Identifying Learning Pattern among Medical Students and Their Preferred Mode of Study

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Abstract

The goal of this study was to identify the problems students face in learning by identifying their pattern of study; to find out the most preferred method of teaching and learning and to assist faculty by identifying the problematic areas for students. This cross-sectional study was conducted at All Saints University School of Medicine, Dominica. It involved 202 students who volunteered to fill out the questionnaire. The questionnaire was designed to obtain information regarding student problems in learning along with their most preferred teaching and learning methodology. The data being compiled and analyzed using STATA IC 14. Of the 202 participants, 191 responses were analyzed. STATA revealed no significance in a gender preferences and mode of learning however, significant differences were observed while comparing year of study to preference of PDI/PDS ($p=0.041$) and Tutoring ($p=0.033$). In addition, 96% ($n=191$) of the students appreciated Problem-based Learning (PBL) in the form of discussing clinical cases related to the topic. These results demonstrate a rising interest in PBL as opposed to traditional methods of learning.

Keywords: Learning methods; medical schools; learning preferences; teaching modules; knowledge acquisition; medical education.

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1. Introduction

Learning is a process and a development skill where one acquires knowledge through study, experience or being taught. Teaching and learning may not always work hand in hand, as learning can be acquired without effective teaching, while effective teaching may not necessary be a prerequisite in the absence of learning. Meaning that learners may not require teachers but teachers need learners otherwise their work is not justified.

In a classroom setting, the goal of the teacher is not only to get a message through to the students on a particular subject, but also to help students' retain material so that they may utilize the knowledge at another point in time or understand the basics pertaining to that subject material in reality. The primary focus for a classroom assessment by both teachers and students is to observe and improve learning, rather than observe and improve teaching [1]. This makes teaching an ever-evolving process with a continuous need for improvement by keeping in step with modernization [2].

With a vast variety of subjects to choose from, teaching methodology would definitely vary not just within individual subjects, but within schools and individual teachers as well. Considering a medical school, one has to understand the variability of subjects that students have to face with a fast pace and a high stress environment. To study topics of the vast subject matter of medicine is like to count each drop of water that fills an ocean, it is never-ending. With this teachers are required to deliver substantial amounts of knowledge in a limited period of time, this knowledge that is a requirement for every student to analyze, retain and apply in future. Keeping this in mind, every medical school undergoes a constant upgrade through exam committees and curriculum committees working effectively to improve and shift from a teacher-centered learning and subject-based teaching to an interactive, problem-based, student-centered learning [2,3].

It has been stated that if teachers can familiarize with the learning habits of their students and adapt to them, this will have a definite benefit for teachers and students [4,5]. While, students on the other hand would realize their individual style of learning and implement them, ensuring scholarly satisfaction and improvement, as they incorporate their best method to learning [2,4,5].

Furthermore for any country or school to deliver a higher quality of education, a lot more dedication is required to integrate the learning style in teaching and technology. The tools of modern teaching should incorporate and advocate technological advancements to achieve such high quality [6].

To study student learning and the impact on the quality of learning, methodologies were being tested since the 1960s [7,8]. Initially a qualitative interview-based study was conducted. This study reported that qualitative differences existed in ways that students acquired and conceptualized knowledge [7,8]. Learning styles were denoted to cognitive, affective and physiological behaviors which attain a fair baseline of how individuals perceive, interact with and respond to their environment during learning by recalling stored memory from their brain [9,10]. Upon completion of detailed research work, Kharb et al., 2013 conclude that a learning style refers to an individuals' preferred method of gathering, processing, interpreting, organizing and analyzing information [11].

Renowned educational scientists have categorized existing learning styles in three layers: instructional preferences which they perceive information (outermost layer), information processing (middle layer) and personality (innermost layer) [12]. As mentioned earlier, medicine holds an enormous volume of content, for one to establish a learning style specifically to cater medical students is quite complex. This has led to the identification of 70 different learning styles [9,13,14]. It has been reported that medical educators currently encounter a great challenge to achieve student satisfaction in regards to their curriculum and learning environment [15]. Presently, there is a global trend to reform medical curriculum from a teacher-centered learning to a student-centered learning.

In order for a medical student to qualify for a medical education, prerequisites are maintained country to country requiring students to complete higher education within a science background. This indicates that medical students are adults and hence have already established their own learning style. Therefore, it becomes essential for medical educators to customize instructions in such a way that medical students pursue, appreciate and understand [16,17].

Educational scholars have developed a model termed VARK (V-visual, A-auditory, R-read/write and K-kinesthetic) that compiles information based on sensory modalities [18]. This model determines the modalities by which learners prefer to process information. Visual learners process information best if they can see it, auditory learners prefer to hear information, read-write learners prefer to see written words and kinesthetic learners like to acquire information through experience and practice [18]. It has been stated that teaching and learning are the two sides of a coin [19]. One way to establish the quality of teaching is by weighing in the amount of information a student has learnt during their course. There has been consistently a high correlation between the student ratings of the amount learnt during a course and their overall rating of the teacher along with the course. Those who learned more provided their teachers a higher rating [20,21].

The MD program at All Saints University School of Medicine, Dominica offers a 4-Year MD Program including successful completion of premedical admission requirements and a 5-Year MD Program for those requiring premedical courses such as biology, physics, chemistry and mathematics. The 4-Year MD program is divided into two phases. Phase I is termed as Basic Medical Sciences composed of 5 semesters, MD1 to MD5 that is completed in a span of approximately 2 years, Phase II is termed as Clinical Rotations and carried out by students who have successfully completed Phase I, Phase II is completed in a span of 2 years as well. This research has taken and evaluated participants from MD1 to MD5 of the 4-Year MD program into consideration who have successfully completed their premedical requirements as premed students are usually within an adolescent age group and may still be in the process of identifying their learning style. Further classifying MD1 to MD5 students, here on Year 1 will indicate students from the MD1 and MD2 class while Year 2 will indicate students from MD3, MD4 and MD5 class. Each semester have a different taught module such as MD1 study Anatomy, Histology, Embryology, Epidemiology and Preventive Medicine, MD2 study Biochemistry, Physiology, Neuroscience and Genetics, MD3 study Microbiology, Immunology, Psychology, General Pathology and Medical Ethics, MD4 study Systemic Pathology, Pharmacology and Physical diagnosis and investigations (PDI) and lastly MD5 study Advanced introduction to clinical medicine, board review, exam preparation and information regarding residency. Patient doctor skills (PDS) contains the basics of PDI and is

run from MD1 to MD3. For the purpose of this study PDS and PDI are clubbed together as one (PDS/PDI).

The study conducted at All Saints University School of Medicine, Dominica is conducted purposely to identify the preferences and perception of students towards the curriculum, course and system adopted by the school. This study has collected data from MD1 to MD5 students regarding their opinion through a questionnaire to analyze the already existing learning or teaching method, whether satisfactory and sufficient or not in order to achieve the MD program objectives.

Objectives of the study is to identify the problems students face in learning, to find out the most preferred method of teaching and learning and to assist faculty by identifying the problematic areas for students, if any, to improve the efficiency of teaching and learning methodology. The results of this study will aid to provide an insightful direction for faculty to improve their student's credibility as future doctors.

2. Materials and Methods

A cross-sectional study was conducted at All Saints University School of Medicine, Dominica. The total study population was 202, out of which 191 were selected and 11 were not included in the study due to insufficient data. Of the 191 study population, 108 belonged to Year 1 and 83 belonged to Year 2. The period of study was 2 months from the 5th of May until the 4th of July 2015. The data was collected by two medical students of MD4 semester, who have not been included within the study population and were supervised during data collection. A questionnaire was developed through an extensive research and review of literatures. Questionnaire was pretested and validated. The questionnaire was designed to obtain information regarding student's problems in learning along with their most preferred teaching and learning methodology. The questionnaire has been divided into 6 sections. The data being compiled and analyzed using Stata IC 14. The study was approved by the research committee of All Saints University School of Medicine, Dominica.

3. Results

Out of 191 respondents, 108 students participated in this study from Year-I and 83 students from Year-II; the number of male participants were 85, and females 106.

Our results show that Lecture which is the main mode of teaching at the university was preferred by 59 (55%) of Year-I and 47 (57%) of Year-II students. Year-I ranked labs as the most preferred method of learning 72 (67%) whereas Year-II students 64 (77%) chose PDI/PDS as the most preferred method of instruction (Refer Figure1).

In addition, no significant difference in gender preference of Lectures, Labs, PDI/PDS, Group discussion and Tutoring was noted. Data is considered significant if p value is <0.05. Similarly, no significance was observed in comparison between year of study and preference of Lectures, Labs and group discussion. However, significant differences were observed while comparing year of study to preference of PDI/PDS (p=0.041) and Tutoring (p=0.033) (Table.1).

When questioned regarding lecture preparation, 56% of the study population disclosed that they do not read

lecture hand-outs/ slides the day before the lecture was held. 88% agreed that reading about a topic before the lecture would help understand the subject better; 76% of the students acknowledge that if questions were asked randomly during the lecture, it would prompt them to read the lecture before entering the class. Majority agreed that they will study more if the questions were used as a method of continuous assessment that would lead to a prize/certificate at the end of the course (Table 2.).
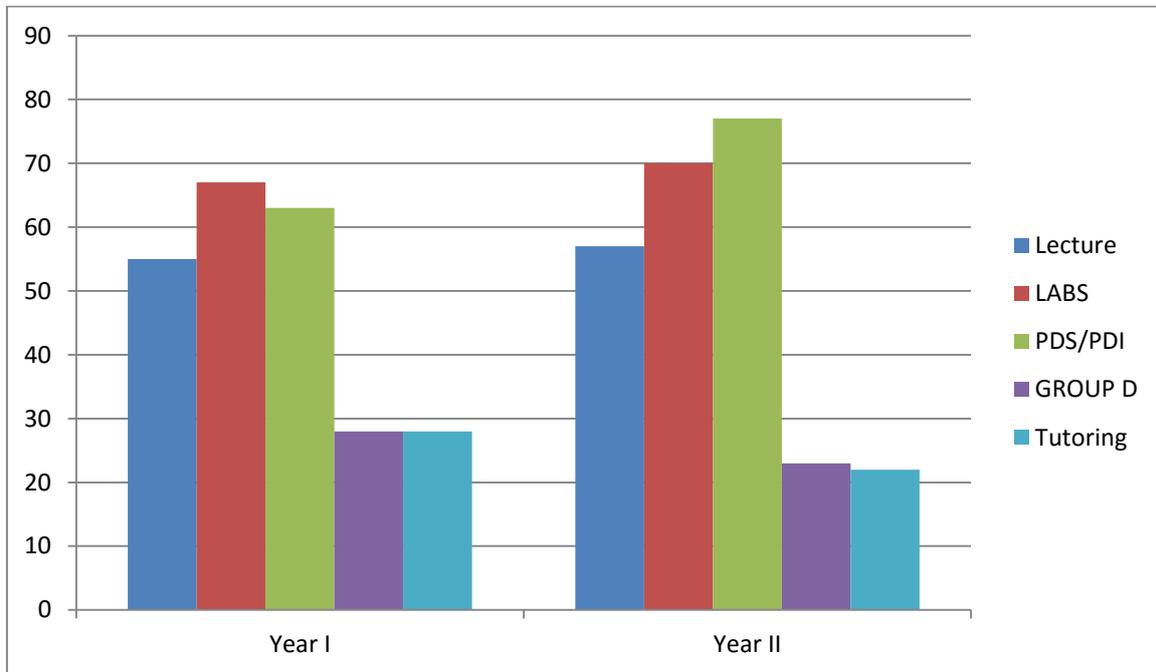

Figure1: Students' Response to Preferred Teaching and Learning Methods. Students were asked to choose for each mode their preference ranging from 1 – 3 (1=most preferred 3=least preferred).

Interactive sessions form a part of a great learning experience where the level of assimilation of information can be measured, a verbal medium of interaction also helps regurgitate or recall. Active participation also helps in information retention. While conducting our research students gave their opinion regarding interactive sessions, presented with options 71.20% chose the use of audio-visual aid, 59.16% believed the use of models enhances their interactive learning, clinical case scenarios which involve intelligent contributions and in depth knowledge of a particular condition has been of benefit to 74.86% of the students, 38.21% of the students prefer the use of presentations which give them a platform for adequate knowledge and brilliant interactions. Scouting for information independently, gathering data & teamwork is appreciated by 25.65%.

A huge portion of the study population 99% agreed that the instructors' creativity is instrumental in transferring information and helps create a fun learning environment. Furthermore, 96% of the students are in support of Problem-based Learning in form discussing clinical cases related to the topic; 71% of the respondents admit that their concentration is likely to deviate after 45mins of the traditional method of learning i.e. lecture (Table 3.).

About 89% of the study population credit a better understanding of the subject to the Lab sessions; 90% feel that two hours is enough time for an effective lab session; the majority (47%) prefer 5-10 people in a group and 42%

preferred the Lab sessions once a week (Table 4.).

"Early clinical exposure will help in building patient doctor communication skills" is the prevalent thought among 97% of the students; 21% confessed to having had problems in communicating with patients and 80% think that a formal attire during a PDS/PDI practice session helps prepare them to be professional as doctors (Table 5.).

The study population were also questioned regarding medical equipment's and gadgets they own for their learning process, 47.12% owned a stethoscope and 10.99% a PDI kit while majority of the study population owned a lab coat (83.25%) and laptops (93.72%).

4. Discussion and Conclusion

In business, the perception of good customer service is primarily dependent on the customer. More accurately, it is the customers' lack of complaint at the end of the transaction. Teaching should be the same. However, having established that medicine encompasses a broad number of subjects; such student satisfaction may be achieved only in theory. It is therefore essential to narrow the gap between theory and reality.

Research conducted by Cross TA showed that classroom assessment assisted faculty to concentrate on student learning. This required determining the material students have learned and what they find difficult to understand. By focusing on these areas instructors can substantially improve learning [1]. When group interest is a paramount consideration, it does not only highlight students with masked concept deficits but serves as a tool to further consolidate and strengthen the knowledge depth of everyone else making learning as smooth as silk.

Our study shows difference in selection of the preferred mode of learning among Year-I (Labs) and Year-II (PDS/PDI) study population. The reason for the difference could be that Year-I concentrate on cadaver dissection labs in anatomy and this gives students hands-on experience to understand anatomy in much more detail rather than learning through anatomical images from books. On the other hand, Year-II is the time period when students get exposed to patient-doctor skills and starts interacting with real patients in simulation laboratory and hospital. Students learn to incorporate their theoretical knowledge in a clinical setting which makes learning much more interactive and hands on rather than watching videos in order to understand patient-doctor skills. There was no surprise that personally 47.12% owned a stethoscope and 10.99% a PDI kit as these are provided by the University for the students.

Instructor-Centered Learning, otherwise referred to as Teacher Centered learning, is the oldest method of imparting knowledge. The Instructor's presentation, explanation, quizzes and numerous questions all play a vital role in learning. A chapter in the *Handbook of Research on teaching* written by Rosenshine and Robert Stevens reviews instructional behaviors of very effective teachers [22].

Fundamental reforms in undergraduate medical education have been advocated for 100 years. Undergraduate medical education needs ongoing improvements to keep up with the changes occurring in medical practice. Although the complexities of medical care have greatly increased over the last century, the methods of teaching

medicine have minimally changed [23]. It has been noted that since the introduction of Problem-Based Learning (PBL) in 1969, medical education has taken a distinctive turn [24].

Table 1: Comparison between gender and year of study, showing preference of teaching methods.

Mode of Learning	Gender, mean(SD)			Year of Study, mean (SD)		
	Male (n=85)	Female (n=106)	p-value*	Year 1 (n=108)	Year 2 (n=83)	p-value*
Lecture	1.51(.76)	1.7(.83)	0.325	1.62(.80)	1.62(.82)	0.912
Lab	1.46(.76)	1.46(.78)	0.726	1.52(.83)	1.35(.66)	0.061
PDI	1.45(.79)	1.5(.84)	0.507	1.60(.89)	1.32(.68)	**0.041**
GroupD	1.86(.91)	1.64(.82)	0.142	1.80(.89)	1.66(.83)	0.438
Tutoring	1.72(.89)	1.80(.88)	0.524	1.84(.92)	1.65(.80)	**0.033**

*Independent t-test, 1=most preferred, 3=least preferred

Table 2: Students' response regarding lecture preparation

Questions	Students' Answers (%)	
	Yes	No
Do you read lecture hand-outs/slides the day before the lecture will be held?	43.98	56.02
Do you think that reading about a topic before the lecture will help you to understand the subject better?	87.96	12.04
At the end of a lecture, if a professor asks students in random, questions about the lecture, to know their understanding, would it prompt you to read the lecture before entering the class?	75.92	24.08
If the above mentioned technique is used as one of the method for continuous assessment, do you think it will prompt you to read the topic in advance?	82.20	17.80
After the class is over, do you go through the lecture material again on the same day?	64.40	35.60
If a prize/certificate is given to the best student in each course at the end of each semester, will it help you to study harder?	61.78	38.22

It was proposed that the knowledge obtained through relevant context was better memorized, concepts are acquired in a way that they can be mobilized to solve/view similar problems, possession over time of prior

examples leads to pattern recognition and promotion by PBL of prior-knowledge activation facilitates processing of new information [24]. Inspiring results were obtained from a study conducted among 92 Jordanian nursing students, to improve on a traditional curriculum with the introduction of Problem Based-Learning (PBL). It was noted that there was a remarkable improvement in learning pattern, as evidenced by an increase in mean VARK score that was observed among the nurses [25]. Moreover, an analysis of 1159 graduates from 1 PBL and 4 non-PBL schools 18 months after graduation showed that PBL graduates had a higher rating for the connection between work and school, their medical skills and readiness for practice in comparison to non-PBL graduates. It was found that PBL graduates had more exposure to profession specific methods, communication skills and team assignments in medical school than non-PBL graduates [26].

Table 3: Students' opinion regarding interactive lecture sessions

Question	Students' opinion (%)	
	Yes	No
Lecturer's creativity in transferring information during a lecture session is important to create a fun learning environment. Do you agree?	99.47	0.52
Do you think pictures drawn by lecturers on a whiteboard help you to visualize and understand the lecture efficiently, rather than PowerPoint presentations alone?	85.86	14.13
Would discussing clinical cases in relation to the topic of the lecture increase your interest in the subject?	95.81	4.18
Based on your experience, do you feel that your concentration span is easy to deviate after 45 minutes of a lecture?	71.20	28.79
Do you think a break of 5-10minutes half way through a lecture will help in increasing your attention span?	92.14	7.85
Do you participate by asking questions during or at the end of a lecture?	54.97	45.02
Do you think that group discussions can improve your understanding about a topic?	81.67	18.32

Table 4: Students' preference regarding Practical/lab session

Questions	Respondents answer (%)		
	Yes		No
Do Lab sessions help you to understand the subject better?	89.01		10.99
Do you feel that 2 hours is enough time for a lab session?	90.05		9.95
How many students do you prefer in a group during a Lab session?	Less than 5	5-10	More than 10
	48.17	47.12	4.71
How many lab sessions would you like to have per subject?	Once in 2 weeks	Once a week	Twice in a week
	15.71	42.41	41.88

Table 5: Student's opinion regarding Clinical exposure

Questions	Respondent's Answer (%)	
	Yes	No
Do you face problems in communication with patients?	20.94	79.06
Do you think early clinical exposure will help you in building patient doctor communication skills?	97.38	2.62
Do you think implementing mandatory formal attire during a PDI/PDS practice session would prepare you to be more professional as a future Doctor?	80.10	19.90

Even though there was difference in the preferred mode of learning among Year-I and Year-II students, the study showed that majority of the students preferred more interactive and creative way of learning in the form of audio-visual aids or group discussions during the lecture sessions. Also, the study indicated that problem-based learning or an assessment in the form of tests during the lectures will help the students to better understand the topic and increase their attention span.

In conclusion, lectures are the main method of teaching in a medical school which helps the students understand the basic concepts and apply these concepts in a laboratory or clinical setting to increase their learning skills. The study showed that students at All Saints University favored more interactive lectures in the class with the active participation of professor and the student. Therefore, in addition to the modes of teaching already present at the university, problem based learning will be given significance to improve the learning outcome.

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