LEARNING STYLE PREFERENCES AMONG UNITEN IT STUDENTS: ANALYSIS OF GENDER AND ETHNICITY

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ABSTRACT

Understanding learning style preference in order to improve teaching and learning experience at tertiary education institutions is considered vital nowadays. Numerous studies have been conducted within learning styles context to find factors that contribute to a better learning environment. By knowing students' learning preferences, the course instructor can assimilate necessary course delivery methods which best suit students' learning style preferences, thus enhancing their learning experience. In this research, we target to study the variation of learning styles preference and its relationship with gender and ethnicity among College of Information Technology students in Uniten. 102 students participated in this study with a percentage of 46% being female students and 54% being male students. They were asked to complete the Visual Auditory Kinesthetic (VAK) learning style self-assessment paper-based questionnaire. Based on the assessed learning styles, 91% preferred unimodal learning style and 9% preferred multi modal learning style. Descriptive statistics were used to evaluate learning styles variation while Chi Squared Test was used to test the relationship between learning style preference with gender and ethnicity. From the analysis, it was found that there is a significant relationship between learning style preference and gender (χ^2= 11.4, p=0.044). However, there is no significant relationship between learning style preference and ethnicity (χ^2= 9.86, p=0.453).

1. INTRODUCTION

At any level of educations, understanding the learning styles of students helps the teachers to deliver teaching materials in a more effective method that best suits the student's learning style preferences. Investigating factors that promote successful and effective learning is considered crucial especially at tertiary education institutions as for majority of students, this is their last stage of receiving formal education before entering the workforce sector. Many have agreed that by understanding students' learning style preference, high quality and more effective teaching and learning environment can take place (Miller, 2001; Lujan and DiCarlo, 2006). The quality of undergraduate education, especially in Information Technology (IT) field is important due to the competitiveness of IT industry nowadays. The availability of the Internet and sharing of information related to IT are way too prevalent that it has become threats to IT graduates to compete with others in securing IT jobs in the market.

Therefore, it is important that tertiary education institutions embed effective teaching and learning environment in order to ensure their students are able to maximize the information they obtained to the fullest.

Until today, scholars are actively finding solutions that can encourage effective and successful learning experience (Mon *et al.*, 2014; Elkalmi *et al.*, 2015). However, very few streamline their focus to IT education. Therefore, in this study, we intend to evaluate the variation of learning style preference of IT students in Uniten. In addition to that, we also intend to investigate if there is any relationship between learning style and gender as well as ethnicity.

2. REVIEW OF RELATED LITERATURES

Learning styles assessment provides an overview to course instructors on how the students receive and process information, thus assisting the instructors to deliver course materials by using approaches which suit the students' learning styles. By definition, learning styles are the manner in which, and the conditions under which, learners most efficiently and effectively perceive, process, store, and recall what they are attempting to learn (James and Gardner, 1995). There are many techniques used to identify one's learning style. One of the commonly used method is by using sensory modality that one prefers to use to receive information. There are three (3) major sensor modalities defined by our neural system which are Visual (V), Auditory (A) and Kinesthetic (K). V learners are those who learn best by observing. This group of learners understands better by using drawings, pictures, diagrams and demonstration. Learners of A type best learn by listening to audio such as recorded lectures and class discussion while K learners learn best by performing physical activities such as drama or hands on activities. Flemming (Fleming, 1995) however has extended this classification to include another category which is Read-Write (R), to be identified as VARK. The new classification, R, learn best through interaction with textual materials.

Numerous researches have been conducted to find any significant relationship between learning style and gender. A study done by Almigbal (2015) found that there was a significant difference in learning style between genders. Another study by Sarabi-Asiabar *et al.* (2015) found similar result, but only for single modality learning preference. The study done by Choudhary *et al.* (2011) also found that there was a significant difference between gender in both unimodal and multimodal learning preferences. However, although many found that there was a relationship between the 2 categories, a study conducted by Ariffin *et al.* (2014) indicated otherwise. The study found there was no significant relationship between gender and learning style preference of IT students. This finding was supported by Kumar *et al.* (2012) in which there was no significant difference between gender and learning style preference found among medical students. Most of the studies that investigate the relationship between gender and learning style preference also looked into the preferred sensory modality of each gender type. A study by (Choudhary *et al.*, 2011; Mon *et al.*, 2014) for example, found that majority of students prefer multimodal as their learning style, and there was a significant relationship between multimodal learning style and gender.

As there are 3 major ethnicities among Uniten students, we are also interested in finding if there is any significant relationship between ethnicity and learning style. The information definitely helps course instructors to properly assimilate to the learning preference of the major ethnicity if there is any significant association between the two. To date, studies that are related to learning style and ethnicity is very minimum. A very old study done by Matthews (1991) found that there was no significant relationship between ethnicity and learning style preference, but the study was done in the United States and the results might not be applicable to Malaysia.

As there are inconsistencies in those findings, there is always a need to explore the relationship further and perhaps by excluding certain factors, a more concrete conclusion about the relationship between these two categories can be properly made. Therefore, in this study, we intend to see the preferred learning styles of IT students in Uniten and investigate if learning style preference has any significant relationship with gender and ethnicity.

3. RESEARCH METHOD

A. Sample

A cross sectional study was performed to assess the learning style preferences among 102 students of College of Information Technology (COIT), Uniten. All students who participated were students who were enrolled in either Computer Science programs or Information Technology programs. The students were randomly selected from various courses that were offered at COIT during Semester I 2013/2014, Semester II 2013/2014 and Semester I 2014/2015.

B. Questionaire

To assess learning style preference, each student was provided with a paper based questionnaire. The questionnaire used in this study was VAK Learning Preferences Self-Assessment Questionnaire. There were 2 parts on the questionnaire: 3 demographic questions and 30 multiple choice questions. The demographic questions were gender, age and race. The language used in the questionnaire was English as English is the medium used for IT courses in Uniten. Fig. 1 depicts an extraction of VAK self-assessment questionnaire.
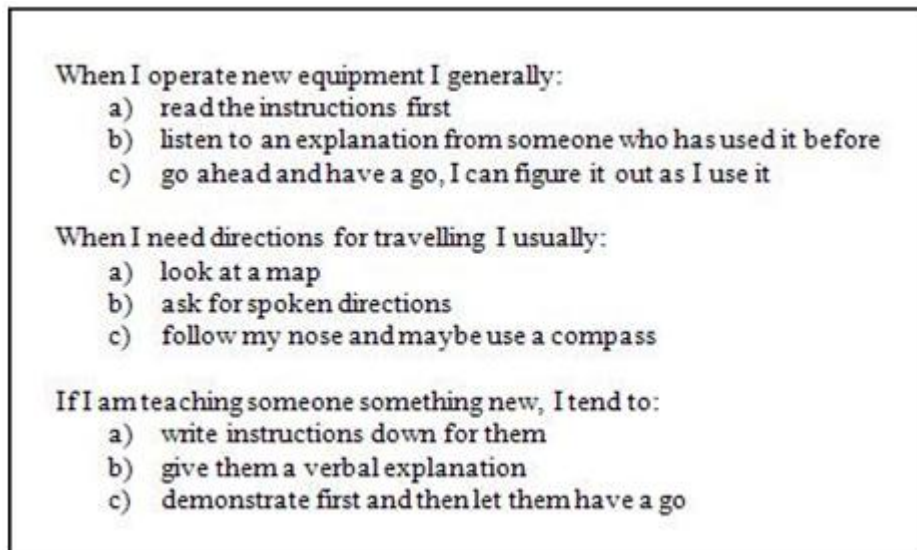

When I operate new equipment I generally:
    a) read the instructions first
    b) listen to an explanation from someone who has used it before
    c) go ahead and have a go, I can figure it out as I use it

When I need directions for travelling I usually:
    a) look at a map
    b) ask for spoken directions
    c) follow my nose and maybe use a compass

If I am teaching someone something new, I tend to:
    a) write instructions down for them
    b) give them a verbal explanation
    c) demonstrate first and then let them have a go

Fig-1. Sample of VAK self-assessment questionnaire

C. Data Collection and Analysis

We randomly distributed VAK self-assessment questionnaire to students of COIT during Semester I 2013/2014, Semester II 2013/2014 and Semester I 2014/2015. Students were informed on the purpose of the study by the authors and 145 students were willing to participate in the study voluntarily. The students' preferred learning styles were determined immediately after they completed the questionnaire. The data were transferred to an electronic file for viewing and analysis. Statistical association between variables in the study were analyzed using Minitab. We performed Chi-Square tests to determine if there was any association between gender and the uni-modal and multimodal learning preferences. In addition, we also calculated the Chi-Square value to see the relationship between learning preference and ethnicity. The level of significance (α) was set at 0.05 for every Chi-Square test performed.

4. RESULTS

The results obtained from this study were analyzed using descriptive statistics and Minitab. From the total participants, 54% were male while the other 46% were female as shown in Fig. 2.
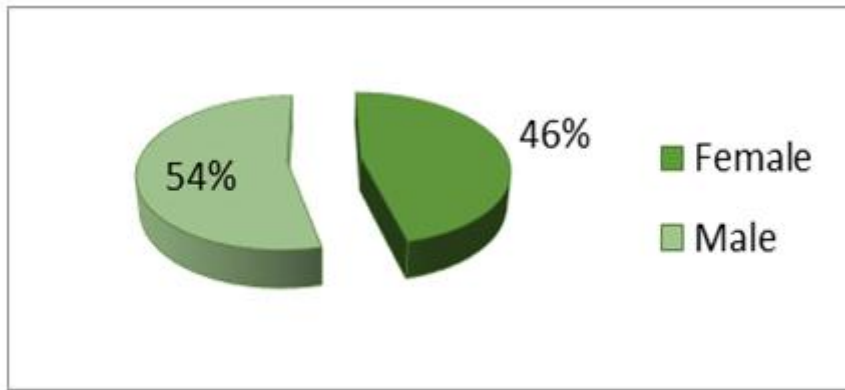
Fig-2. Gender distribution of students

Their age range was between 19 to 22 years old. No further analysis was done on age since the range is considered minimum. From the self-assessment result, 91% of the students preferred single sensory modality (either V, A, or K), 8% preferred bimodal sensory modality (VK, or AK) and 1% preferred trimodal sensory modality (VAK). Fig. 3 summarizes the distribution.
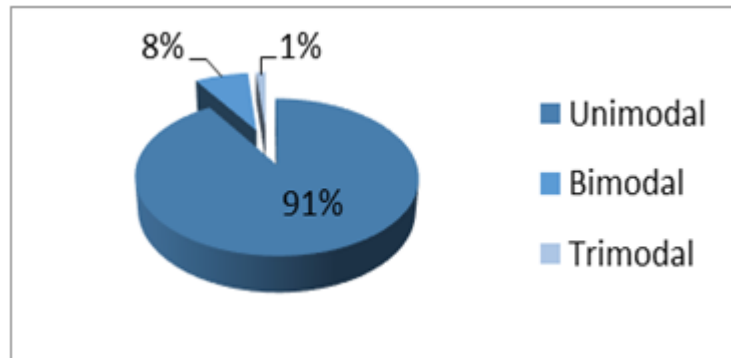

Fig-3. Learning style modality of students

For a much simpler analysis on sensory modality, we had decided that only 2 categories would be used, unimodal sensory and multi modal sensory where multimodal includes both bimodal and trimodal sensory modalities. We found that multiple sensory learning preference was dominated by male instead of female. Fig. 4 depicts the distribution of gender for multimodal learning preference.
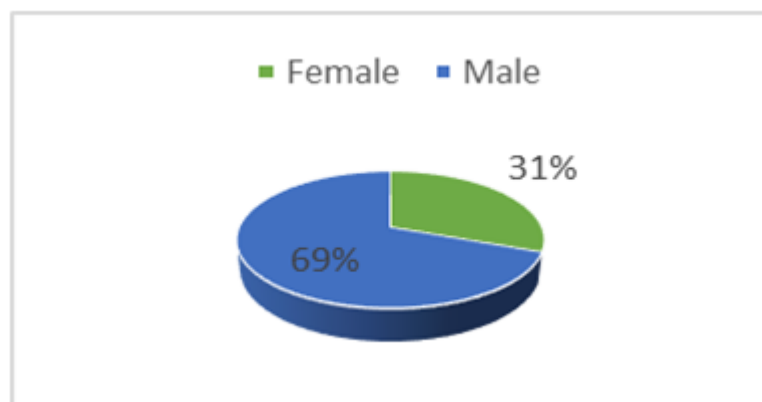

Fig-4. Gender distribution for multimodal learners

The data for learning style modalities were tabulated against gender in Table 1. We performed Chi-Square Test and found there was no significant relationship between gender and modality of learning preference (χ^2= 1.37, p=0.242).

Table-1. Learning Styles Distribution

Gender	Unimodal		Multimodal		Total		Chi Square Value	p-value
Female	63	43%	4	3%	67	46%		
Male	69	48%	9	6%	78	54%	1.37	0.242
Total	132	91%	13	9%	145	100%		

We then displayed the learning style preferences and their frequency on a bar chart. It was observed that for single sensory modality, majority of the students were V learners where 59 students of the total participants preferred this learning style, followed by K learners with 46 students and A learners with 27 students. 7 students were VA learners, 4 students were VK learners while 2 students were VAK learners. Fig. 5 summarizes the VAK distribution classification for all students who participated in this study.

To investigate the relationship between gender and learning style preference, we first displayed the results in descriptive statistics as shown in Fig. 6.
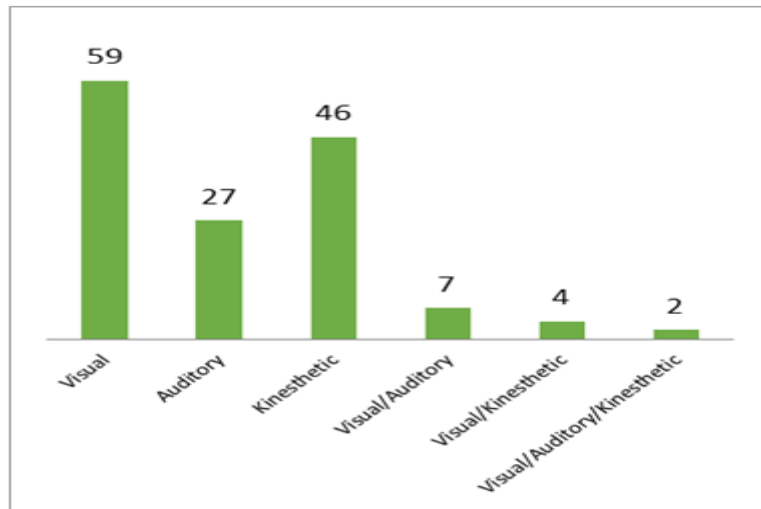

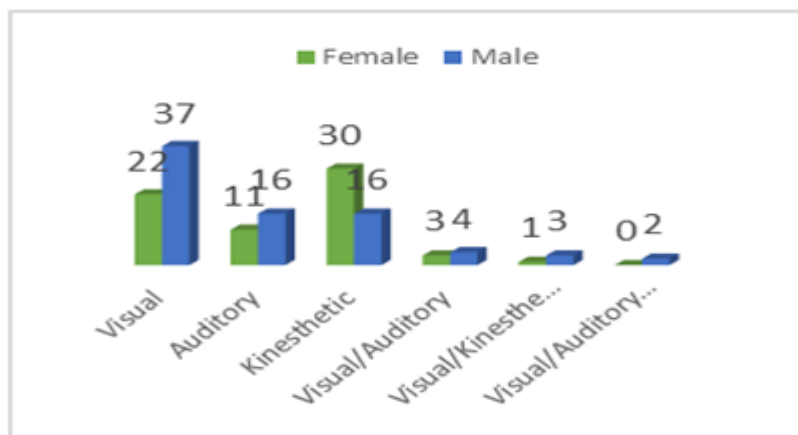**Fig-5.** Learning style classification of students

Fig-6. Learning style distribution based on gender

From the descriptive statistics, majority of male students were V learners, while majority of female students were K learners. We further analyzed the data by using Chi Square Test and it was found that there is a significant relationship between the gender and learning style preference (χ^2= 11.4, p=0.044).

As this study also aims at studying whether there was a relationship between learning style and ethnicity, we tabulated the data on learning style preference against ethnicity as shown in Table 2.

Table-2. Learning Styles Distribution AMONG Ethnicity

Style	Malay		Chinese		Indian		Others		Total
V	36	25%	9	6%	10	7%	4	3%	59
A	12	8%	5	3%	10	7%	0	0%	27
K	30	21%	5	3%	10	7%	1	1%	46
VA	5	3%	0	0%	2	1%	0	0%	7
VK	1	1%	1	1%	2	1%	0	0%	4
VAK	2	1%	0	0%	0	0%	0	0%	2
Total	86	59%	20	14%	34	23%	5	3%	145

We also displayed the results for 3 main ethnicities in the sample, Malay, Chinese and Indian by using pie charts as shown in Fig. 7, 8 and 9 respectively.
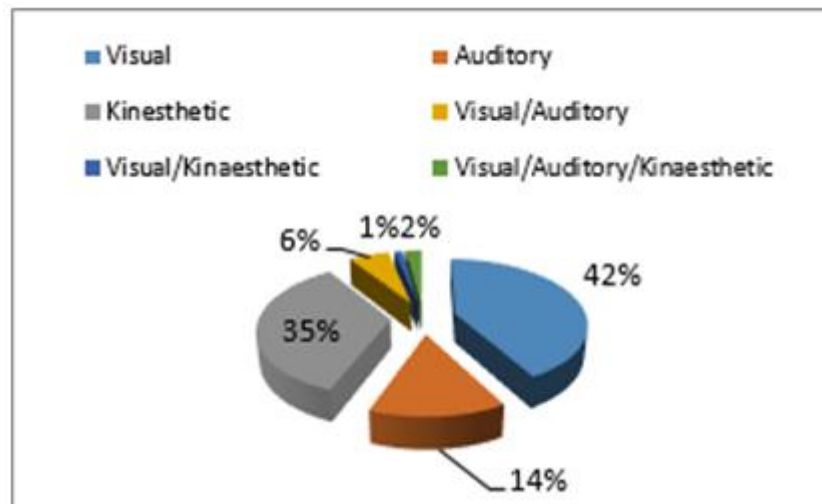
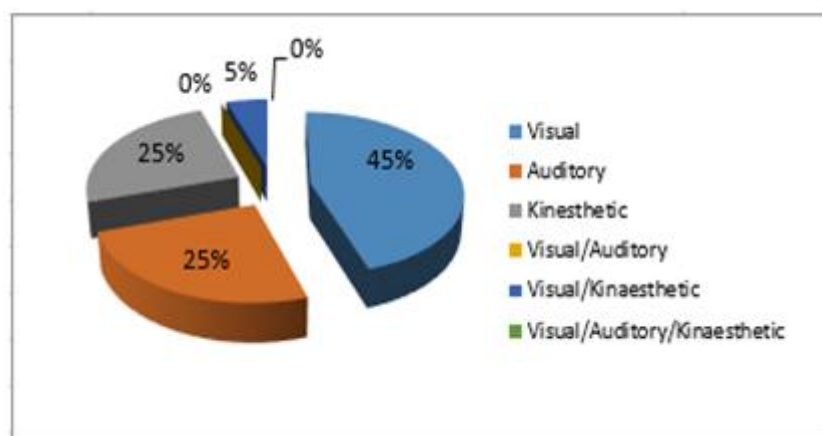

Fig-7. Learning style distribution for Malay

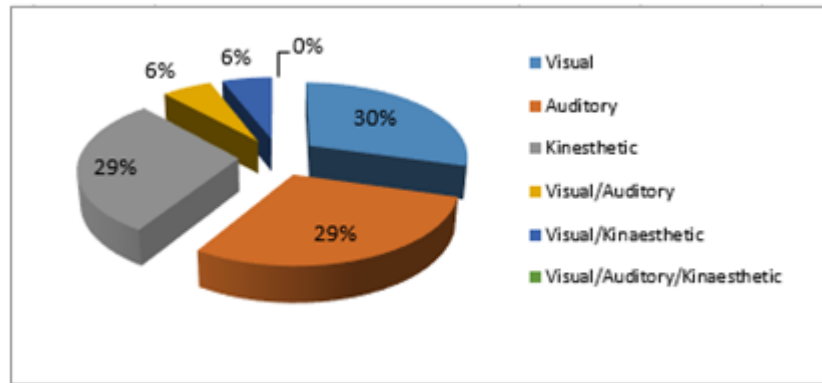**Fig-8.** Learning style distribution for Chinese

Fig-9. Learning style distribution for Indian

From the descriptive statistics, V learners seemed to be the most dominant learning style preference among Malay, Chinese and Indian students, followed by K learners for Malay and Chinese, while A learners for Indian. However, from the Chi-Squared Test, it was found that there was no significant relationship between ethnicity and learning style preference (χ^2= 9.86, p=0.453).

5. DISCUSSION

In this study, we found that many IT students preferred a single modality learning preferences (91%) and not many students preferred multimodal learning preferences (9%). Among unimodal learners, majority of them were V learners, which is common for many ethnicities. In a study done by Mon *et al.* (2014) female had more diverse learning style preference as compared to males' but our study found otherwise. Although there was no significant relationship between gender and modality of learning styles, it could be observed that majority of multimodal learners were male students.

Among unimodal learners, it was found that V was the most preferred learning style among Uniten IT students. Majority of female learners were found to be K learners as compared to male students where majority of them were V learners. This is in line with the results from a study by (Wehrwein *et al.*, 2007; Shabana and Komel, 2015) where female students tend to be K learners. As found in studies by (Lujan and DiCarlo, 2006; Almigbal, 2015) and in this study, there was a significant relationship between gender and learning style preference. Therefore, gender difference could affect learning style preferences. With this finding, course instructors can design course materials that best suit the learning preference depending on gender of the students in their class.

As Uniten is composed of 3 main ethnics, namely Malay, Chinese and Indian, it is vital that course instructors assimilate their teaching deliveries that best suit the ethnic needs. However, our study found that there was no significant relationship between learning style preference and ethnicity. Hence, ethnicity does not affect learning style preference among Uniten students.

6. CONCLUSION

Promoting an effective and successful learning environment is the ultimate goal of many tertiary education institutions. Couse instructors must embed various teaching methods in order to accommodate multiple modes of students' learning style preference. As this study indicated that there is a statistical significant difference between gender and learning style, it is important that course instructors apply appropriate teaching deliveries according to gender of their students. Failure to adapt to students' preferred learning style may result in loss of interest in lectures, hence affecting the performance of the students. Any tertiary education institutions should promote successful learning environment so that high quality graduates can be produced for the IT industry.

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