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Learning styles of pharmacy undergraduates: Experience from a Malaysian University

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Abstract

Background: Available evidence suggests that understanding students' learning style is helpful in providing them a successful learning experience. The aim of the study was to determine learning styles preferences of first year pharmacy students enrolled at School of Pharmaceutical Sciences, Universiti Sains Malaysia.

Methods: A cross-sectional study design was adopted to conduct the study. The Visual, Auditory, Kinaesthetic – Learning questionnaire was administered to all undergraduates of first year (n=115) enrolled at School of Pharmaceutical Sciences, Universiti Sains Malaysia. Both descriptive and inferential statistics were used for data explanation. SPSS® v 18.0 was used for data analysis. The level of statistical significance was taken to be $p<0.05$.

Results: Ninety-two students responded to the survey with a response rate of 80.0%. Females (78, 84.8%) dominated the cohort with Malay being the prevailing ethnic group. Visual learning style was the most commonly adopted learning style among the students (n=45, 48.9%) followed by kinaesthetic (n=29, 31.5%) and auditory learning style (n=18, 19.5%). Apart from ethnicity being significantly associated with auditory learning style ($p=0.030$), the preferred learning styles were statistically independent of the demographic variables examined in the study.

Conclusion: Based on the results, the respondents preferred visual learning whereby they favour using images, pictures, colours, and maps to organise information and communicate with others. Therefore, policy makers and educators should take into consideration, the learning style preferences of undergraduate pharmacy students when planning, implementing and evaluating educational initiatives.

Keywords: *learning styles, Malaysia, Malaysian university, pharmacy undergraduates*

Background

Learning style is an individual's distinctive approach towards the erudition process and is based on one owns' strengths, weaknesses, and preferences (Felder & Henriques, 1995). Despite of accountability for individual learning style assessment, health-related teaching institution still pay considerable attention only to the content of the curriculum, organisation of the teaching sessions and to the conduct of assessments and examinations (Newble & Entwistle, 1986; Coffield *et al*., 2004). Even though, a positive relationship between the academic performance and students who were taught in their preferred learning style is reported in the literature, there is paucity of information towards students learning preferences from the developing countries (Wratcher, 1991). The developed world, however, does report that students who were assessed on their learning styles and received an interpretation of their strengths and weaknesses achieved significantly higher grade-point averages than those student who did not receive any learning style intervention (Nelson *et al*., 1993; Romanelli *et al*., 2009). Moreover, knowledge and awareness of students' learning styles play an important role in optimising the learning process, consequently, coordination between learning styles and teaching styles leads to improved student attitudes and better academic achievement (Romanelli *et al*., 2009).

Shifting the concerns to the profession of Pharmacy, the use of alternative teaching methods to help students in developing their abilities and thought process is extensively reported (Blouin *et al*., 2009). These methods are incorporated in the teaching plans to instil knowledge, professionalism, problem solving capabilities, critical thinking, team building and communication skills among pharmacy undergraduates (Adamcik *et al*., 1996). Furthermore, lecturers can adapt an effective way of teaching and guidance to instil the abilities that a pharmacy student should possess, by simply targeting the

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preferred learning styles of the students (Romanelli *et al*., 2009). Therefore, in order to inculcate such knowledge and experiences into pharmacy students, their learning styles should be assessed once they enter the university as first year students, so that the most suitable method in which all students will benefit from can be proposed.

Within this context, the Malaysian educational system comprises of students with varied ethnic and cultural backgrounds, from a multitude of institutes, and with differing learning styles (Banks, 2010). Coupled with this increase in diversification has been a growth in distance education programs and expansions in the types of instructional media used to deliver information. All of these factors play a vital role in learning and retaining capabilities of the students. However, in the case of pharmacy education, the broad coverage of topics, involvement in research assignments, and time constrains are some additional reasons that lessen the effectiveness of teaching-learning interactions (Sholy & Zeenny, 2013). Therefore, the present study is aimed to identify the learning styles of first year pharmacy students at Universiti Sains Malaysia (USM) to provide them with a clearer overview of their own strengths and awareness of preferences. In addition, the results will also help the lecturers in moulding and modifying their teaching modules as per the needs and interest of the students.

Methods

Study design, settings and sampling

The study was designed as a cross-sectional, descriptive survey. All (n=115) first year pharmacy undergraduates enrolled at the School of Pharmaceutical Sciences, USM were targeted for the study.

Study instrument

The VAK (Visual, Auditory, and Kinaesthetic) learning styles self-assessment questionnaire was used for data collection. Prior permission to use the questionnaire was taken from the developers (Tanner & Allen, 2004). The learning style model suggests that most people can be categorised into one of these three preferred styles of learning, namely Visual learning style, Auditory learning style and Kinaesthetic learning style (Tanner & Allen, 2004). The VAK model is designed for both learners and teachers. The learners can determine their preferred modes for communicating, so that the teachers can utilise the learner's preference to arrange strategies for teaching different groups of learners (Lujan & DiCarlo, 2006). Furthermore, the learner can understand own learning styles in order to maximise learning potential in independent study and lifelong learning.

The tool was piloted among 25 pharmacy undergraduates of second professional year to ensure the validity and reliability of the questionnaire. Validity was performed by a panel of experts at School of Pharmaceutical sciences, USM with no involvement in the research. The tool was declared as reliable with alpha value of 0.82.

Ethical approval

Institutional ethical committee of Discipline of Social and Administrative Pharmacy, School of Pharmaceutical Sciences, USM approved the study. Attached along with the questionnaire was an explanatory statement to ensure that the participation of each respondent was voluntary and the confidentiality of the participants' feedback was guaranteed. To minimise any potential for bias and to protect the participants' anonymity, no participant identification information was collected.

Statistical analysis

Statistical Package for Social Science (SPSS®) version 18.0 was used for data analysis. Descriptive and inferential statistics were used to elaborate the study variables. The students' preferences were calculated as per instruction provided by the questionnaire developers. The K-S test was used for normality assessment and non-parametric tests were used accordingly. The Mann Whitney and Kruskal Wallis test were used to evaluate the difference of the learning styles of the students with the demographic variables. *P* value of less than 0.05 was taken as significant.

Results

Table I presents the demographic data of the study respondents. One hundred and fifteen questionnaires were distributed and 92 responded to the survey, giving a response rate of 80%. The cohort was dominated by females (n=78, 84.8%) and 50 (54.3%) belonged to the Malay ethnic group. Seventy-six (82.6%) had matriculation level of education with 82 (89.1%) were of 19 years of age.

Table I: Demographic characteristics of the study respondents

Characteristic	Frequency	Percentage
Age in years (19.09±0.439)		
18	2	2.2
19	82	89.1
20	7	7.6
21	0	0
22	1	1.1
Gender		
Male	14	15.2
Female	78	84.8
Ethnic group		
Malay	50	54.3
Chinese	24	26.1
Indian	8	8.7
Others	10	10.9
Mode of entry into school of pharmacy	76	82.6
Matriculation	5	5.4
STPM*	4	4.3
A-level	7	7.6
Others		

STPM=Sijil Tinggi Persekolahan Malaysia (Malaysian Higher School Certificate)

The distribution of respondents according to their learning styles is presented in Table II. The majority of respondents had a visual learning style (n=45, 48.9%) followed by kinaesthetic (n=29, 31.5%) and auditory (n=18, 19.5%) learning style.

In terms of age, respondents of age 19 years old represented the majority, translating to 93.3%, 88.8% and 82.7% of the visual, auditory and kinaesthetic learning groups respectively. For visual learning style, a higher percentage of respondents were females (n=37, 82.2%). Twenty-five (55.5%) of the Malay ethnic group dominated the visual learning pattern followed by Chinese and 'others' (n=11, 24.4%; n=7, 15.5%) respectively. For auditory learning style, the majority of respondents were female (n=17, 94.4%). Based on ethnic group, Malay ethnicity again were the majority in the group followed by Indian and Chinese ethnicities. In addition, fourteen (77.7%) students who reported to prefer an auditory learning method were from a matriculation background. Twenty-four (82.7%) of kinaesthetic learners were female. Malay ethnic group made up the majority of this learning group (n=14, 48.2%) followed by the Chinese (n=10, 34.4%). Twenty-two (75.8%) respondents with a preference for kinaesthetic learning style were from the matriculation mode of entry.

Table II: Distribution of respondents according to their learning styles

Learning Style	Frequency (%)*								
	Total	Gender		Age (years)		Ethnicity		Mode of entry	
Visual	45 (48.9)	Male	8	18	0	Malay	25	STPM	1
				19	42	Chinese	11	A-Level	2
		Female	37	20	2	Indian	2	Matriculation	40
				22	1	Others	7	Others	2
Auditory	18 (19.5)	Male	1	18	0	Malay	11	STPM	1
				19	16	Chinese	3	A-Level	1
		Female	17	20	2	Indian	4	Matriculation	14
				22	0	Others	0	Others	2
Kinaesthetic	29 (31.5)	Male	5	18	2	Malay	14	STPM	3
				19	24	Chinese	10	A-Level	1
		Female	24	20	3	Indian	2	Matriculation	22
				22	0	Others	3	Others	3

**Frequencies are for the yes response only*

The Mann Whitney U test and Kruskal Wallis test were used to assess the difference among the learning styles and demographic variables. Significant association was reported when auditory learning style was compared with ethnic group (p=0.030). Furthermore, the Bonferroni adjustment reported Malay ethnic group to be significantly associated with the Chinese (p=0.02) with Chinese having high mean rank values. No significant associations were reported among other study variables as shown in Table III.

Table III: Association among learning styles and study variables

Learning styles	*p* Value			
	Gender*	Age¶	Ethnicity¶	Mode of entry¶
Visual	0.506	0.232	0.298	0.359
Auditory	0.156	0.610	***0.030***	0.964
Kinaesthetic	0.715	0.144	0.188	0.206

Mann Whitney U test, ¶Kruskal Wallis test

Discussion

Results from the study reflected that visual stimulus was the major preferred style followed by kinaesthetic and auditory style among the study respondents. Hence, it is concluded that students are more comfortable with the use of images, graphs and structures during their educational activities. In addition to the interest building component, this use of pictorials and graphs support their learning process throughout the educational sessions. One major reason of adopting a visual learning style is that majority of faculty members at School of Pharmaceutical Sciences, USM deliver their lectures by Microsoft PowerPoint®. Embedded with graphs, structures and pictures, the presentations pose a positive image on the students to adapt to visual learning style as compared to others. The results are in line to what is reported by Murphy and colleagues in their study among dentistry students in New Zealand (Murphy *et al*., 2004). The authors declared their respondents as visual learners and preferred pictures, images, graphics, animations and charts (Murphy *et al*., 2004). Furthermore, it has been reported that visual learners also prefer the use of structural and graphic organisers to systematise their ideas, thoughts, knowledge and concepts (Jonassen, 2004). Such students who use the graphic organisers in their studies had shown considerable improvement in their performance in certain areas such as retention of information and critical thinking abilities (The Institute for the Advancement of Research in Education, 2003). In today's world, with the advancement and ready availability of smart phones and gadgets, it is easier for the students to be connected on the World Wide Web, hence acting as a major influence in preferring visual learning style to other learning methods.

On the contrary, the results of this study are against to what is reported by Lujan and DiCarlo (Lujan & DiCarlo, 2006). The authors reported that only 5.4% of their respondents preferred visual learning methods (Lujan and DiCarlo, 2006). One major reason can be the difference of the study subjects, whereby Lujan and DiCarlo's respondents belonged to a medical school. Medical students learned conceptual and abstract material because it is provided with suitable analogies, real-life examples, or metaphors which is opposite to the curriculum of pharmacy whereby in first year, students are taught subjects related to research, basic concept of statistics, public health pharmacy and social pharmacy at School of Pharmaceutical Sciences, USM.

The respondents, comprising 19.54% and 31.5% of the cohort respectively, also adopted auditory and kinaesthetic learning styles. Students who learn by listening, speaking, and discussing are grouped under auditory or aural subgroups (Drago & Wagner, 2004). The process includes listening, identifying sound patterns, rhythms and tones and such learners prefer putting the data and information into lyrics in order to help them in memorising the information creatively and effectively. Meanwhile, students that are more prone to learn by experiencing through physical movement of aspects such as touch, feel and hold are classified as kinaesthetic group (Murphy *et al*., 2004). Kinaesthetic learners use hands-on and physical activities to help them in processing the information received. The literature does support the effectively of the two learning styles (Coffield *et al*., 2004; Baykan & Naçar, 2007), however, there is lack of evidence showing the effects of adopting auditory and kinaesthetic learning style independently.

A significant association between ethnicity and auditory learning style was reported by this study. A possible reason of this association is attributed to the difference in the educational system in Malaysia. For instance, there are public schools, which include the national and vernacular schools and private schools, which are self-supported. Ethnicity based educational curriculum is still being practiced in Malaysia, where Malaysian students from different ethnic backgrounds are exposed to different teaching style, causing a diversity in learning style (Loo, 2010). The results of the present study are parallel to the study conducted among Southeast Asian students. The authors reported significant ethnic group differences among the learning style preferences of Southeast Asian and white students as well as significant differences within the diverse Southeast Asian groups (Park, 2000).

Almost half of the study respondents preferred visual learning followed by kinaesthetic and auditory learning style. None of the respondents preferred to use multiple modes of information presentation. Acclimatisation to bi- or tri- model learning style is seen as an advantage because students can adapt to their learning environment and can have opinions that are more ductile in problem solving (Duff, 2000). Students having diverse learning styles are also efficient in adapting to the teaching styles of different lecturers in order to receive information and knowledge optimally (Drago & Wagner, 2004). Therefore, in order to ensure that all students learn optimally, the lecturers should employ teaching methods, which include visual presentations, well as practical hands-on sessions where students can brainstorm, experience and apply what they have been taught, in order to boost their academic performance in the future.

Conclusion

The study was conducted to assess the learning preferences of first year pharmacy students. The results suggested that majority of the student's prefer pictures, graphics, animations and mind maps in learning. Knowing the students' preferred learning styles could help provide instruction tailored to the student's individual preference; overcome the predilection to treat all students in a similar way, and to motivate faculty members to move from their preferred methods to adapt what is preferred by the students. Furthermore, accustomising to students' learning styles will help the pharmacy instructors in developing appropriate learning approaches and explore opportunities so that they will be able to make the educational experience more productive.

Limitations

The study was conducted among first year pharmacy students of USM. Thus, this sample might not represent the population of first year pharmacy students across the country. Moreover, as the study included only first year students, students from higher levels (*i.e*. 2nd, 3rd and 4th year) were not represented. This could provide the difference and a possibility of shifting of learning style between the beginners and seniors in the School of Pharmaceutical Sciences, USM.

Disclosure

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