

Research Article

My e-Mind Maps: A Multi-modal Approach Engaging Visual and Auditory Learning Styles

Norhayati Zamri^{1*}, Norul Akma Mansor², and Farah Husna Mohd Fatzel³

¹ Faculty of Accountancy, Universiti Teknologi MARA, Perak Branch, Malaysia; norha266@uitm.edu.my;  ORCID ID: <https://orcid.org/0009-0005-4808-8448>

² Faculty of Accountancy, Universiti Teknologi MARA, Perak Branch, Malaysia; norul195@uitm.edu.my;  ORCID ID: <https://orcid.org/0009-0008-7421-5107>

³ Faculty of Accountancy, Universiti Teknologi MARA, Perak Branch, Malaysia; farahhusna@uitm.edu.my;  ORCID ID: <https://orcid.org/0009-0004-2405-0544>

* Correspondence: norha266@uitm.edu.my; +6053742000.

Abstract: *My e-Mind Maps explore the usage of e-mind maps as an educational tool that combines visual and auditory elements to enhance student learning. Learning styles are explained by how people learn based on their abilities, preferences, motivation, and learning environment. An educational psychologist, Walter Burke Barbe and his colleagues suggested three different learning modalities in 1979 to describe and comprehend different learning styles. These modalities include visual, auditory, and kinesthetics. A questionnaire was distributed to students to find out the most preferred learning styles. From the result, there is a need for a multi-modal approach for effective learning tool. Hence, My e-Mind Maps combine the visual and auditory learning modalities to help students make a topic revision and promotes a deeper understanding of the subject matter. Visual learners benefit from the use of colours, shapes, and visual cues which help them to process and retain information more effectively. On the other hand, auditory learners engage their auditory senses by hearing and observing the content being explained, which enhances their comprehension and memory retention. Therefore, using My e-Mind Maps encourage a better learning method to capture students' attention while creating a more effective and comprehensive learning experience. Educators may create a dynamic and engaging learning environment that caters to the diverse learning preferences.*

Keywords: *Learning style; Visual; Auditory; Kinesthetics; Effective learning.*



Copyright: © 2023 by the authors. Submitted for open access publication under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

1. INTRODUCTION

On 1 April 2022, Malaysia announced a transition to treating Covid-19 as an endemic resulting to the reopening of schools in stages according to the phases of states under the National Recovery Plan (NRP). Due to this, students will have to adjust to a different environment, transitioning from three years of online and hybrid learning to full face-to-face classes. Apart from this, Education Minister also has introduced post pandemic Digital Education Policy whereby the policy was aimed at creating a digital-savvy generation by nurturing talents with knowledge, skills, and ethics in the usage of technology. This situation gives greater challenges to students as they need to find a better method of effective learning to increase their motivation especially in the IT- education field.

Learning styles are explained by how people learn based on their abilities, preferences, motivation, and learning environment. An educational psychologist, Walter Burke Barbe and his

colleagues suggested three different learning modalities in 1979 to describe and comprehend different learning styles. These modalities include visual, auditory, and kinesthetics. For visual learners, they absorb information primarily by seeing it or by visualising it mentally. As for auditory learners, they absorb information primarily by hearing it and for kinaesthetic learners, they absorb information primarily through movement in a physical way. Learning Modality Model which is referred to VAK theory (Figure 1) was then used in many studies to evaluate and assess the learning styles among students (Li and Alduais, 2018).

Based on the above problem and theory, we developed a product named My e-Mind Maps which incorporates the visual and auditory learning style. The main purpose of introducing this product is to help students for better understanding in their subject learning mainly to cater the visual and auditory learners. Therefore, using My e-Mind Maps is hoped to encourage a better learning method to capture students' attention while creating a more effective and comprehensive learning experience.

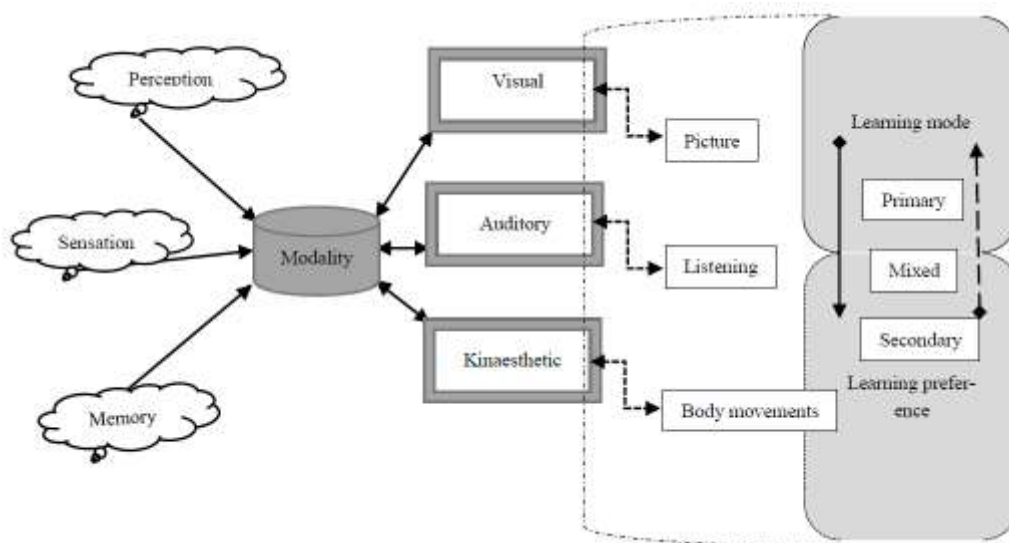


Figure 1. This is a VAK Theory and learning modalities proposed model (Li and Alduais, 2018).

2. METHOD & MATERIAL

The research method employed in this study involved the distribution of questionnaires to gather data. The measures in the questionnaires were adapted from the VARK learning styles (Fleming and Bonwell, 2019). Since the study focus on the VAK theory, thus, it only includes VAK Learning Styles for analysis purpose. There are four sections involved. The first section asked about the basic demographic profile of the students. Sections two through four concerns about each learning style separately, with five questions each, rated on a 5 Likert scale ranging from (1) Strongly Disagree; (2) Disagree; (3) Neutral; (4) Agree; (5) Strongly Agree.

The primary objective of the questionnaires was to ascertain the learning styles preferred by the students, either visual, auditory, or kinesthetics which will be the base in developing the product. The targeted respondents were students enrolled in the Faculty of Accountancy at UiTM Tapah, Perak. A total of 114 responses were received from the participants. The descriptive statistics was used to summarize the data.

The timeline for the questionnaire administration began with brainstorming ideas to develop a tool that would enhance learning effectiveness. After careful deliberation, it was determined that a

mind map with a variety of learning modalities and an element of augmented reality (AR) would be appropriate. From February to March 2023, the questionnaires were constructed and distributed to the accounting students to solicit their feedback on their learning style preferences. In April 2023, data analysis was conducted, and My e-Mind Maps was put forth. It incorporates a multi-modal of visual and auditory approaches with augmented reality. The product prototype was developed in May 2023. Currently, plans are underway to present the survey results at a conference and publish them in an indexed journal. Additionally, there is a plan to transform the prototype into an application (app). The first step in this process involves applying for copyright protection.

3. FINDINGS

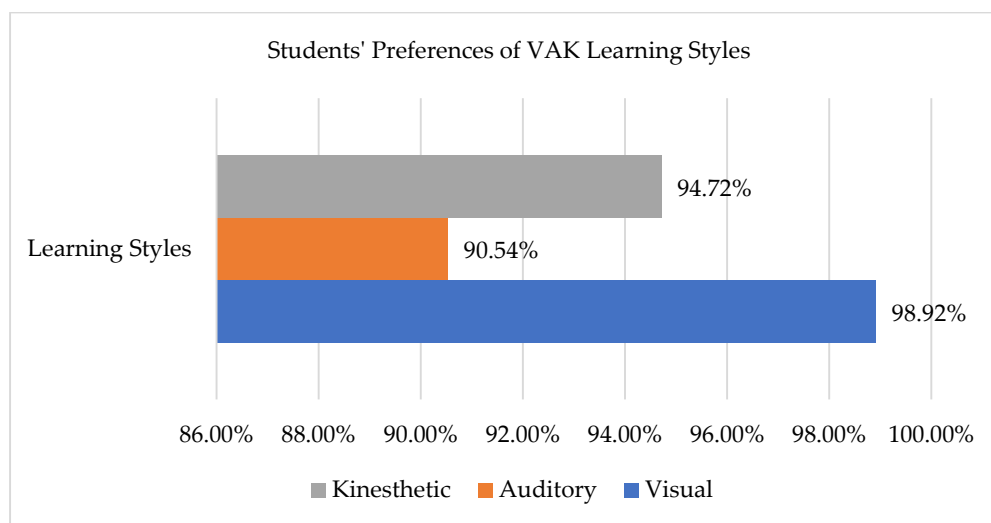


Figure 2. This is a survey's result for the most preferred learning styles among students.

Figure 2 illustrate the feedback obtained from students regarding their most preferred learning styles. Even though the visual learning style is the most preferred, the data reveals that all learning styles were chosen by students, with a significant percentage exceeding 90% for each style. This outcome implies that all learning styles are well-received among the students. This aligns with the findings of Mirza and Khurshid (2020) who highlight the acceptability of diverse learning styles in promoting student engagement and knowledge retention. Previously, same conclusion has been made in Prithiskumar and Michael (2014)'s study, who similarly reported a high acceptance rate for diverse learning styles among students when more students choose multi-modal than uni-modal. Furthermore, the study conducted by Payaprom and Payaprom (2020) highlights the importance of diversifying teaching styles, teaching methods, and instructional techniques for effective teaching and learning. This approach recognizes that students have diverse learning preferences, strengths, and needs, and tailoring instruction to accommodate these differences can enhance the overall learning experience.

By diversifying teaching styles, educators can engage students with varied instructional approaches. For example, some students may benefit from visual aids and presentations, while others may prefer hands-on activities or group discussions. Adapting teaching methods to incorporate a mix of lectures, group work, individual projects, and technology-based learning can cater to different learning styles and promote active participation. Hence, these previous studies, along with our current finding, suggest that combining various learning styles may result in a more comprehensive and effective learning experience.

4. DISCUSSION

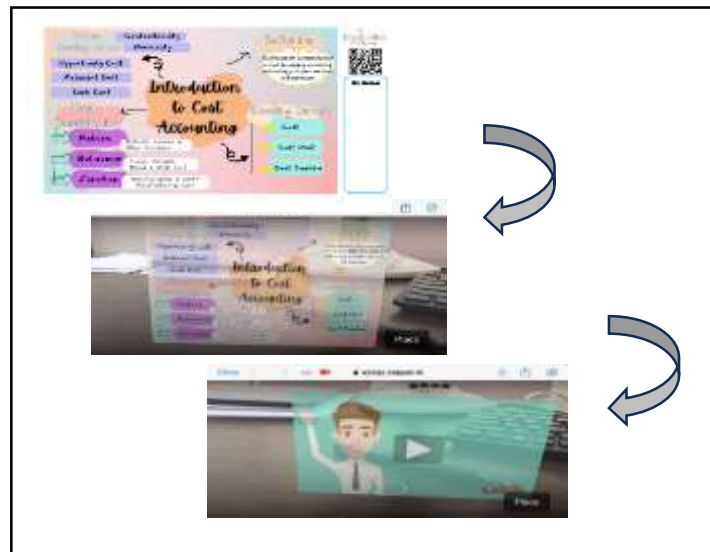


Figure 3. This is the e-Mind Map as an effective learning tool.

Based on the findings, we propose the implementation of a multi-modal approach as an effective learning tool to enhance student in studying more effectively. My e-Mind Maps offer a combination of visual and auditory learning modalities, facilitating topic revision and fostering a deeper understanding of the subject matter. Visual learners benefit from the incorporation of colors, shapes, and visual cues, facilitating more efficient information processing and retention. Conversely, auditory learners engage their auditory senses by listening and observing the content being explained with the use of animation, thereby improving comprehension and memory retention.

The functionality of e-Mind Maps encompasses several features that enhance the learning experience for students. Here are the key elements mentioned:

- 1) **Availability in softcopy format:** e-Mind Maps are accessible in a digital format, allowing students to either print them out or store them digitally. This flexibility enables students to choose their preferred method of accessing and utilizing the mind maps.
- 2) **QR code integration:** A QR code is provided on the top right corner of the mind maps. By scanning this code using a smartphone or QR code reader, students can gain access to topic-related videos directly within the mind maps. This integration of multimedia resources adds a dynamic element to the learning process.
- 3) **Interactive video elements:** The videos embedded within the mind maps offer interactive features such as play, re-play, and stop buttons. This functionality enables students to control their engagement with the video content, allowing them to navigate to specific points of reference as needed. It provides greater control and flexibility in accessing relevant information.
- 4) **Augmented Reality (AR):** The mention of augmented reality suggests that e-Mind Maps may incorporate AR technology to provide an interactive learning experience. AR can overlay digital content onto the physical world, allowing students to interact with virtual elements in real-time. This integration of AR within the e-Mind Maps can further enhance student engagement and understanding by providing immersive and interactive learning opportunities.

By combining the convenience of digital accessibility, the integration of multimedia resources through QR codes, and the potential use of augmented reality, e-Mind Maps offer a multi-dimensional and interactive learning experience. These features aim to promote student engagement, facilitate comprehension, and create a dynamic learning environment.

5. CONCLUSION

This study examines the most preferred learning styles among students. It uses a sample of 114 respondents among accounting students. The finding reveals that the variability of students' learning styles, indicating that there is no requirement to confine students of focusing solely on one style. The result provides empirical support for the acceptance of all learning styles among students. Educators can cultivate an interactive and stimulating learning environment that accommodates diverse learning preferences. They should employ innovative approaches when delivering lectures, considering various learning modalities. By incorporating multiple modalities in the classroom, educators can effectively address the individual needs of all learners. Diversifying teaching styles, methods, and techniques also encourages student engagement and motivation. When students are actively involved in the learning process and have opportunities to explore concepts from different angles, they are more likely to develop a deeper understanding of the subject matter and retain information over time.

Considering this finding, it becomes evident that a multi-modal approach is essential for an effective learning tool. The e-Mind Maps have been developed with the primary objective of promoting a superior learning method that captures students' attention while facilitating a more comprehensive and impactful learning experience. The integration of mind maps and explanatory videos caters to the needs of both visual and auditory learners, resulting in an enhanced learning experience for students. Furthermore, employing a range of instructional techniques can help capture students' attention and facilitate comprehension. These techniques may include interactive activities, multimedia resources, case studies, role-playing, simulations, and real-world applications. By presenting information in different ways, educators can enhance understanding and make learning more relatable and meaningful to students.

Acknowledgments: We would like to express our heartfelt gratitude to Allah SWT for granting us the strength and guidance to successfully complete this project. We are also immensely grateful to our family and friends for their unwavering support throughout this journey. Furthermore, we extend our sincere appreciation to our faculty members for their invaluable guidance and assistance, both directly and indirectly, which greatly contributed to the completion of this project.

References

- Fleming, N. D. & Bonwell, C. (2019). How Do I Learn Best? A learner's guide to improved learning. Available: <https://vark-learn.com/wp-content/uploads/2019/07/How-Do-I-Learn-Best-Sample.pdf>
- Li, M., & Alduais, A., (2018). Exploring learning styles and their possible effect on academic performance among university students in Glasgow. *Res Result: Pedagogy Psychol Educ, In review*.13.
- Mirza, M.A., & Khurshid, K. (2020). Impact of VARK learning model at tertiary level education. *International Journal of Educational and Pedagogical Sciences*, 14(5), 354-361.
- Payaprom, S., & Payaprom, P. (2020). Identifying learning styles of language learners: A useful step in moving towards the learner-centered approach. *Journal of Language and Linguistic Studies*, 16(1), 59-72.
- Prithiskumar, I., & Michael, S., (2014). Understanding your student: using the VARK model. *Journal of Postgraduate Medicine*, 60(2), 183-186