



Identifying Students' Learning Styles: A Case Study among First year Engineering Undergraduates in Brunei

Thulasimani Munohsamy
Independent Researcher

Date of Submission: 25-06-2021

Date of Acceptance: 07-07-2021

ABSTRACT: Every student has their own way of learning, and this learning styles influences their ability to understand, acquire and respond to their learning environment. Therefore, it is vital for every student to know their own learning styles for their own effective learning. The main objective of this paper is to identify whether the students know their own learning styles, the students' most preferred learning styles and also to identify if there are differences in the students' learning style according to their gender. A total of 113 first year engineering students of Universiti Teknologi Brunei were randomly selected for the purpose of this study. Three methods of learning styles were used in this study and these were explained in the research being undertaken. Students were asked to write down what they thought their learning styles were before and subsequently undertaking a VAK (Visual, Auditory & Kinesthetic) Learning Styles Self-Assessment Questionnaire to identify their actual learning styles. Based on the outcome, the students presumed learning styles were compared with their actual style. The study reveals that among the 113 students, 32% of the students did not know their actual learning styles until they did the VAK Learning Styles self-assessment questionnaire. The study also shows that 32% of the students were predominantly visual learners and 31% of the students were kinesthetic learners. The findings reveal that there is difference in the learning styles between male and female students. The majority of the female students were visual learners whereas majority of the male students were kinesthetic learners.

KEYWORDS: Learning styles, visual, auditory, kinesthetic

I. INTRODUCTION

Every student has their own way of learning. The learning styles of students usually influences their ability to acquire information and respond to the learning environment [1]. Sometimes

students read for hours yet they are unable to comprehend what they have learnt which leads them to perform badly in their studies. Worst case scenario will be, when the students learning styles mismatch with the teachers' teaching styles which can potentially affects the students' performance and in many cases, students tend to drop out from school [2].

Therefore, it is very important for teachers to know their students learning styles in order to deliver a fruitful lesson. However, it is very beneficial for students themselves to know their own learning styles. At the university level, they cannot be expecting their lecturers to accommodate every students' learning styles. By knowing their own learning styles, it can help them to succeed in all their subjects at every level. What exactly is learning styles?

According to Fleming [3], learning style is an individuals' preferred method of gathering, organizing, and thinking about information. It is considered as behaviours related to the psychological, cognitive and affective domains of interaction with learning environments. It is stated that learning styles revolves the learners' preferred ways to receive, process and recall information during instruction which is related to learners' motivation and information processing habits [4] [5].

The three main mode of learning discussed and emphasized in this research is the visual, auditory, and kinaesthetic. The visual learning style is considered to be a process through which students gain knowledge and understanding via explicitly using visual tools. The kinesthetics learning style on the other hand means that the students learn best often when they are permitted to touch and feel through physical activity [6]. According to Fleming [3], the auditory learners learn best when they are able to hear the instruction [7]. There are many methods to assess the learning styles of the students and the method used in this study will be discussed



in the later part of the study. Many studies also have been done to find out if gender differences are involved in the learning styles of the students. Therefore, this study is determined to find out if the male students and the female students have similar or different learning styles.

It is very crucial for students to know their own learning styles for them to succeed in any subject that they study. According [8], understanding the learning styles preferences of students can provide effective learning strategies for teachers to use. Furthermore, by making students aware of their own specific learning style, teachers can encourage the students to realize the importance of appropriate learning styles for different disciplines or subjects which can change the learning situation and enhance their performances [9].

Moreover, every student study differently as [10] said, 'what works well for one student may not be beneficial or favourable to another'. He further added that individuals learn differently through many ways time to time, from culture to culture and from context to context. Therefore, it is clear that knowing students preferred learning styles can assist the whole learning process. Furthermore, many teachers don't seem to understand and give importance to the students learning styles. It was mentioned in a study that students learning styles have been disregarded by teachers and have been considered a minor component in the learning process [11]. As such there are high tendency for teachers to misinterpret students' lack of attention or hyperactive in class as students' bad attitudes due to lack of proper evaluation of students' preferred learning styles.

Besides that, most of the time teachers do not teach according to learning styles preferred by students instead they teach based on their own learning styles or teaching styles. According to [12], a study was found that continuum of mismatch between teachings and learning styles will tremendously influence students' attitudes and motivation towards the subject matter. They highlighted that when there is a mismatch between teaching and learning styles students get bored and pay less attention in the class which leads to poor grades [13]. However, this contradicts the study done by [2], where he stated that it is pointless for teachers to always accommodate to all students' preferences. Instead, teachers should challenge the students to learn using techniques which are not preferred by them [14].

Therefore, it is always the best for students to know their own preferred learning styles so that

they can accommodate and twig whatever teaching styles that are delivered by their teachers to their own learning styles. This study focuses on the learning styles of the first-year engineering students of Universiti Teknologi Brunei. Universiti Teknologi Brunei (UTB), established in 1986, is an engineering and technology university in Brunei Darussalam that specializes in the niche areas of engineering, business and computing. It will be very useful for the students and lecturers of this university to find out the preferred learning styles of the students. The main purpose of this study which will be discussed in the following section.

The objective of this study is to:

i) identify the most preferred learning styles of the first-year engineering student of Universiti Teknologi Brunei

ii) identify the most preferred learning styles of the first-year engineering students of Universiti Teknologi Brunei according to gender.

iii) investigate if the first-year engineering student of Universiti Teknologi Brunei are aware of their own learning styles.

This study focuses only on the first-year engineering students of Universiti Teknologi Brunei's (UTB) learning styles in order to find out their preferred learning styles and also if they are aware of their own learning styles.

This study will be significant for the students of Universiti Teknologi Brunei, the lecturers and the administration as well as to the module designers. The results from the study gives an opportunity to identify their own learning styles which enables them more effective learning. The findings of the study also will benefit the lecturers as it gives a platform to understand their students' learning styles much better as it provides them the background of the students learning styles and this can help in preparing their lectures to fit best to the students' learning styles. This can lead to a successful teaching and learning process. The administration will also find this study beneficial as apprise the variety of learning styles the students adopt which can aid the to conduct courses, activities or instructional materials can be prepared based on the students' learning styles. This finding also is expected to contribute to the existing literature in the field of learning styles in UTB and serve as a basis for future research in this area.

II. LITERATURE REVIEW

According to Fatt, the essential of learning styles became known around the year 1892 and used first most likely by Thelen. He further explained that the impression of learning styles was originally



based on David Kolb's theories. Kolb saw learning as a circular process where learning is viewed as a series of experiences with cognitive additions: concrete experience, reflection and observation, abstract concepts and generalizations, and active experimentation and students who adopt their

On the other hand, Silver, Strong, and Perini (1997) said that the learning-style theory began with Carl Jung in 1927. Jung found major differences in the way people envisioned, the way people made decisions, and how active or reflective they were while interacting with others. Theorists of learning styles "believe that learning is the result of a personal, individualized act of thought and feeling.

Meanwhile it was stated that people use their five senses to gather information and then channel it through three separate routes, called representational systems, to make sense of it. These representational systems include visual, auditory, and kinesthetic types of learners. Each individual shows a preference towards one of these systems, and specific communication accustomed to the learning style can improve communication with others. These are the three types of learning that will be focused in this study [9].

Visual learners prefer reading, observing, and the display of data and visual aids. Visual students prefer to learn by watching movies, film strips, pictures, and graphs which help integrate the subject and when taking a test, a visual learner would do better on the test if the test had visual diagrams [9]. On the other hand, auditory learners prefer sound and make better decisions on what they have heard or read. Auditory learners would prefer lectures, seminars, discussions, and tapes and when taking a test, an auditory learner would do their best by being given an oral examination [9]. Meanwhile kinesthetic learners prefer to communicate with the environment by feelings and by doing. Kinesthetic learners prefer a trial and error method of learning. By giving a test with task-oriented questions a kinesthetic learner would have better results [9].

According to [8], understanding the learning style preferences of students can provide effective learning strategies for teachers to use. By making students aware of their specific learning style teachers can encourage them to realize the importance of appropriate learning styles for different disciplines or subjects and that such styles may hopefully be changed to suit changing learning situations [9].

learning styles to the task given are considered as versatile learning style. David Kolb's theories were used in Honey and Mumford's creation of the psychological framework of four basic learning styles: activist, reflector, theorist, and pragmatic [9].

There are several ways to determine how a child learns most effectively. There are many reliable self-assessment questionnaires to identify their learning styles. There are many studies also conducted on this field. A study conducted by [13], on the preferred learning styles of students taking the English 1119 paper in SMK Tengku Intan Zaharah, Dungun, Terengganu, found that majority of the students preferred visual learning and the teachers are aware of the students preferred learning styles when they are teaching the class.

Another study done by [15], on gender differences in learning style preferences among undergraduate physiology students. These preferences were assessed by using the VARK questionnaire. The study reveals that a majority of male students preferred multimodal instruction, specifically, four modes (VARK), whereas a majority of female students preferred single-mode instruction with a preference toward Kinesthetic. Thus, male and female students have significantly different learning styles. It is the responsibility of the instructor to address this diversity of learning styles and develop appropriate learning approaches.

Besides that, [5], also conducted another study on analyzing the effect of learning styles and study habits of distance learners on learning performances. Sixty-two sophomore students who enrolled in an online introductory programming course participated in this study. Kolb's Learning Style Inventory (LSI) was used to measure the students' learning styles. Another inventory developed by the researcher was used to determine learners' study habits. An achievement test was used to put forward their learning performances. The study reveals a significant relationship between learning styles, study habits, and learning performances. The results present some ideas about distance learners' learning styles and study habits for instructors who wish to incorporate synchronous courses and support learners.

Another study conducted by [16] which aims to identify students' perceptual learning style preferences in EFL classroom on the basis of VARK learning style model. The VARK questionnaire version 7.1 was used as a data collection tool. The study also gives the comparative analysis between the male and the



female students studying at the same level. The data analysis highlights a considerable difference between the boys and girls learning preferences. It concludes that female students are found to be Aural learners (i.e. prefer to explain new ideas to others, discuss topics with other students and their teachers, attend lectures, and discussion groups). Whereas, Boys are found to be kinesthetic learners (i.e. prefer field trips, doing things to learn them, hands-on approaches, using their senses). The study asks for better teaching methods and strategies, keeping in view students' unique ways of learning. The study suggests that the teachers should modify their teaching strategies in accordance with their students learning preferences. The awareness about students learning preferences increases the teachers' efficiency of their classroom orientation.

These are some of the similar studies done by other researchers in this area. There are many more studies done in this field by many researchers. In the next section, the research method is discussed.

III. METHODOLOGY

This is a quantitative study and the sample consisted of 113 Universiti Teknologi Brunei (UTB) first year engineering students. The study sample consisted of 55 male students and 58 female students. Students were first given explanation on the three modes of learning styles namely, visual, auditory and kinesthetic and they were asked to write down what they think is their preferred learning style is. After that students were given VAK Learning Styles Self-Assessment Questionnaire to identify their real learning styles and compare with their preferred learning styles written earlier. The VAK Learning Styles Self-Assessment Questionnaire consisted 30 questions to determine the three different learning styles. Data were then collected for analysis purposes. The collected data were analyzed using SPSS version 20.0 (Statistical Packages for Social Sciences) and presented in the form of percentages. These are the methods used for this study. The results and discussion are explained in the following section.

IV. RESULTS AND DISCUSSION

The main purpose of this study is to investigate the Universiti Teknologi Brunei first year engineering students' learning styles. A total of 113 first year engineering students were randomly selected for this purpose of study. 55 of the respondents were male and 58 respondents of the study were female. The data analysed are discussed in the following paragraph.

Question 1

What are the most preferred learning styles of the first-year engineering student of Universiti Teknologi Brunei?

Figure 1 below show the most preferred learning styles of the first-year engineering of Universiti Teknologi Brunei (UTB) students. 32% of the students prefers visual learning and 31% of the students are kinesthetic learners. This result is similar to the studies done by [13], in Dungun, Terengganu where majority of the learners prefers visual learning.

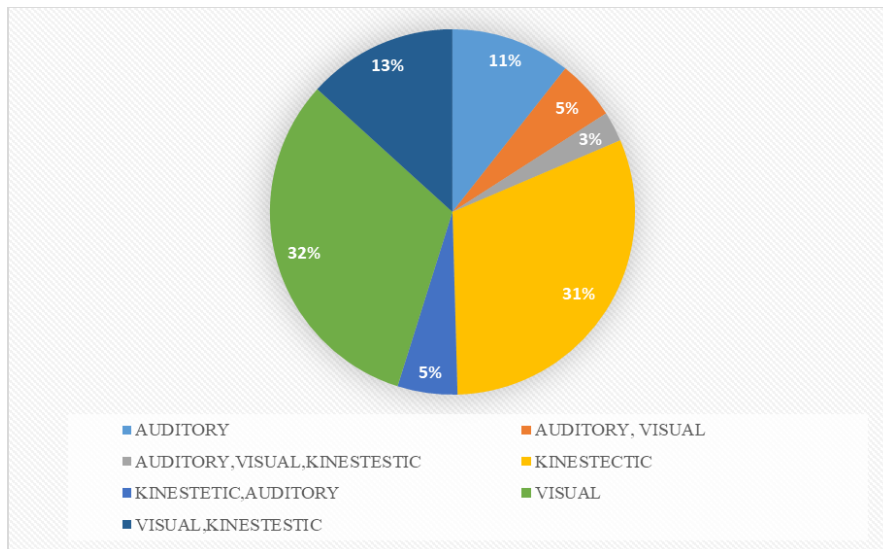


FIGURE 1: THE MOST PREFERRED LEARNING STYLES OF FIRST YEAR ENGINEERING OF UTB STUDENTS

Question 2

What are the most preferred learning styles of the first-year engineering students of Universiti Teknologi Brunei according to gender?

Figure 2 below shows the most preferred learning styles of first year engineering students of UTB according to gender. The findings shows that there is a difference in the preferred learning styles

between male and female students. 42% of the male students prefers kinesthetic learning styles whereas 40% of the female students are visual learners. These findings are like the findings of [16] in his EFL Classroom where majority of the boys were kinesthetic learners whereas the girls were aural learners. This finding is also similar with the results obtained from the research conducted by Erica, Heidi and Stephen (2007).

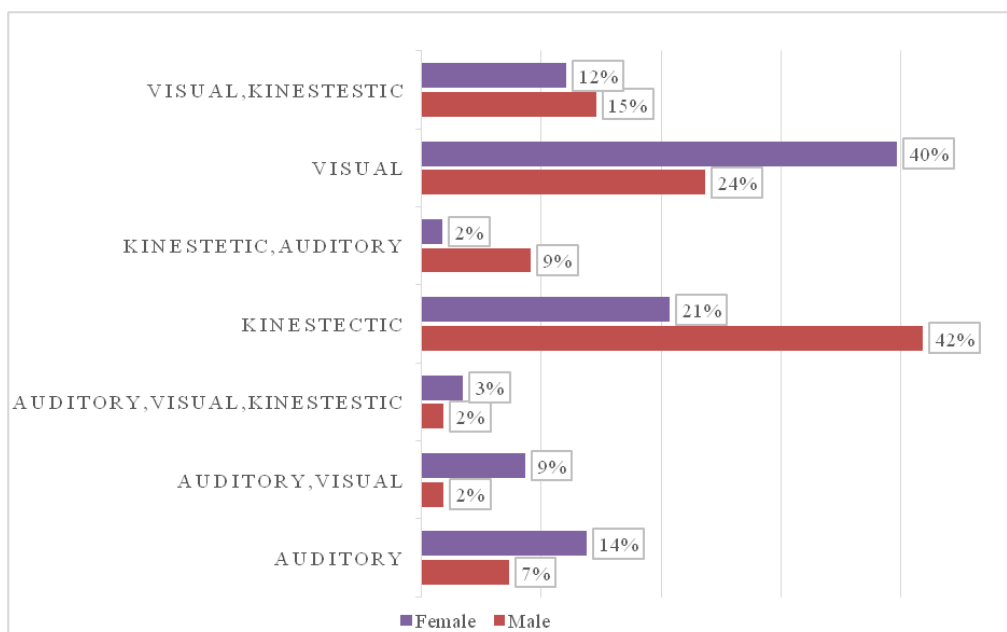


FIGURE 2: THE MOST PREFERRED LEARNING STYLES OF THE FIRST YEAR ENGINEERING STUDENTS OF UNIVERSITI TEKNOLOGI BRUNEI ACCORDING TO GENDER



Based on the data below, the correlation was measured, and Figure 3 below shows that the correlation coefficient is -0.160 where it shows a strong negative relationship between gender and students learning styles. The correlation is

significant at the 0.05 (2-tailed), and the p value shown below is 0.091. This shows that the results accept the null hypothesis which is no relationship and concludes that the relationship between gender and learning styles is statistically not significant.

Correlations		Gender	Learning styles
Gender	Pearson Correlation	1	-.160
	Sig. (2-tailed)		.091
	N	113	113
Learning styles	Pearson Correlation	-.160	1
	Sig. (2-tailed)	.091	
	N	113	113

Figure 3: Pearson Correlation between Gender and Learning Styles

Question 3

Is the first-year engineering student of Universiti Teknologi Brunei aware of their own learning styles?

Among the 113 students, 32% of the students did not know their actual learning styles until they did the VAK Learning styles self-assessment questionnaire. After completing the questionnaire only this group of students realized their learning styles. This will be very helpful for them to start doing the revisions correctly and know why they couldn't cope up with some lectures.

V. CONCLUSION

The main purpose of this study is to identify whether the students know their own learning styles, the students' most preferred learning styles and also to identify if there are differences in the students' learning style according to their gender. The findings revealed that only 32% of the students were not aware of their actual learning styles. Majority of the students preferred visual and kinesthetic learning styles. The data analysis highlights a considerable difference between the male and female students' learning preferences. Thus, the male and female students have significantly different learning styles. Since the study is only done with 113 first-year engineering students, it cannot be generalized to any subset of the population. This study was also designed to present a preliminary investigation of identifying the learning styles of engineering students. The sample is not large enough to make a rigid conclusion but

gives suggestions for further studies.

REFERENCES

- [1]. Azlinda Abdul Aziz, 2006. Learning style adopted by students in learning English as a second language. *Unpublished master thesis*, Universiti Teknologi Mara, Kuala Lumpur.
- [2]. Felder, R.M. & Brent, R., 2005, Applications, reliability and validity of the index of learning styles. *INTERNATIONAL JOURNAL OF ENGINEERING EDUCATION*, 21(1), 103-112.
- [3]. Fleming, N. D. (2001). *Teaching and learning styles: VARK Strategies*. Honolulu Community College.
- [4]. Aragon, S. R., Johnson, S. D., & Shaik, N., 2002, The influence of learning style preferences on student success in online versus face-to-face environments. *THE AMERICAN JOURNAL OF DISTANCE EDUCATION*, 16(4), 227-243.
- [5]. Unal Cakiroglu, 2014, *Analyzing the Effect of Learning Styles and Study Habits of Distance Learners on Learning Performances: A Case of an Introductory Programming Course*. Vol 15, No 4, file:///C:/Users/Owner/Desktop/Backup%20August%202016/Thulasi/Research%20papers/Learning%20Styles/Analyse%20learning%20styles.htm.
- [6]. Lewis, B., 2012, Visual Learning. About.com: <http://k6educators.about.com/od/education/glossary>.



- [7]. Shannon,E. & David,S.B., 2012, Learning styles and its importance in education. https://www.researchgate.net/publication/256022625_Learning_Style_and_its_importance_in_Education
- [8]. Lohri-Posey, B., 2003, Determining Learning Style Preferences of Students. NURSE EDUCATOR, 28(2), 54.
- [9]. Fatt, J. P., 2000, Understanding the learning styles of students. INTERNATIONAL JOURNAL OF SOCIOLOGY AND SOCIAL POLICY, 20(11), 31-45. <http://dx.doi.org/10.1108/01443330010789269>
- [10]. Man.P.C. & Tomoko,N., 2010, A Study of Chinese and Japanese College Students L2 Learning Styles. ASIAN CULTURE AND HISTORY. 2(2).30-35. [Electronic Version]
- [11]. Almasa, M., Parilah, M.S., &Fauziah,A. 2005, Learning-style preferences of ESL students. SCIENCE RESEARCH. 1(2), 9-17. [Electronic Version]
- [12]. Almasa, M., Parilah, M.S., & Fauziah,A. 2009, Perceptual learning styles of ESL students. EUROPEAN JOURNAL OF SOCIAL SCIENCE. 7(3), 101-113. [Electronic Version]
- [13]. Wan Raihan Wan Shaaidi, 2012, A Study of the Preferred Learning styles of Students taking the English 1119 paper in SMK Tengku Intan Zaharah. Thesis. <https://www.researchgate.net/publication/274780335>
- [14]. Rosniah Mustaffa, 2004, The Need to Develop Auditory Learning Styles among Students. *Proceedings of the National Seminar on English language Teaching*. Proceeding of the National Seminar on English Language Teaching, 19-20 January 2004, Palm Garden resort, Kuala Lumpur, pp.72-83. Kuala Lumpur,
- [15]. Erica A. Wehrwein, Heidi L. Lujan, Stephen E. DiCarlo, 2007, Gender differences in learning style preferences among undergraduate physiology students. ADVANCES IN PHYSIOLOGY EDUCATION. Vol. 31 no. 2, 153-157 [Electronic Version] <http://advan.physiology.org/content/31/2/153>
- [16]. Huda Suliaman Alqunayeer and Sadia Zamir, 2015, Identifying Learning Styles in EFL Classroom. INTERNATIONAL JOURNAL OF LEARNING AND TEACHING, Vol.1(2).1-6 [Electronic Version]