UNIVERSITI PUTRA MALAYSIA

LEARNING STYLE AMONG MEDICAL STUDENTS IN FACULTY OF MEDICINE AND HEALTH SCIENCES, UNIVERSITI PUTRA MALAYSIA IN 2013

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LEARNING STYLE AMONG MEDICAL STUDENTS IN FACULTY OF MEDICINE AND HEALTH SCIENCES, UNIVERSITI PUTRA MALAYSIA IN 2013

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ABSTRACT

Background: Every students possess different learning style from each other. This study use VARK questionnaire where learning style are divided into four major groups which are visual learners that learn through flow diagram and pictures, auditory learners that learn through listening and speech, read and write learners that learn best through reading text book and jot down the notes and kinesthetic learners that learn from touch, hearing, smell, taste, and sight.

Objective: The aim of this study is to determine the learning style preferences of medical students in Faculty of Medicine and Health Sciences, Universiti Putra Malaysia and its association with gender, age, ethnicity and year of study.

Methods: The study design is a cross sectional study with systematic sampling method. The setting is students that are in medical course in 2013. We administered the VARK questionnaire to 213 of the students (n=213) out of 500 medical student after calculating the sample size which was 211. The questionnaire consists of 16 real life questions which identify four different learning modes which is visual, aural, read and write or kinesthetic.

Results: The response rate was 100%. Majority of the students (70.4%) preferred multimodal learning preference over single mode. Only 29.6% of the students preferred the single mode. The most preferable single mode was kinesthetic with 34.9%, which also applicable to both male (10.3%) and female (12.5%) students. For multiple mode, the most preferable mode was quadmodal which comprises the whole VARK modes with 27.2%. it is then followed by bimodal (22.5%) mode and lastly trimodal (20.2%) mode. According to the year of study, 4th year males (20.7%) prefer kinesthetic more than female. While within 5th year students, females (13.8%) prefer kinesthetic mode better than male. In the end, there was no significant association between learning style preferences with factors studied, which are gender, age, ethnicity and year of study where all the P values for each factor are more than 0.05 ($P>0.05$).

Conclusion: The results of this study can provide a useful information for the students and teacher to acknowledge their learning preferences while improving the quality of the teaching and learning experiences of students. However, there were no statistically significant difference between gender, age, ethnicity and year of study with learning style of the medical students.

Keywords: Learning Style, VARK Questionnaire, visual, auditory, read/write, kinesthetic; learning modes.

GAYA PEMBELAJARAN DALAM KALANGAN PELAJAR PERUBATAN DI FAKULTI PERUBATAN DAH SAINS KESIHATAN, UNIVERSITI PUTRA MALAYSIA PADA TAHUN 2013

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ABSTRAK

Latar Belakang: Setiap pelajar mempunyai gaya pembelajaran mereka yang tersendiri. Borang kaji selidik VARK digunakan yang akan membahagikan gaya belajar tersebut kepada empat kumpulan besar, iaitu visual, pendengaran, membaca dan menulis dan juga kinestetik. Pelajar yang lebih suka belajar melalui kinestetik lebih senang belajar dengan menggunakan lima pancaindera.

Objektif: Tujuan kajian ini dijalankan adalah untuk mengenalpasti gaya pembelajaran dalam kalangan pelajar perubatan di Fakulti Perubatan dan Sains Kesihatan (FPSK), Universiti Putra Malaysia dan hubungannya dengan jantina, umur, kaum dan tahun pembelajaran seseorang pelajar.

Kaedah: Reka bentuk kajian yang dijalankan adalah kajian keratan rentas yang menggunakan kaedah persampelan sistematik. Populasi kajian ini adalah pelajar perubatan di FPSK pada tahun 2013. Borang soal selidik VARK telah diedarkan kepada 213 sampel pelajar (n=213) daripada 500 jumlah pelajar perubatan. Borang soal selidik tersebut mengandungi 16 soalan yang akan menentukan sama ada responden tersebut mempunyai gaya belajar melalui visual, pendengaran, membaca dan menulis atau kinestetik.

Keputusan: Kadar respons adalah sebanyak 100%. Kebanyakan pelajar lebih suka kepada cara belajar yang pelbagai yang merangkumi 70.4% daripada jumlah pelajar. Hanya 29.6% sahaja daripada jumlah pelajar tersebut yang memilih cara belajar yang tunggal. Cara belajar tunggal yang paling disukai adalah kinestetik (34.9%) yang menjadi pilihan kedua-dua jantina lelaki (10.3%) dan perempuan (12.5%). Untuk cara belajar yang pelbagai pula, cara belajar yang paling digemari adalah kesemua kumpulan VARK dengan 27.2% dan dituruti oleh cara bimodal (22.5%) dan trimodal (20.2%). Pelajar lelaki tahun 4 lebih gemar dengan cara kinestetik dengan 20.7%. Manakala bagi tahun 5 pula, pelajar perempuannya (13.8%) yang lebih cenderung kepada kinestetik berbanding lelaki. Namun yang demikian, kajian ini tidak dapat mencari hubungan antara cara belajar dengan jantina, umur, kaum dan tahun belajar.

Kesimpulan: Keputusan kajian ini sangat berguna kepada pelajar dan juga tenaga pengajar supaya kedua-dua belah pihak dapat meningkatkan kemahiran belajar dan mengajar masing-masing. Namunyang demikian, tiada hubungan yang jelas antara jantina, umur, kaum dan tahun belajar dengan cara belajar pelajar perubatan.

Kata Kunci: Cara belajar, soal selidik VARK, visual, pendengaran, mambaca dan menulis, kinestetik

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LIST OF ABBREVIATIONS

V	Visual
A	Auditory
R	Read and Write
K	Kinesthetic
VA	Visual and Aural
VR	Visual and Read and Write
VK	Visual and Kinesthetic
AR	Aural and Read and Write
AK	Aural and Kinesthetic
RK	Read and Write and Kinesthetic
VAR	Visual, Auditory and Read and Write
VAK	Visual, Auditory and Kinesthetic
ARK	Auditory, Read and Write and Kinesthetic
VRK	Visual, Read and Write and Kinesthetic
VARK	Visual, Auditory, Read and Write and Kinesthetic
SPSS	Statistical Package for Social Sciences
FMHS	Faculty of Medicine and Health Sciences
UPM	Universiti Putra Malaysia

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

Students have different ways of learning and receiving new information. The transition from pre-university to first year medical education can be very hard for the students as there is dramatic increase in the volume of contents and work load. Medical students nowadays represent a broad spectrum of background in terms of age, ethnicity, culture, and experience as well as learning preferences and styles. This phenomenon brings challenges for lecturers to meet the educational needs of all students. To be more specific, students' motivation and performances are greatly improved when the instruction is adapted to student learning preferences and styles (Miller, 2001). So, it is the responsibility of the students to find out this diversity of learning styles among students and develop a more appropriate learning approaches (Tanner & Allen, 2004). Moreover, it is also the responsibility of the students to find out their own preference learning methods as to improve their learning efficiency and academic achievement.

A learning style or preference is the complex manner in which, and conditions under which, learners most efficiently and most effectively perceive, process, store, and recall what they are attempting to learn (James & Gardner, 1995). It is to address learners' preferred ways of learning in terms of sensory modality by which they would like to take in new information and knowledge. VARK is an acronym that stands for visual (V), auditory (A), reading/writing (R) and kinesthetic (K). These are the four major sensory modes of learning. Learners can use all of these sensory modes of learning, but there is always one mode which is dominant and most preferred. Visual learners learn by seeing drawings, pictures, graphs, charts and other image-rich teaching tools. Auditory learners learn through listening to lectures and speech, exploring material through discussions, and talking through ideas.

Reading/writing learners like to interact with textual materials, whereas kinesthetic learners learn from touching, hearing, smelling, tasting and sight-seeing (Lujan & DiCarlo, 2006). Certain students have single, strong preference mode of learning (unimodal), while some students prefer multiple learning modes (bimodal, trimodal, quadmodal) (Breckler *et al.*, 2009). The inventory tool used to identify students preference ways of learning is through VARK questionnaire, which is developed by Fleming (Fleming, 1995).

The aim of this study is to identify the learning style among medical students in Faculty of Medicine and Health Sciences of Universiti Putra Malaysia. The finding of the study can help in improving teaching and learning approaches of the lecturers to those medical students so as to improve the quality of learning among the students. Most importantly is for those medical students to know their favorite and most effective learning methods to improve their academic achievement.

1.2 OBJECTIVES

1.2.1 General Objective

To identify the learning style among medical students in Faculty of Medicine and Health Sciences, Universiti Putra Malaysia in 2013.

1.2.2 Specific Objectives

1. To determine the learning style among medical students.
2. To determine the association of gender on learning style preferences.
3. To determine the association of age on learning style preferences.
4. To determine the association of ethnicity on learning style preferences.
5. To determine the association of year of study on learning style preferences.

1.3 RESEARCH HYPOTHESIS

1. There is association between gender and learning style preferences.
2. There is association between age and learning style preferences.
3. There is association between ethnicity and learning style preferences.
4. There is association between year of study and learning style preferences.

1.3.1 Null Hypothesis

There is no association in gender, age, ethnicity and year of study with learning style preferences among medical students.

CHAPTER 2

LITERATURE REVIEW

2.1 DEFINITION OF LEARNING

Learning is defined as the acquisition of knowledge or skills through experience, practice, or study, or by being taught. This whole process is done purposely to gain and acquire knowledge, skills and attitudes. The learner understands and process information in many different ways (Claaxton & Murrel, 1987). These are known as learning styles. In a university or college life, the faculties teach overwhelmingly in single mode, which is through lecturing the students. For the students, listening to lectures is a way of passive learning method that acts as a route of memorizing and being exposed to a new knowledge. The lectures usually used PowerPoint presentation as the teaching method and the lecturers will give an explanation of the topic involved. Usually, most students will enroll themselves into note-taking as the means of acquiring the knowledge (Endorf. & McNeff, 1991).

2.2 IMPORTANCE OF KNOWING LEARNING STYLE

However, students need to put in more effort in their studies by doing a self-directed learning as there is absolutely insufficient information by only depending to the lectures. In short, they have to initiate an attentive study outside the class as tertiary education usually stressed out students' centered learning more than lecture's based learning. This is unconditionally applied to the medical students as their curricular are too many to be covered in both preclinical and clinical years. In order to catch up and match to the vast current medical knowledge available, they need to figure out their preferred learning styles to enhance their competency for a better learning experience. This will likely contribute to a long-life experience (Yeow *et al.*, 2001)

People are different from one another which make us special in our own way. Due to this distinctness, everyone has different perception which ultimately resulted in various ways of learning among students. If our style of learning is accommodated wisely, which means the learning styles match the teaching styles, it can provide a better attitudes toward learning, exploring, and an increase in productivity, academic achievement, as well as creativity (Griggs & Shirley, 1991). It also said that if both of the styles are superiorly mismatched, the students are likely to become annoyed, bored and inattentive in class. Then, it may cause them to fails the tests and exams which eventually will lead them to get discouraged and become despair towards the courses, the curriculum and towards themselves. These conditions worsen when they decide to change to other course or even drop out of school (Felder, 1996).

2.3 DEFINITION OF LEARNING STYLE

Generally, learning styles is the method used by an individual to focus and retain new and difficult information (Vijaya & Zanaton, 2012). In addition, Legendre stated that learning styles is the modalities of a person using in condition of learning, solving a problem and thinking as well as the style the person prefer to react in within an educational setting (Legendre & Legendre, 1998). It is one of those elements (Griggs & Shirley, 1991) which influences the learning capability of students. In other study, learning styles is defined as the complex manner and circumstances in which, the learners perceive, process, store, and recall what they are attempting to learn most efficiently and most effectively (Azizi *et al.*, 2001) There are various factors that can influence student learning styles. James and Gardner stated that these factors include gender, age, academic achievement, brain processing, culture and creative thinking (James & Gardner, 1995). However, in this study, we will be identifying the association between gender, age, ethnicity and year of study with the preference of learning

styles among medical students in Faculty of Medicine and Health Sciences, Universiti Putra Malaysia.

2.4 TYPES OF LEARNING STYLE

Basically, there are four major types of learning styles according to Fleming. They are visual (V), auditory (A), read and write (R), and kinesthetic (K) which is called as VARK (Fleming, 2007). The visual learners are those who usually learn through seeing with their eyes (Mary, 2009). They prefer maps, charts, graphs, diagrams and pictures that will enlighten their mind to induce better understanding. Auditory learners gather information best by using listening techniques which makes them a good listener (Josephine, 2012). This makes them learn better in typical lectures and classes. They also prefer to share ideas by discussing with other students and teachers (Doris & Supawan, 2001). On the other hand, learners with a read or write preference learn better by taking notes during the lectures and by reading text book to enhance their knowledge. They like essays, reports, textbooks and manuals which they understand faster by reading it. Kinesthetic learners are tactile learners who learn best by experienced it themselves with their body especially by experiencing with their five senses. They learn better when they are doing physical procedure such as practical and experimental manipulation (Fleming, 2004).

This topic is important as both the teachers and students will notice and acknowledge that there are various ways of learning in different students (Honigsfeld, 2001). It is not necessarily for the teachers to fulfill each and every student preferred learning styles. They just can try multiple ways of teaching as including unique and informative videos in their presentations, use models so that students can visualize and clearly understand what the lecturers are trying to teach or by making the students involved in any demonstration. This way, student's mind will become more focused toward the whole lecture. Besides that, students can as well discover the best method for them to study with their best speed. This

will ensure that students can grab the knowledge at a comfortable pace. Furthermore, these will improve the teaching and learning skills and experience of both parties. In order to do this, the teachers need to understand the learning strategies and get acquainted with their students' trait (Gudmundsdottir, 1987). As the students can understand easily with a compatible teaching style, they tend to retain the information longer which will increased their productivity and competency effectively. This also can lead the students towards a more positive post-course attitude towards the learning subject in the future (Murphy *et al.*, 2004)

2.5 VARK QUESTIONNAIRE

Most of the researchers use the Fleming's VARK questionnaire as the tool to assess the students preferred ways of learning (Fleming, 2007). The VARK inventory that was developed in 1987 provides metrics for each of four perceptual modes: visual (V), auditory (A), read/write (R), and kinesthetic (K). This questionnaire contains a total of 16 questions with multiple-choice responses where each response represents a particular mode. The respondents are allowed to choose more than one answer for each question which indicates that the participants are not restricted to only one of four modes (Fleming, 2007). However, they may show a strong preference for one particular mode. In brief, an individual's preference may range from a unimodal until multimodal which comprises of bimodal, trimodal and quadmodal preferences (Fleming, 2005) (Hawk & Shah, 2007).

2.6 OTHER LEARNING TOOLS

As far as VARK questionnaire is widely used in learning styles investigation, Kolb's Learning Style inventory also is vastly used in these kind of study. The Learning Style Inventory (LSI) is derived from an experiential theory and model of learning developed by Kolb (Kolb, 1976, 1984). It was first developed in 1976 and until now, five versions of the Learning Style Inventory have been published over the last 35 years (Kolb, 2005). In addition,

the fundamental basis for Kolb's model was psychology, philosophy and physiology. In his study, he divided learning styles into four groups: converging, assimilating, diverting and accommodating (Gulpinar *et al.*, 2011). He also argued that learning styles of an individual may change over time which indicates that the results may be different when it is tested on the same individual years after the first test. The latest version of the inventory is the Kolb Learning Style Inventory-Version 3.1 wish is published in 2005. It is also stated that this inventory offer individuals the understanding of how they solve problems, deal with new situations and manage others (Kolb, 2005).

2.7 PREVIOUS STUDIES FINDINGS

There have been a lot of study of learning styles that used VARK questionnaire as their tools. Flemming stated in his VARK website that a minority of people that is around 36% prefer to use one sensory modality when digesting information(unimodal), whereas the majority of people which is around 64% prefer to use multiple modalities when learning (Gudmundsdottir, 1987). In a study about the learning styles of the first-year students of the medicine discipline in Michigan done by Lujan and Dicarlo, 63.8% of the students preferred multiple modes of learning presentation. From there, 24.5% preferred bimodal, 32.1% preferred trimodal and majority of the students, (43.4%) preferred quadmodal. Meanwhile, only 36.1 % of the students preferred a single mode learning styles (visual, auditory, reading/writing, or kinesthetic) (Lujan & Dicarlo, 2006). In other study done in King Saud Bin Abdul Aziz University for Health Sciences in Saudi Arabia stated that, vast majority of students (72.6%) preferred to learn by multiple sensory modalities. Of these, 34.9%, 42.5% and 22.6% were bimodal, trimodal and quadmodal, respectively. There are only 27.4% of students preferred to learn by a single sensory modality (Nuzhat et.al.,2011). This shows that most students had a balanced set of preferences which means that they prefer information to arrive in a variety of modes.

In Malaysia, a study that was done by Kumar, Voralu, Pani and Sethuraman in AIMST University School of Medicine, Kedah, in 2008 found that 51.5% preferred a single mode while 48.6% preferred multiple modes of learning which is not very significant in differentiation. Among those single mode preference, majority of them (38%) preferred single read/write mode, while the least is the visual learner (10%). Furthermore, the representations of multimodal learners were 25% Bimodal, 12% Trimodal and 67% Quadri-modal (Kumar et al., 2009). In brief, both local and oversea students preferred multiple modes of learning styles compared to single mode.

Many studies were conducted to find whether gender influenced the learning styles of a student. So, are there any significant differences in the style of learning between male and female? In a study done by Wehrwein, Lujan and DiCarlo investigated that the gender difference influenced the learning style preferences among the physiology students. About 54.2% of the female and 12.5% of the male students preferred only one learning style; while 48.5% of the female and 87.5% of the male students preferred a multiple learning styles. In brief, most of the male students preferred multi-modal learning styles, whereas majority of the female students were likes to use single-modal learning style (Wehrwein et al., 2007).

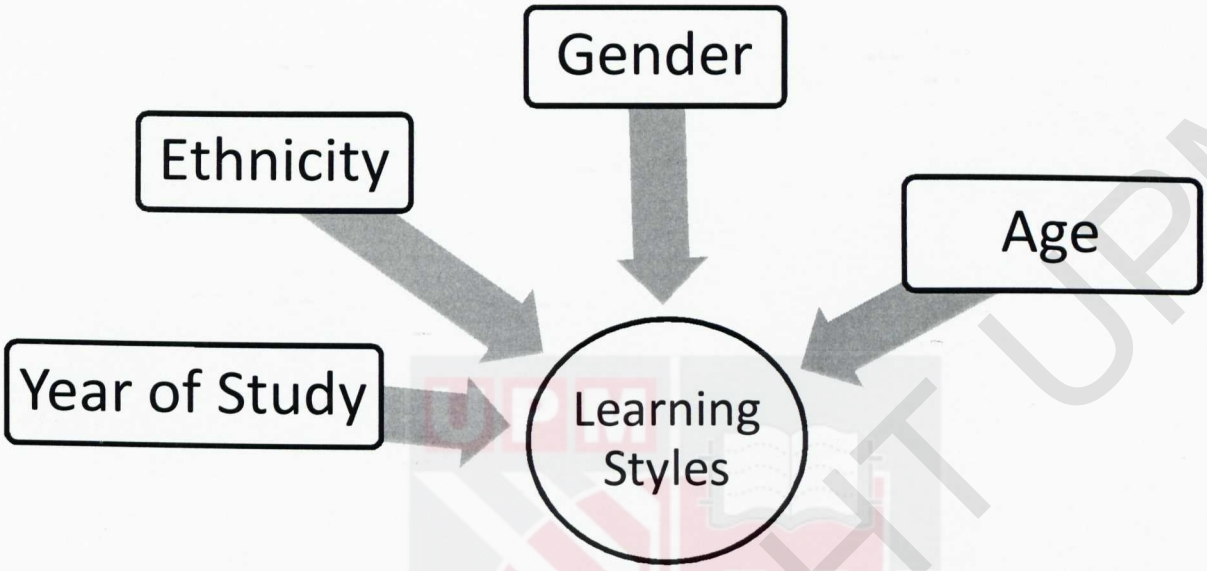
In other study about the learning styles among medical students in Western Nigeria, most females (34.3%) preferred the read and write technique. Meanwhile, most of the males students (48.0%) preferred the kinesthetic method. This difference was also statistically significant (Josephine, 2012). In other words, males prefer to be tactically and physically involved in order to improved their learning, while female students can understand and learn better just by reading and making notes. However, in a study of gender differences in learning style preferences among medical students in India stated that there was no difference in learning preferences by gender (Agnihotri *et al.*, 2012). In a study that was conducted in

Universiti Teknologi MARA, Malaysia by Noraizan, Farrah, Zulkefli and Szarina regarding the learning styles of non-science and non-technology students on technical courses, they found that there are also no significant difference between genders in learning preferences (Noraizan et al., 2010).This concludes that learning styles is not necessarily different among gender in different study population.

Besides that, a considerable amount of research has been done in order to find the association between learning styles and academic achievement. Several studies confirmed that there is a relationship between learning styles and academic achievement (Dobson, 2010) (Indreica *et al.*, 2011). Moreover, a significant relationship was found between the performance of the students and the single-modal and the multi-modal learning styles (Mohammadkarim et al., 2011). However, there are studies shows that there is no relationship between learning styles and academic achievement (Ilias *et al.*, 2010). In addition, Ronan (1996) and Van Zwanenberg *et al.* (2000) also found that the learning style preferences did not anticipate the students' academic performance.

In certain studies, they tried to find if there is association between age and status with learning styles. Mohammadkarimm et al. (2011) found that there was a significant relationship between the education status and the multi-modal learning styles ((Mohammadkarim *et al.*, 2011). However, in other studies done by Dobson (2010) found that there was no association between sensory modality preferences and status or age (Gudmundsdottir, 1987). Dobson also stated that a future research should include different groups of students and also a larger and more statistically valid sample so that the learning styles preferences can be compared directly.

2.8 CONCEPTUAL FRAMEWORK



CHAPTER 3

METHODOLOGY

3.1 STUDY LOCATION

The study was conducted in Faculty of Medicine and Health Sciences, Universiti Putra Malaysia.

3.2 STUDY DESIGN

It was a cross-sectional study.

3.3 STUDY DURATION

The study was conducted from March until September 2013.

3.4 SAMPLING

3.4.1 Study population

All medical students in Faculty of Medicine and Health Science, Universiti Putra Malaysia.

3.4.2 Sampling population

3.4.2.1 Inclusion criteria

- Students in medical programme.

3.4.2.2 Exclusion criteria

- Students in other than medical programme.

3.4.3 Sampling frame

List name of medical students in Faculty of Medicine and Health Science, Universiti Putra Malaysia.

3.4.4 Sampling unit

A medical student in Faculty of Medicine and Health Sciences, Universiti Putra Malaysia.

3.4.5 Sampling method

Systematic sampling was used in this study. The total of medical students is 500, while the sample size for this study is 211. To find the interval selection, Y, 500 is divided by 211 (Y=500/211). Thus Y= 2.36, which is approximated to 2. Then, the respondents were picked from the sampling frame according to their number, where the first number is either 1 or 2. If the first number is *k*, starting from it then continued with every k^{th} name from the list is chosen as respondents.

3.4.6 Sample size

All medical students in FPSK UPM in 2013 were included.

n – Required sample size

P – Estimated prevalence of R learning preference in the population. (Kumar, Voralu, Pani, 2009)

Z – Confidence level at 95% (standard value of 1.96)

d – the proportion of sampling error in a given population

$$n = \frac{Z^2 P(1-P)}{d^2}$$

$$= \frac{1.96^2 x 0.38(1-0.38)}{0.05^2}$$

$$= 211$$

Minimum number of our sample size was 211.

3.5 INSTRUMENTS AND DATA COLLECTION

3.5.1 Instruments

VARK questionnaire will be used to investigate the learning style preferences among medical students of Faculty of Medicine and Health Science, Universiti Putra Malaysia. The VARK questionnaire provides metrics for each of four perceptual modes: visual (V), auditory (A), read/write(R), and kinesthetic (K). This questionnaire contains a total of 16 questions with multiple-choice responses where each response represents a particular mode. The respondents are allowed to choose more than one answer for each question which indicates that the participants are not restricted to only one of the four modes.

3.5.2 Data collection techniques

- The VARK questionnaires will be handed personally to the respondents together with the information sheet about this study and consent forms. The questionnaires were then collected from the respondents within the time frame.
- Data was ensured to be valid and reliable to avoid confusion and misleading conclusion.

3.5.3 Quality control

To increase the validity and accuracy of the study, proper quality control will be taken. Simple compare and review check will be carried out to prevent data errors while collecting and analyzing data.

3.6 DATA ANALYSIS

- The total number of student responses was tallied for each of the four sensory modalities (V, A, R, and K) and for all possible combinations of the modalities

(e.g., VA, VRK, etc.). The scoring algorithm on the VARK website is then applied to identify each student's modality preferences.

- Data was analyzed using Statistical Package of Social Sciences (SPSS) version 20.
- Chi-square is performed to determine if there is any significant differences exist for each of the following situations:

1) Unimodality and multimodality preferences between males and females;

2) Quad-, tri-, and bimodality preferences between males and females;

3) Unimodal preferences between different age groups;

4) Unimodal preferences between different ethnicity;

5) Unimodal preferences between different years of study.

3.7 STUDY ETHICS

- Ethics approval will be obtained from the Faculty of Medicine and Health Science UPM (FPSK UPM) Ethics Committee before data collection. Informed consent will be obtained from the respondents before data collection. Apart from that, we will also obtain the approval from the Dean of FPSK.

3.8 VARIABLES

3.8.1 Dependent variables

Learning style of medical students.

3.8.2 Independent variables

Gender, age, ethnicity and year of study.

3.9 DEFINITION OF TERMS

Learning Style

- The complex manner where learners most efficiently and most effectively perceive, process, store, and recall what they are attempting to learn.

Visual (V)

- Visual preference learn best through information in maps, charts, graphs, flow charts, labeled diagrams and other devices that people use to represent what could have been presented in words. (Fleming, 2011)

Auditory (A)

- Auditory or aural mode learns best through things that is heard or spoken. They absorb the most information from lectures, group discussion and talking things through. They also prefer to talking out loud as well as talking to oneself and also learn through saying it - their way. (Fleming, 2011)

Read and Write (R)

- This preference is for information displayed as words. This type of students learn best from text-based input and output, which are reading and writing in all its forms but especially manuals, reports, essays and assignments. (Fleming, 2011)

Kinesthetic (K)

- This modality describes the learning preference through experience and practice, either it is simulated or real. People with kinesthetic preference learn from the experience of doing something and they value their own background of experiences and less so, the experiences of others. (Fleming, 2011)

Unimodal

- Having one single preference, either V, A, R, or K.

Multimodal

- Multimodal means having more than one preference.

Bimodal

- Having two preferences.

Trimodal

- Having three preferences.

Quadmodal

- Having all the four V, A, R, K preferences.

3.10 LIMITATIONS

One batch of students from the 5-year medical program will not be available at the time of this study. Hence, comparison cannot be done for that particular batch. Due to the research was done in a very short duration, the missing batch cannot be accommodated in time. Ethnicity factor will be one of the limitations as well due to unequal distribution of the number of students from various ethnics.

3.10.1 Bias and confounding

- The possible bias that aroused from the questionnaire is misclassification bias as respondents need to understand the questionnaires clearly. Thus, any misunderstood questions or dishonest answers would lead to inaccurate categorization of the data obtained. To avoid misclassification bias, the presence of researchers during distribution of questionnaires to the respondents is a must to instantly clarify any doubt posed by the respondents.
- Another bias that will probably arise from the study is non-respondent bias. This happens when respondents refuse to take part in the study or the distributed questionnaires were not returned to the researchers.

CHAPTER 4

RESULTS

4.1 RESPONSE RATE

Among 213 respondents from medical students in Faculty of Medicine and Health Sciences that were approached, all of the respondents participated in the study giving a response rate of 100%. This was considered as very satisfactory when compared with response rate of Kumar et. al, (2009), where 214 out of 246 questionnaires that were distributed were completed and returned giving a response rate of 87%.

4.2 DESCRIPTIVE (UNIVARIATE) ANALYSIS

4.2.1 Distribution of Respondent's Socio-Demographic Characteristics (Gender, Ethnicity and Year of Study).

Table I shows the distribution of respondents by socio-demographic characteristics according to their gender, ethnicity and year of study. The results indicated that the percentage of female (63.4%) was significantly higher than male, which was 36.6%. In addition, Malay represented as the highest number of respondents with 130 people (61.0%), followed by Chinese with 63 (29.6%) respondents and followed by Indian and other ethnic in a minute amount which represents only 7.0% and 2.3% respectively. Besides that, most of the respondents were from the 1st year students which was 61 (28.6%) respondents, and the least number of respondents were from 4th year students which represented only by 21.1%. However, it was comparable because the number of respondents for each year of study were close enough to each other to represent their year.

Table I: Distribution of Respondent's Socio-Demographic Characteristics. (Gender, Ethnicity and Year of Study) n=213

No	Variables	Variable Category	n	(%)
1	**GENDER**	Male	78	36.6
		Female	135	63.4
2	**ETHNICITY**	Malay	130	61.0
		Chinese	63	29.6
		Indian	15	7.0
		Others	5	2.3
4	**YEAR OF STUDY**	1st	61	28.6
		2nd	59	27.7
		4th	45	21.1
		5th	48	22.5

4.2.2 Distribution of Respondent's Socio-Demographic Characteristics. (Age)

Table II shows that most of the respondents were from 20 (24.9%), 21 (24.4%) 22 (23.0%) and 23 (22.5%) years old. While the least respondents were from 24 (1.4%) and 25 (1.4%) years old students where most of the both age group were no longer available in medical programme as they have finished their studies.

Table II: Distribution of Respondent's Socio-Demographic Characteristics. (Age) n=213

No	**Variables**	**Variable Category**	**n**	**(%)**	**Mean**	**SD**
1	**AGE**	19	5	2.3	3.48	1.265
		20	53	24.9		
		21	52	24.4		

22	49	23.0
23	48	22.5
24	3	1.4
25	3	1.4

4.2.3 Distribution of Respondent's Learning Style

Table III shows the distribution of respondent's learning style generally. The results shows that multimodal learning style was more preferable compared to a single learning style which comprises of 70.4% compared to 29.6% of a single learning preferences.

Table III: Distribution of Respondent's Learning Style (n=213)

Variables	**Variable Category**	**n**	**(%)**
Learning Preferences	Single	63	29.6
	Multimodal	150	70.4

4.2.4 Distribution of Learning Style Preferences of All Respondents.

Table IV shows the distribution of learning style of all respondents through all modalities which includes the single preference (V, A, R, K) and multiple preferences (VA, VR, VK, AR, AK, RK, VAR, VAK, ARK, VRK and VARK). From the table, it shows that kinesthetic modality has the highest preferences among the single learning style; which was 10.3%, while read and write modality has the lowest preference of learning style for the whole respondents (3.3%). On the other hand, quadmodal preferences (VARK) scores the highest among the multimodal learning preferences where 59 respondents (27.7%) having

quadmodal preferences, while the lowest multimodal preferences were scored by visual and read and write preferences, VR (2.3%).

Table IV: Distribution of Learning Style Preferences of All Respondents. (n=213)

	Frequency (n)	**Percentage (%)**
	Unimodal	
V	18	8.5
A	16	7.5
R	7	3.3
K	22	10.3
	Total Unimodal	
	63	29.6
	Multimodal	
VA	6	2.8
VR	5	2.3
VK	7	3.3
AR	9	4.2
AK	14	6.6
RK	6	2.8
VAR	6	2.8
VAK	13	6.1
ARK	17	8.0
VRK	8	3.8
VARK	59	27.7
	Total Multimodal	
	150	70.4

4.2.5 Distribution of Unimodal, Bimodal, Trimodal and Quadmodal in Male and Female Respondents

This table shows the distribution of learning preferences into four subgroups which were unimodal, bimodal, trimodal and quadmodal. Both male and female has kinesthetic as their most preferable unimodal preference which was 10.3% and 12.5% respectively. It was then followed by aural preference for male (9.0%), while female's runner up preference was visually (8.9%). The least preferable mode for both gender was read and write mode, where female (2.3%) scores lower than male (6.4%). It also shows that female (17.4%) has a slightly higher unimodal preference compared to male (12.4%). For bimodal preferences, male students prefer aural and read and write (AR) modes (5.1%), while female (8.1%) students prefer aural and kinesthetic (AK) more compared to other bimodal preferences. For trimodal learning preferences, male possess the ARK (7.7%) learning preferences where aural, read and write and kinesthetic preferences were dominant. Same goes with female students, where they scored the highest in VAK and ARK group, where both subgroups comprise of 8.1% each. For quadmodal preferences, both male and female students score the highest among the learning preferences which was 30.8% and 25.9% respectively. Thus, male has higher quadmodal preferences compared to female. However, out of 213 respondents, female (46.0%) has a mildly higher percentage of multimodal learning preferences compared to male (24.4%).

Table V: Distribution of Unimodal, Bimodal, Trimodal and Quadmodal in Male and Female Respondents

	Male Students		**Female Students**	
	Frequency (n)	**Percentage (%)**	**Frequency (n)**	**Percentage (%)**
		Unimodal		
V	6	7.7	12	8.9

A	7	9.0	9	7.8
R	5	6.4	2	2.3
K	8	10.3	14	12.5
		Total Unimodal		
	26	33.3	37	27.4
	26 out of 213 respondents	12.4	37 out of 213 respondents	17.4
		Multimodal		
VA	2	2.6	4	3.0
VR	1	1.3	4	3.0
VK	0	0.0	7	5.2
AR	4	5.1	5	3.7
AK	3	3.8	11	8.1
RK	3	3.8	3	2.2
VAR	3	3.8	3	2.2
VAK	2	2.6	11	8.1
ARK	6	7.7	11	8.1
VRK	4	5.1	4	3.0
VARK	24	30.8	35	25.9
		Total Multimodal		
	52	66.7	98	72.6
	52 out of 213 respondents	24.4	98 out of 213 respondents	46.0

4.2.6 Distribution of Single Learning Preferences among Respondents

Based on table VI, the percentage distribution of single learners with consideration of 100% were as follows. It shows that kinesthetic modality scores the highest, which was 34.9%. It was followed by visual (28.6%) and aural (25.4%). Meanwhile, read and write scored the lowest (11.1%).

Table VI : Distribution of single learning preferences among respondents. (n=63)

	Frequency (n)	Percentage (%)
V	18	28.6
A	16	25.4
R	7	11.1
K	22	34.9
TOTAL	63	100.0

4.2.7 Distribution of Multimodal Learning Preferences among Respondents

From this table, the results showed that unimodal has the highest frequency when compared to every single modality which comprises about 30.0% of the respondents. It was then followed by quadmodal preference with 27.2%. On the other hand, trimodal mode scores the least which comprises of only 20.2%.

Table VII : Distribution of multimodal learning preferences among respondents. (n=213)

	Frequency (n)	Percentage (%)
UNIMODAL	64	30.0
BIMODAL	48	22.5
TRIMODAL	43	20.2

QUADMODAL	58	27.2
TOTAL	213	100.0

4.2.8 The Most Preferable Learning Style Preference According to Year of Study by Gender.

This table shows the most preferable learning method according to year of study by gender. It shows that both male (9.5%) and female (12.5%) from first year students prefer bimodal mode which comprises of visual and kinesthetic learning group the most. Meanwhile, both male and female from forth year students prefer unimodal mode better, where male students prefer kinesthetic mode (20.7%) while female students prefer mostly through visual mode (10%). On the contrary, female fifth year students prefer kinesthetic mode the most with 13.8 % out the whole fifth year, while male fifth year prefer visual and aural mode the most (10.5%).

Table VIII: The Most Preferable Learning Style Preference According to Year of Study by Gender. (n=213)

Year of Study	**Learning Preference (%)**	
	Male	**Female**
1st	VK (9.5%)	VK (12.5%)
2nd	VARK (8.7%)	AK (8.3%)
4th	K (20.7%)	V (10%)
5th	VA (10.5%)	K (13.8%)

4.3 BIVARIATE ANALYSIS

4.3.1 Association of Gender and Learning Style Preferences

Table IX shows that there were no significant association between learning style preferences and gender (p=0.361). It demonstrates that both male and female students preferred multimodal learning mode than a single mode. 66.7% of male students preferred multimodal mode, while there was only 33.3% among male students that preferred a single mode. It was also the same in female, where there was only 27.4% of female students preferred a single mode, while 72.6% of them preferred multimodal mode.

Table IX: Association of Gender and Learning Style Preferences.

GENDER (n=213)	**Learning Style Preferences**			**x^2**	**df**	**P**
	UNIMODAL n(%)	MULTIMODAL n(%)	TOTAL (n)			
Male	26(33.3)	52(66.7)	78	0.833	1	0.361
Female	37(27.4)	98(72.6)	135			
TOTAL	63(29.6)	150(70.4)	213			

4.3.2 Association of Age and Learning Style Preferences

This table shows that there were no significant association between age and learning style preferences (p=0.660). The actual student's age groups which are from 19 to 25 years were recoded into age below 22 and 22 and above. Based on the table, it shows that both students below and above 22 prefer multimodal learning preferences which contributed to 69.1% for students below 22 and 71.8% for students whose 22 and above.

Table X : Association of Age and Learning Style Preferences.

AGE (n=213)	**Learning Style Preferences**			**x^2**	**df**	**P**
	UNIMODAL n(%)	MULTIMODAL n(%)	TOTAL (n)			
Below 22	34(30.9)	76(69.1)	110	0.194	1	0.660
22 and Above	29(28.2)	74(71.8)	103			
TOTAL	63(29.6)	150(70.4)	213			

4.3.3 Association of Ethnicity and Learning Style Preferences

This table shows that there were no significant association between learning style preferences and ethnicity (p=0.655). From the table, it shows that majority of the medical students were Malay which represent the highest respondent among the ethnicity. Thus, it affects the distribution of learning preferences where it was not normally distributed. It also shows that all of the ethnic (70.4%) prefer multimodal learning preferences over a single learning style (29.6%).

Table XI: Association of Ethnicity and Learning Style Preferences.

ETHNICITY (n=213)	**Learning Style Preferences**			**x^2**	**df**	**P**
	UNIMODAL n(%)	MULTIMODAL n(%)	TOTAL (n)			
Malay	40(30.8)	90(69.2)	130	1.620	3	0.655
Chinese	16(25.4)	47(74.6)	63			
Indian	6(40.0)	9(60.0)	15			
Others	1(20.0)	4(80.0)	5			

TOTAL	63(29.6)	150(70.4)	213

4.3.4 Association of Year of Study and Learning Style Preferences

Table XII stated that there were no significant association between learning style and year of study (p=0.729). The table shows that the number of respondents from first to fifth year was closely distributed.It also shows that every year of study prefer multimodal preference compared to unimodal, where 2nd year students score the highest (74.6%) in multimodal mode and 5th year scores the lowest (66.7%) where it was not a very significant in difference. On the other hand, 5th year scores the most (33.3%) for unimodal learning preference, while 2nd year students score the lowest (25.4%).

Table XII : Association of Year of Study and Learning Style Preferences.

YEAR OF STUDY (n=213)	**Learning Style Preferences**			**x^2**	**df**	**P**
	UNIMODAL n(%)	MULTIMODAL n(%)	TOTAL (n)			
1st	20(32.8)	41(67.2)	61	1.298	3	0.729
2nd	15(25.4)	44(74.6)	59			
4th	12(26.7)	33(73.3)	45			
5th	16(33.3)	32(66.7)	48			
Total	63(29.6)	150(70.4)	213			

CHAPTER 5

DISCUSSION AND CONCLUSION

5.1 DISCUSSION

5.1.1 Demographic Characteristics

In this study, medical students that were available during the study duration were selected as our sample. Out of 500 medical students, 213 students were chosen as our study sample. Among 213 samples, majority of the subjects were female (63.4%) as female students were vividly higher than male students (36.6%) in medical programme in FHMS, UPM. Most of the respondents also were Malay (61.0%) and the other ethnics accounted for less than 30% as majority of the medical students in FHMS was Malay. The number of respondents from each year of study was also balanced and closed to each other as we used systematic sampling.

As a medical student, they need to have a strategic way of learning that was suitable and comfortable for them to learn effectively in this vast area of study so that they can become a competitive, dependable and helpful to others in the future. To become successful, they need to chase, grab, and hold their knowledge firmly so that they can use it properly at a proper time and place. According to Fleming, VARK questionnaire divided learning preferences into 4 major group which was Visual, Auditory, Read and Write and Kinesthetic. (Fleming, 2011). The purpose of our study was to find out the learning style among medical students in FMHS, UPM.

We found that majority of the medical students prefer multimodal (70.4%) learning mode compared to unimodal. These students also had a balanced preferable learning type,

which indicated that they preferred a variety of learning strategies compared to one classical learning type. One of the studies that had been done for clinical students in a Melaka-Manipal Medical College in Malaysia also found that most of them prefer multimodal (56%) mode better (Sinha, *et al.*, 2013). However, it was different in another study that was done in AIMST University in 2008. Out of 214 respondents, 51.5% of them prefer single mode (Kumar, 2009). In other study that was done on first year medical students in Michigan in 2005, only 36.1% of the students preferred a single mode and 64% preferred multimode. (Lujan & Dicarlo, 2006). Nevertheless, when a single mode was compared to further divide multimodal groups which were bimodal, trimodal and quamodal, we found that most students preferred a single mode (30%) more than other modes. We could see that learning preferences was different in place and time of the study.

In the multimodal group, quadmodal group was the most preferable group (27.2%), while the least preferable was VR group (2.3%). This showed that most of the medical students in FMHS preferred to learn in a various ways of learning. In other study that was done in a Malaysian college found that the most preferable multimodal group was bimodal mode. It was the same as the study that was done in Saudi Arabia where the most preferable multimodal group was bimodal mode (34.9%) (Nuzhat *et.al.*, 2011). As we all know that we can access the internet almost anywhere nowadays. The students can learn through watching videos, looking to the images and also listening to any medical related sound, such as wheezing and others. So, they can adjust to the different teaching styles easily which results in a better result.

For the single preference group, we found that most students preferred kinesthetic mode the most (34.9%). It was applicable to both genders where both male (10.3%) and female (12.5%) medical students preferred kinesthetic mode better for a single mode. In a

study that was done in Michigan University in 2006 found that female students also preferred kinesthetic mode the most (33.3%), while male students had a balanced single preference where 4.2% of them preferred A,R,K, respectively (Wehrwein et al, 2007). However, in another study that was done in Nigeria, they found that most of the females preferred read and write mode with 34.3%, while male students stick to the kinesthetic method with 48.0%. However, the most preferable method for them was still read and write technique (Josephine, 2012). Meanwhile, in our study, kinesthetic method surpasses the other method as the most preferable learning mode. This also showed that female students in FMHS preferred to learn tactically and kinesthetically by doing practical and demonstration in acquiring new knowledge.

As stated before, the least preferable single mode of study was through read and write mode which were only 3.3%. This was quite shocking to know that even though medical course was a subject that requires read and write as the core action the most, it was actually the opposite. It has been also reported that science and engineering students were kinesthetic learners whereas business students were reading/writing learners (Tierney, 2005). Basically medicine comprises of both science and art of the human body, where it deals with animate objects called human. It covers on how our body manages to maintain a stable condition as well as on how to maintain our health to keep fit. Indeed, read and write method was important as there were so many unique and complex things that were need to be understood and remembered. Nevertheless, according to our findings, we can assume that most medical students in our faculty preferred tactic and kinesthetic mode as the best method, as we know that experience is the best teacher.

We also observed some variation among students in each year of study with their gender. Our results show that both male (9.5%) and female (12.5%) from first year prefer Visual and Kinesthetic mode. For 4th and 5th year, their preferences intertwined with each

other. 4th year male students preferred Kinesthetic (20.7%) the most, while female preferred Visual mode the most (10%). The kinesthetic mode (13.8%) were more preferred by female students in 5th year more compared to male where they preferred bimodal mode, which was visual and auditory (VA) with 10.5%. Even though the year of study of the students was different, they still born within the same generation, which was Generation Y. Generation Y which was born from the early 1980s to the early 2000s have grown up in a society where expertise and knowledge can be obtained from anywhere. Older generations rarely exploited these wider networks in the same way (Carina, Su, 2010). So, these generation's way of learning were not way too difference from their age and year of study.

In addition, we speculate that during the 4th year of medical life where the students were still learning and developing their skills, male respondents preferred to do any practical and medical procedure by themselves on the patient, while female respondents preferred to watch the whole process and picture it first and learn better through that. For 5th year, this was the era where the students deal with the patients the most. Male students learn better through watching and listening to the patients complains and by doing discussion among them and other doctors, so that was why they preferred VA group the most. Meanwhile fifth year female preferred kinesthetic because most of them were brave enough to do any procedure and learn better through it.

5.1.2 Association of Gender and Learning Style Preferences

There were few studies that found the association between gender and learning style preferences. There was a previous study that was done on Nigerians, found that there was a significant association ($P<0.05$) between gender and learning style preferences, where females prefer read and write technique, while males prefer kinesthetic mode as stated before (Josephine, 2012). In addition, another study that was done in Michigan State University in 2006, they found that there was a significant difference in learning style preferences between

male and female where majority of the female students (54.2%) preferred a single mode of learning, either V, A, R or K and males preferred multiple learning methods which was significantly high (87.5%) (Wehrwein *et al.*, 2007). These two studies were contradicted with our findings where we found no association between these two variables. However, in a study that was done in India in 2010, they found that (x^2 =0.710, df = 3 and p=0.871) indicated that there was no difference in learning preferences by gender, which coincided with our findings (Agnihotri *et al.*, 2012). Our results show that there was no significant association between gender and learning style preferences (x^2=0.833 and p=0.361). Both male and female students preferred multimodal mode over a single learning mode. We were not sure why was the results were different in different studies in different places. This was maybe due to the changing surrounding and lifestyle across place and time where we live in a world of knowledge at a tip of our finger where many styles of learning were absorbed passively into our life.

5.1.3 Association of Age and Learning Style Preferences

We recoded the year of study into below 22 and 22 and above group. In our findings, we found that there was also no significant difference between age of the students (x^2=0.194 and p=0.660). In a study that was done in 3 institutions in Ireland in 2010, they found that there were no significant association between age group and learning (Iain, 2010). Logically, there was no association between learning preferences and age was because of age does not define maturity and how people thinking and learning. Furthermore, our findings showed that all age group prefer multiple modes compared to a single mode. This indicates that age group between 19 to 25 does not affect the learning style of a person.

5.1.4 Association of Ethnicity and Learning Style Preferences

Medical students in FMHS comprises of 3 major ethnics which was Malay, Chinese Indian and others. Majority the respondents were Malay. From our findings, we found that there was also no significant association between ethnicity and learning style preferences (x^2=1.620 and p=0.655). All ethnics prefer multiple mode of study more with 74.0% compared to a single mode of study which comprises only 29.6%. The results were not significant because first, the distribution of the ethnic within the medical students were not equally distributed. In addition, it shows that ethnic does not define the learning preferences of a person where intellectual and critical thinking of a person will affect more of the learning preferences. We also could not compare our results with other studies as there were no previous studies that try to find the association between ethnicity and learning style preferences.

5.1.5 Association of Year of Study and Learning Style Preferences

Year of study also may affect the learning style preferences of a student. This was because, throughout the whole five year of medical school, the syllabus and the way medical students learn were different. The first two years of medical school were filled and stressed with theoretical knowledge, where reading were mostly needed in order to increase the medical knowledge in our mind. These two years were called preclinical years.

The clinical years that comprises of 3rd, 4th and 5th year learn mainly by meeting, interacting, communicating and examining patients directly. So, in this clinical setting, we believed that kinesthetic learning preferences will be predominant within these 3 clinical years. In our study, 3rd year students were not yet available when this study was carried out, because the 2nd year students that were going to 3rd year would not go to 3rd year until September 2013. Unfortunately, we found that there was no significant association between the year of study with learning style preference(x^2=1.298 and p=0.729).

There was also a study that was conducted in Florida in 2010 found that there was also no association status and learning style preference between undergraduate and postgraduate study among physiology students (Dobson, 2010). However, the factor studied which was graduate status may be different with our study. Thus, we just can conclude that the year of study may not affect the learning style preferences.

5.2 STUDY LIMITATIONS

One of the limitations in our study was the study was limited until the learning preferences of the students only, and not until the student's examination result where we can find if a particular learning style will affect the academic performance of a student. For example, did females score higher than males? Did kinesthetic person perform better than read and write or vice versa? We believed that there were possibilities where learning style preferences may affect the academic performance. Besides that, one batch of medical students were not available when the study was carried out, which was the 3rd year students. So, the sample size was reduced as the study population was reduced. In this case, we also could not do a comparison within the whole batch. In addition, as we use systematic sampling in our study, we were prone to be biased according to the list name provided as it was more biased, as not all members or points have an equal chance of being selected. Thus, it may therefore lead to over or under representation of a particular pattern.

However, the VARK questionnaire that was not statically validated until recently give it strength to itself (Dobson, 2010). There was also substantial evidence for the existence of modality-specific strengths and weaknesses (for example, in visual, auditory, or kinesthetic processing) in people with various types of learning difficulty. Thus, we can assist them better by teaching according their learning preferences as it was important to educator to appeal to student's preferred learning style. The strongest appeal of VARK analysis was that

it offers a positive, inclusive affirmation of the learning potential of all students. This way the VARK philosophy encourages a belief that everyone can learn if their preferences were addressed (Wehrwein *et al.*, 2007).

5.3 RECOMMENDATIONS

There are a number of recommendations that can be made to overcome the shortcomings of our study. With regard to future research, several questions regarding learning styles emerged from this study. For example, do multiple mode learners perform better in class compared to single learners? How well did their academic performance correlate with their learning style? Does kinesthetic learners performed better in laboratory and practical class and aural learner performed better in lecture? Does male students performed better than female in preclinical or clinical years? Does accommodating to learning preference really alter learning outcomes? How does the professor accommodate both those who prefer only one style and those who prefer many? All of these questions merit further research. Future researcher also should consider comparing medical students with other course of studies like engineering and law so that we can compare their learning preference in different courses. We did not say that each preference either single or multiple was better and surpass the others. As it was known as preference, we know that each person possess different style which definitely good for themselves. We also know that these learning style preferences may change in a person from time to time.

5.4 CONCLUSION

From our research, we can conclude that majority of the medical students prefer multiple mode than a single mode. For unimodal mode we found that both male and female prefer kinesthetic mode the most which was quite unique because most of the previous studies found that females prefer read and write the most. However, when compared to the year of study by gender with learning style, 4th year males prefer kinesthetic more than female. While within 5th year students, females prefer kinesthetic mode better. Meanwhile among multimodal group, the most preferable group was VARK group where both male and female prefer the most. Besides that, there was no significant association between learning style and the factor studied which were gender, age, ethnicity and year of study.

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APPENDIX 1

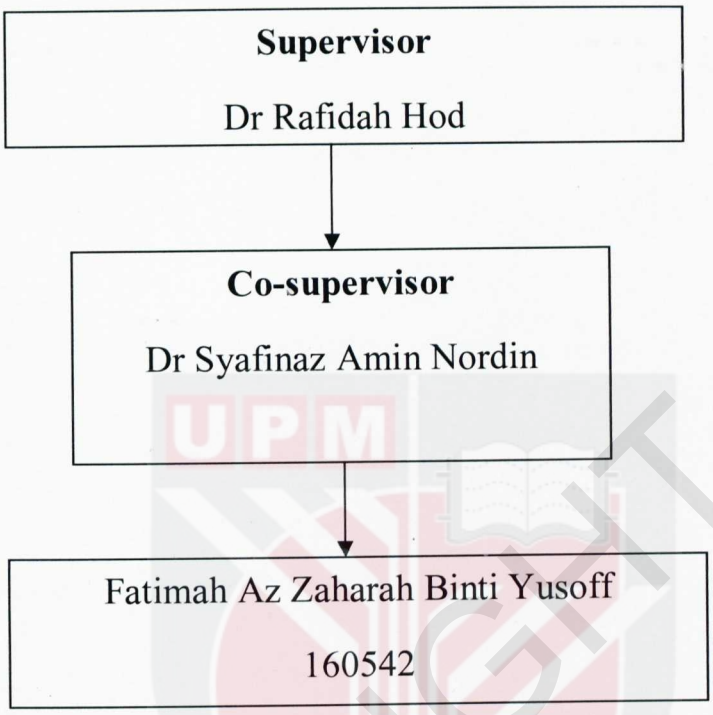
Gantt chart

WEEKS	1	2	3	4	5	6	7	8	9	10	11	12
1. Proposal preparation and meeting with supervisors												
1. Proposal preparation/meeting with supervisors 2. Submission of proposal to module coordinator 3. Proposal presentation preparation												
1. Proposal presentation 2. Correction of proposal and meeting with supervisors 3. Preparation of ethical approval/letters to respective organizations												
1. Send all ethical forms and letters to module coordinator												

WEEKS	13	14	15	16	17	18	19	20	21	22	23	24
1. Send all ethical forms and letters to module coordinator												
1. Data collection and data analysis 2. Submission of data analysis to module coordinator 3. Preparation for data analysis presentation												
1. Data analysis presentation 2. Correction on data analysis												
1. Group work/report writing/meeting with supervisors 2. Submission of project report and scientific article to package coordinator												
1. Preparation for final presentation 2. Rehearsal for final presentation 3. Final presentation seminar												
1. Correction of final report and scientific article 2. Submission of log book and final report (hard cover) to package coordinator 3. Result												

APPENDIX 2

RESEARCH TEAM



APPENDIX 3

BUDGET PLANNING

TABLE 1: Budget Planning

Item	Quantity	Price
Photostate	400	RM 200
Printing	50	RM50
Hardcover	4 set	RM200
TOTAL		**RM 450**

APPENDIX 4

QUESTIONNAIRE

PART A: SOCIO-DEMOGRAPHIC

Date of Birth:
_____ (day)/_____ (month)/_____(year)

Age:
_____

Gender: Male ☐ Female ☐

Ethnicity: Malay ☐
Chinese ☐
Indian ☐
Others. Please specify: _____

Marital status:
Single ☐
Married ☐

Year of study:
1st year ☐
2nd year ☐
3rd year ☐
4th year ☐
5th year ☐

* You may answer the questionnaire either in Bahasa Melayu or in English. For English version of the questionnaire please proceed to part C in page 5.

PART B: SOALSELIDIK VARK DALAM BAHASA MELAYU **(Version 7.0)**

Diterjemahkan oleh Ahbul Zailani Begum Binti Mohamed Ibrahim, Pensyarah Universiti Teknologi MARA Melaka

Kaedah pembelajaran terbaik bagi saya.

Pilih jawapan yang amat menjelaskan kecenderungan anda. Bagi setiap situasi, pilih ayat yang paling sesuai untuk anda. Sekiranya satu pilihan tidak begitu tepat, **anda boleh pilih lebih daripada satu**. Sila tinggalkan kosong sebarang soalan yang tidak berkaitan.

1. Anda sedang membantu seseorang yang ingin ke lapangan terbang, pusat bandar atau stesen keretapi di Bandar anda. Anda akan:
a. membawanya ke tempat yang dituju. ☐
b. memberi tunjuk-arah secara lisan ke tempat itu. ☐
c. menulis tunjuk-arah ke tempat itu (tanpa peta). ☐
d. melukis, atau beri peta kepadanya. ☐

2. Anda tidak pasti sama ada perkataan berikut dieja "dependent" atau "dependant". Anda akan:
a. bayangkan perkataan tersebut dan memilih mengikut rupanya. mana yang nampak sesuai. ☐
b. bunyikan perkataan tersebut dalam minda anda dan pilih salah satu. ☐
c. rujuk pada kamus. ☐
d. tulis kedua-dua perkataan tersebut dan pilih satu. ☐

3. Anda sedang merancang percutian bagi suatu kumpulan. Anda inginkan maklumbalas daripada mereka mengenai rancangan itu. Anda akan
a. menerangkan acara-acara kemuncak. ☐
b. guna peta atau laman web untuk menunjukkan tempat-tempat. ☐
c. memberi mereka salinan bercetak jadual pelancongan (itinerary). ☐
d. telefon, SMS atau e-Mel mereka. ☐

4. Anda ingin masak sesuatu yang istimewa untuk keluarga anda. Anda akan:
a. memasak sesuatu yang anda sedia tahu tanpa memerlukan tatacaranya. ☐
b. minta cadangan daripada kawan-kawan. ☐
c. merujuk kepada buku resepi masakan untuk mencari ide berpandukan gambar. ☐
d. merujuk kepada buku masakan yang anda tahu terdapat resepi istimewa. ☐

5. Sekumpulan pelancong ingin mempelajari tentang taman-taman atau hutan:
a. memberi taklimat atau aturkan ceramah mengenai taman-taman atau hutan simpanan bagi kehidupan liar. ☐
b. tunjukan gambar dari internet, foto atau buku bergambar. ☐
c. membawa mereka ke taman atau hutan simpanan bagi kehidupan liar dan berjalan bersama mereka. ☐
d. berikan kepada mereka buku atau risalah-risalah tentang taman-taman atau hutan simpanan bagi kehidupan liar. ☐

6. Anda hampir membeli kamera digital atau telefon bimbit. Selain daripada harga, apakah akan mempengaruhi keputusan anda? ☐

a. mencuba atau mengujinya.
b. membaca keterangan tentang ciri-ciri produk tersebut.
c. rekabentuknya moden dan bergaya.
d. jurujual menerangkan ciri-ciri produk itu kepada saya.

7. Imbas kembali pada suatu ketika anda mempelajari sesuatu yang baru. Elak memilih kemahiran fizikal seperti menunggang basikal. Anda mempelajari sungguh baik dengan:
a. melihat tunjuk-ajar (demonstrasi).
b. mendengar seorang menerangkannya dan bertanya soalan.
c. gambar rajah dan carta – tanda-tanda visual.
d. panduan bertulis- contoh manual atau buku teks.

8. Anda menghadapi masalah pada lutut anda. Anda lebih suka doktor:
a. memberi alamat laman web atau bahan bacaan berkaitan nya.
b. mengunakan model lutut plastik untuk menunjukkan masalahnya.
c. menerangkan masalahnya.
d. menunjukkan gambar-rajah yang menerangkan masalahnya.

9. Anda ingin mempelajari sesuatu program baru, kemahiran atau permainan melalui komputer. Anda akan:
a. membaca arahan bertulis yang dibekalkan bersama program itu.
b. berbincang dengan orang yang mengenali program itu.
c. mengunakan alat kawalan atau papan kunci.
d. mengikut gambar rajah dalam buku panduan yang dibekalkan dengannya.

10. Saya gemar laman web yang ada:
a. benda-benda untuk saya klik, anjak, atau mencuba.
b. rekabentuk yang menarik dan ciri-ciri visual.
c. huraian-huraian menarik bertulis, senarai-senarai dan penerangan.
d. saluran-saluran audio di mana saya boleh mendengar muzik, rancangan radio atau temubual.

11. Selain daripada harga, apakah akan paling mempengaruhi keputusan anda untuk membeli sesuatu buku bukan fiksyen yang baru?
a. Rupanya menarik.
b. Membacanya sepintas lalu.
c. Seorang kawan bercakap mengenainya dan mencadangnya.
d. Ia mengandungi cerita-cerita kisah benar, pengalaman-pengalaman dan contoh-contoh.

12. Anda menggunakan sebuah buku, CD atau laman web bagi mempelajari cara mengambil gambar dengan kamera digital baru anda. Anda mahu:
a. satu peluang untuk bertanya soalan dan bercakap tentang kamera dan ciri-cirinya.
b. arahan bertulis yang jelas dengan senarai-senarai dan urutan tatacara pengunaan.
c. paparan gambar rajah kamera berserta fungsi tiap-tiap satu bahagian.
d. banyak contoh gambar-gambar baik serta yang kurang baik dan cara membaikinya.

13. Anda suka seorang guru atau penceramah yang menggunakan:
a. Demonstrasi, model atau sesi amali. ☐
b. soal-jawab, ceramah, perbincangan dalam kumpulan, penceramah jemputan. ☐
c. nota-edaran, buku atau bahan bacaan. ☐
d. gambar-rajah , carta, atau graf. ☐

14. Anda baru selesai sesuatu pertandingan atau ujian dan ingin mendapat maklumbalas. Corak maklumbalas yang anda ingin merupakan:
a. guna contoh-contoh daripada apa yang anda telah lakukan. ☐
b. guna penerangan bertulis mengenai keputusan anda. ☐
c. daripada seseorang yang membincangkannya dengan anda. ☐
d. graf yang menunjukkan pencapaian anda. ☐

15. Anda sedang memilih makanan di sebuah restoran atau kafe. Anda akan:
a. memilih sajian yang anda pernah makan dahulu di situ. ☐
b. mendengar cadangan pelayan atau bertanya kepada kawan-kawan untuk mencadangkan pilihan. ☐
c. memilih berdasarkan penerangan dalam menu. ☐
d. melihat apa orang lain sedang makan atau melihat gambar setiap sajian. ☐

16. Anda dikehendaki memberi suatu ucapan penting dalam satu persidangan atau upacara khas. Anda membuat persediaan:
a. melukis gambar rajah atau graf untuk memberi penjelasan. ☐
b. menulis beberapa perkataan penting dan mengulangi latihan penyampaian ucapan itu. ☐
c. menulis ucapan anda dengan lengkap dan menghafalnya dengan membacanya berulang kali. ☐
d. mengumpul banyak contoh dan cerita untuk menjadikan ucapan anda lebih realistik dan praktikal. ☐

PART C: THE VARK QUESTIONNAIRE **(Version 7.1)**

How Do I Learn Best?

Choose the answer which best explains your preference and tick the box(es) next to it. **Please tick more than one** if a single answer does not match your perception.
Leave blank any question that does not apply.

1. You are helping someone who wants to go to your airport, the center of town or railway station. You would:
a. go with her. ☐
b. tell her the directions. ☐
c. write down the directions. ☐
d. draw, or give her a map. ☐

2. You are not sure whether a word should be spelled `dependent' or `dependant'. You would:
a. see the words in your mind and choose by the way they look. ☐
b. think about how each word sounds and choose one. ☐
c. find it online or in a dictionary. ☐
d. write both words on paper and choose one. ☐

3. You are planning a vacation for a group. You want some feedback from them about the plan. You would:
a. describe some of the highlights. ☐
b. use a map or website to show them the places. ☐
c. give them a copy of the printed itinerary. ☐
d. phone, text or email them. ☐

4. You are going to cook something as a special treat for your family. You would:
a. cook something you know without the need for instructions. ☐
b. ask friends for suggestions. ☐
c. look through the cookbook for ideas from the pictures. ☐
d. use a cookbook where you know there is a good recipe. ☐

5. A group of tourists want to learn about the parks or wildlife reserves in your area. You would:
a. talk about, or arrange a talk for them about parks or wildlife reserves. ☐
b. show them internet pictures, photographs or picture books. ☐
c. take them to a park or wildlife reserve and walk with them. ☐
d. give them a book or pamphlets about the parks or wildlife reserves. ☐

6. You are about to purchase a digital camera or mobile phone. Other than price, what would most influence your decision?
a. Trying or testing it. ☐
b. Reading the details about its features. ☐
c. It is a modern design and looks good. ☐
d. The salesperson telling me about its features. ☐

7. Remember a time when you learned how to do something new. Try to avoid choosing a physical skill, eg. riding a bike. You learned best by:
a. watching a demonstration. ☐

b. listening to somebody explaining it and asking questions.
c. diagrams and charts - visual clues.
d. written instructions – e.g. a manual or textbook.

8. You have a problem with your heart. You would prefer that the doctor:
a. gave you a something to read to explain what was wrong.
b. used a plastic model to show what was wrong.
c. described what was wrong.
d. showed you a diagram of what was wrong.

9. You want to learn a new program, skill or game on a computer. You would:
a. read the written instructions that came with the program.
b. talk with people who know about the program.
c. use the controls or keyboard.
d. follow the diagrams in the book that came with it.

10. I like websites that have:
a. things I can click on, shift or try.
b. interesting design and visual features.
c. interesting written descriptions, lists and explanations.
d. audio channels where I can hear music, radio programs or interviews.

11. Other than price, what would most influence your decision to buy a new non-fiction book?
a. The way it looks is appealing.
b. Quickly reading parts of it.
c. A friend talks about it and recommends it.
d. It has real-life stories, experiences and examples.

12. You are using a book, CD or website to learn how to take photos with your new digital camera. You would like to have:
a. a chance to ask questions and talk about the camera and its features.
b. clear written instructions with lists and bullet points about what to do.
c. diagrams showing the camera and what each part does.
d. many examples of good and poor photos and how to improve them.

13. Do you prefer a teacher or a presenter who uses:
a. demonstrations, models or practical sessions.
b. question and answer, talk, group discussion, or guest speakers.
c. handouts, books, or readings.
d. diagrams, charts or graphs.

14. You have finished a competition or test and would like some feedback. You would like to have feedback:
a. using examples from what you have done.
b. using a written description of your results.
c. from somebody who talks it through with you.
d. using graphs showing what you had achieved.

15. You are going to choose food at a restaurant or cafe. You would:
a. choose something that you have had there before. ☐
b. listen to the waiter or ask friends to recommend choices. ☐
c. choose from the descriptions in the menu. ☐
d. look at what others are eating or look at pictures of each dish. ☐

16. You have to make an important speech at a conference or special occasion. You would:
a. make diagrams or get graphs to help explain things. ☐
b. write a few key words and practice saying your speech over and over. ☐
c. write out your speech and learn from reading it over several times. ☐
d. gather many examples and stories to make the talk real and practical. ☐

THE VARK QUESTIONNAIRE SCORING CHART

Use the following scoring chart to find the VARK category that each of your answers corresponds to. Circle the letters that correspond to your answers

e.g. If you answered b and c for question 3, circle V and R in the question 3 row.

Question	A category	B category	C category	D category
3	K	V	R	A

Question	A category	B category	C category	D category
1	K	A	R	V
2	V	A	R	K
3	K	V	R	A
4	K	A	V	R
5	A	V	K	R
6	K	R	V	A
7	K	A	V	R
8	R	K	A	V
9	R	A	K	V
10	K	V	R	A
11	V	R	A	K
12	A	R	V	K
13	K	A	R	V
14	K	R	A	V
15	K	A	R	V
16	V	A	R	K

Calculating your scores

Count the number of each of the VARK letters you have circled to get your score for each VARK category.

Total number of Vs circled = ____

Total number of As circled = ____

Total number of Rs circled = ____

Total number of Ks circled = ____

* V - Visual
A - Auditory
R - Read & Write
K - Kinesthetic

APPENDIX 5

Scoring Instructions

Because respondents can choose more than one answer for each question the scoring is complex. It can be likened to a set of four stepping-stones across water.

1. Add up your scores, **V + A + R + K =**

2. Enter your scores from highest to lowest on the stones below, with their V, A, R, and K labels.

3. Your stepping distance comes from this table.

Total of my four VARK scores is	**My stepping distance is**
10-16	1
17-22	2
23-26	3
More than 26	4

3. Your first preference is your highest score so check the first stone as one of your preferences and enter its label on the stone.

4. If you can reach the next stone with a step equal to or less than your stepping distance then check that one too.

Once you cannot reach the next stone you have finished defining your set of preferences.

APPENDIX 6

JAWATANKUASA ETIKA UNIVERSITI UNTUK
PENYELIDIKAN MELIBATKAN MANUSIA (JKEUPM)

UNIVERSITI PUTRA MALAYSIA, 43400 UPM SERDANG,

RESPONDENT'S INFORMATION SHEET

Please read the following information carefully and do not hesitate to discuss any questions you may have with the researcher.

STUDY TITLE
Learning Style Among Medical Students in Faculty of Medicine and Health Sciences, UPM in 2013

INTRODUCTION
Students have different ways of learning and receiving new information. Students' motivation and performances are greatly improved when the ways of acquiring knowledge is adapted to student learning preferences and styles. So, it is the responsibility of the students to find out this diversity of learning styles among students and thus develop a more appropriate learning approaches. Moreover, it is also the responsibility of the students to find out their own preference learning methods as to improve their learning efficiency and academic achievement.

WHAT WILL YOU HAVE TO DO?
You are invited to fill up the questionnaire pertaining to your preferences learning styles sincerely.

WHO SHOULD NOT ENTER THE STUDY?
Students who are not a medical student in Faculty of Medicine and Health Sciences, Universiti Putra Malaysia (FPSK,UPM).

WHAT WILL BE THE BENEFITS OF THE STUDY:

(a) TO YOU AS THE SUBJECT?

You will be able to find out your own mode/modes of learning and acquiring new knowledge, which is the most effective in your learning process. By knowing your preferences leaning style, you can make appropriate changes in your study and learning methods and thus improve your academic achievement.

b) TO THE INVESTIGATOR?

Your participation will help us in accessing knowledge of medical students learning styles in FPSK, UPM, so that to help the authorities in improving the teaching methods fro medical students, to improve the students' academic achievement.

WHAT ARE THE POSSIBLE RISKS?
None.

WILL THE INFORMATION THAT YOU PROVIDE AND YOUR IDENTITY REMAIN CONFIDENTIAL?

Yes. All information provided are strictly confidential. Information will only be presented in a collective manner without the mentioning of any individual identity.

WHO SHOULD YOU CONTACT IF YOU HAVE ADDITIONAL QUESTIONS DURING THE COURSE OF THE RESEARCH?

Researcher	:	Khoh Hui Fern	0178728198
		Fatimah Az Zaharah Binti Yusoff	0133214741
Supervisor	:	Dr.Rafidah Binti Hod	0196691512
		pi38046@gmail.com	
Co-supervisor	:	Dr.Syafinaz Binti Amin Nordin	0193377247
		syafinaz@medic.upm.edu.my	

JAWATANKUASA ETIKA UNIVERSITI UNTUK
PENYELIDIKAN MELIBATKAN MANUSIA (JKEUPM)

UNIVERSITI PUTRA MALAYSIA, 43400 UPM SERDANG,

HELAIAN PENERANGAN RESPONDEN

Sila baca maklumat berikut dengan teliti. Sekiranya anda mempunyai sebarang pertanyaan, sila kemukakan kepada penyelidik.

TAJUK KAJIAN
Gaya pembelajaran pelajar perubatan di Fakulti Perubatan dan Sains Kesihatan, UPM pada tahun 2013.

PENGENALAN
Setiap pelajar mempunyai gaya pembelajaran yang berbeza dalam memperoleh ilmu dan maklumat yang baru. Apabila cara untuk memperoleh sesuatu maklumat diselarikan dengan gaya pembelajaran yang disukai oleh pelajar tersebut, hal ini dapat meningkatkan motivasi dan pencapaian akademik seseorang mereka. Oleh itu, pelajar itu sendiri haruslah mengetahui kepelbagaian yang terdapat dalam gaya pembelajaran mereka sendiri supaya mereka dapat menentukan cara belajar yang sesuai dengan mereka di samping dapat meningkatkan keberkesanan sesebuah pembelajaran, justeru meningkatkan pencapaian akademik mereka.

APAKAH YANG PERLU ANDA LAKUKAN?
Anda dikehendaki mengisi borang soal selidik yang berkaitan dengan gaya pembelajaran anda dengan jujur.

SIAPA YANG TIDAK BOLEH MENYERTAI KAJIAN INI?
Pelajar yang bukan pelajar perubatan di Fakulti Perubatan dan Sains Kesihatan, Universiti Putra Malaysia (FPSK, UPM).

APAKAH FAEDAH MENYERTAI KAJIAN INI?

a) KEPADA ANDA SEBAGAI PENYERTA?

Anda akan dapat mengetahui tentang gaya pembelajaran yang anda lebih suka dalam memperoleh maklumat terbaru supaya proses pembelajaran anda lebih efektif. Anda juga boleh membuat perubahan dalam gaya pembelajaran anda supaya dapat meningkatkan lagi prestasi akademik anda.

b) KEPADA PENYELIDIK?

Penyertaan anda dapat membantu kami dalam memperoleh maklumat tentang gaya pembelajaran yang disukai oleh pelajar perubatan di FPSK, UPM. Maklumat ini dapat membantu pihak pengurusan akademik dalam memperbaharui gaya mengajar kepada pelajar perubatan supaya pelajar dapat meningkatkan lagi tahap pencapaian akademik mereka.

ADAKAH IA BERISIKO?

Tidak

ADAKAH MAKLUMAT DAN IDENTITI SAYA KEKAL RAHSIA?
Ya. Segala maklumat yang diberikan adalah rahsia. Maklumat hanya akan dipaparkan dalam pengumpulan data tanpa mengetahui identiti individu masing - masing.

SIAPA YANG SAYA PERLU HUBUNGI SEKIRANYA SAYA MEMPUNYAI SOALAN TAMBAHAN SEMASA MENGIKUTI PENYELIDIKAN INI?

Researcher	:	Khoh Hui Fern	0178728198
		Fatimah Az Zaharah Binti Yusoff	0133214741
Supervisor	:	Dr.Rafidah Binti Hod	0196691512
		pi38046@gmail.com	
Co-supervisor	:	Dr.Syafinaz Binti Amin Nordin	0193377247
		syafinaz@medic.upm.edu.my	

APPENDIX 7

JAWATANKUASA ETIKA UNIVERSITI UNTUK
PENYELIDIKAN MELIBATKAN MANUSIA (JKEUPM)

UNIVERSITI PUTRA MALAYSIA, 43400 UPM SERDANG,

CONSENT FORM (RESPONDENT)

RESEARCH TITLE :

Learning Style Among Medical Students in Faculty of Medicine and Health Sciences, UPM in 2013

RESEARCHER : 1. Khoh Hui Fern 158290

2. Fatimah Az Zaharah Binti Yusoff 160542

I ..... Identity Card No. .....
address.....
.....hereby voluntarily agree to take part in the clinical research *(clinical study, questionnaire study/ drug trial) specified above.

I have been informed about the nature of the clinical research in terms of methodology, possible adverse effects and complications (as written in the Respondent Information Sheet). I understand that I have the right to withdraw from this clinical research at any time without assigning any reason whatsoever. I also understand that this study is confidential and all information provided with regards to my identity will remain private and confidential.

I* wish / do not wish to know the results of the tests performed on any samples taken from me.

* delete where necessary

Signature .....
(*Respondent*)

Signature .....
(*Witness*)

Date :.....

Name :.....

I/C No. :.....

I confirm that I have explained to the respondent the nature and purpose of the above –mentioned clinical research.

Date .....

Signature .....
(Researcher)

JAWATANKUASA ETIKA UNIVERSITI UNTUK
PENYELIDIKAN MELIBATKAN MANUSIA (JKEUPM)

UNIVERSITI PUTRA MALAYSIA, 43400 UPM SERDANG,

BORANG PERSETUJUAN RESPONDEN

TAJUK PENYELIDIKAN :

Gaya pembelajaran dalam kalangan pelajar perubatan di Fakulti Perubatan dan Sains Kesihatan, Universiti Putra Malaysia pada tahun 2013.

PENYELIDIK : 1. Khoh Hui Fern 158290

2. Fatimah Az Zaharah Binti Yusoff 160542

Saya..... No Kad Pengenalan. .....
beralamat.....
.....dengan ini bersetuju untuk mengambil bahagian secara sukarela dalam menyertai penyelidikan klinikal *(pengajian klinikal/ pengajian soal selidik/ percubaan ubat-ubatan) seperti yang disebut di atas.

Saya telah diberi penjelasan secara menyeluruh mengenai dasar penyelidikan klinikal dari segi metodologi, risiko dan komplikasi (seperti tertulis pada Helaian Penerangan Responden). Saya memahami bahawa saya berhak menarik diri dari penyelidikan ini pada bila-bila masa tanpa memberi sebarang alasan.Saya juga memahami bahawa sebarang maklumat yang berkaitan identiti saya akan dirahsiakan.

Saya* berminat / tidak berminat untuk mengetahui keputusan kajian yang dijalankan ke atas sampel yang diambil dari saya.

*potong yang tidak berkenaan

Tandatangan .....
(*Responden*)

Tarikh :.....

Tandatangan .....
(*Saksi*)

Nama :.....

No. K/P: .....

Saya mengesahkan bahawa saya telah menerangkan kepada responden sifat dan tujuan penyelidikan klinikal tersebut di atas.

Tarikh .....

Tandatangan .....
(*Penyelidik*)

JKEUPM Ref No. : FPSK_Mei (13) 31 (UNDERGRADUATE)

Members of the JKEUPM who reviewed the documents:

Prof. Madya Dr. Noritah Omar

Date of approval: 17/6/2013

Endorsed at JKEUPM Meeting on **5/7/2013**, attended by:

NAME	DESIGNATION	GENDER	TICK IF PRESENT
Prof. Dr. Norlijah Othman	Paediatrics& Dean, Faculty of Medicine and Health Sciences	Female	
Prof. Dr Zamberi Sekawi	Medical Microbiologist & Deputy Dean of Research and Internationalization, Faculty of Medicine and Health Sciences	Male	√
Prof. Dato' Dr. Lye Munn Sann	Medical Statistician, Dept of Community Health, Faculty of Medicine and Health Sciences	Male	√
Prof. Dr. Tengku Aizan Abd Hamid	Gerontologist & Director, Institute of Gerontology	Female	
Prof. Dr. Lekhraj Rampal	Medical Statistician, Dept of Community Health, Faculty of Medicine and Health Sciences	Male	
Prof. Dr. Elizabeth George	Pathologist, Dept of Pathology, Faculty of Medicine and Health Sciences	Female	√
Prof. Dr. Lim ThiamAun	Anesthesiologist, Dept of Surgery, Faculty of Medicine and Health Sciences	Male	√
Prof. Dr. Wan Omar Abdullah	Medical Parasitologist, Dept of Medical Microbiology and Parasitology, Faculty of Medicine and Health Sciences	Male	√
Prof. Dr. Patimah Ismail	Professor of Biomedicine, Dept of Biomedical Sciences, Faculty of Medicine and Health Sciences	Female	√
Prof. Dr. Azali Mohamed	Professor of Macroeconomics, Dept of Economics, Faculty of Economics and Management	Female	
Assoc. Prof. Dr. Johnson Stanslas	Pharmacologist, Dept of Medicine, Faculty of Medicine and Health Sciences	Male	√
Assoc. Prof Dr. Mansor Abu Talib	Assoc. Professor of Guidance and Counselling, Dept of Human Development and Family Studies, Faculty of Human Ecology	Male	
Assoc. Prof. Dr. Noritah Omar (Lay Person)	Assoc. Professor of English Language, Dept of English Language, Faculty of Communication and Modern Languages	Female	√
Dr. Rojanah Kahar (Lay Person)	Lecturer of Dept of Human Development and Family Studies, Faculty of Human Ecology	Female	
Tan Sri Dato' Napsiah Omar (Lay Person)	Chairman, National Population and Family Development Board	Female	