis-3					0.828
vis-4					0.868

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