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Original Article

A Study to Assess Whether 'Medium of Schooling' Affects the 'Learning Style preferences' of First Year Medical Students

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Abstract

Introduction: First-year medical students coming from different backgrounds and mediums of schooling have to cope up with a vast amount of information. Learning is influenced by the mode of input that has been presented to the students. They have different learning styles and preferences as far as knowledge uptake is concerned. Visual, Auditory, Reading/Writing, and Kinesthetic (VARK) are among the known modes of information presentation.

Purpose: The present study was aimed at checking out if the medium of instruction in schools affected preference in learning styles among the 1st-year medical students. This could be of help probably in providing customized instructive plans if required.

Methods: In the present study, 116 1st-year medical students from Grant Government Medical College coming from different mediums of instruction in school were included and categorized as English medium (EM) and Non-EM (NEM). The standard VARK questionnaire developed by Fleming was used in the study to assess their learning preferences.

Results: No significant difference in learning style preference for both EM and NEM was found in either multimodal or unimodal learners. Further breakdown of the multimodal learners into modality combinations, i.e., bimodal, trimodal, and quadmodal, too, did not reveal any significant learning style difference among the different mediums.

Conclusion: As no significant difference in learning style preference among students from different mediums were revealed in the present study, there seems to be no need of personalized teaching strategy differences for the students coming from different backgrounds and medium of instruction.

Key words: Medium, Learning style, Modal, Visual, Auditory, Reading/Writing, and kinesthetic

INTRODUCTION

The term learning style describes an individual's preferred method of gathering, processing, interpreting, organizing, and analyzing information.[1] Learning style has been described as strategies that students adopt to a learning situation. Learning style is one of the ways in which students begin to focus on the topic, understand and apply new information in real life situations irrespective of their fields. Many students have different preferences in learning styles, and it is a major factor in their learning process.[2] Students thus possess different needs when it comes to learning.[3]

In India, the transition from 12th standard to 1st-year medical education can be difficult for students due to the dramatic increase in the volume of contents.[1] Medical curriculum specifically being totally in English could pose a specific challenge for those educated in vernacular mediums in their schooling years. Coping up could be a bit easier for their English medium (EM) counterparts. Due to these inherent learning challenges, there could be an attitudinal change in adapting to different learning styles by the vernacular medium students with respect to the English educated ones. Some studies conducted on medical students in Nepal seem to show that the EM students used a more deep learning

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strategy whereas unfamiliarity with the language and stress of adjusting to a different environment may be a factor for adapting surface learning styles among the vernacular educated counterparts.[4]

We, therefore, as researchers, have made an attempt to understand this difference in learning styles among medical students educated in EM and those educated in vernacular medium, if they do exist. Learning style preferences are the manner in which, and the conditions under which, learners most efficiently and effectively perceive, process, store, and recall what they are attempting to learn.[3] Knowing about the students learning style preferences might aid in the development of the most effective teaching approaches.[5] It may be helpful in planning teaching sessions and develop effective curricular approaches and for processing information.[1]

Our interest to know about preferred learning modes and thereby develop teaching approaches to address the learning needs of both English and vernacular medium educated medical students, led us to use the Visual, Auditory, Reading/Writing, and Kinesthetic (VARK) inventory tool. The VARK questionnaire developed by Fleming was used as the required tool to better understand our learners as well as their learning style characteristics.[6] VARK is a tool which categorizes learning preferences based on four major sensory modes of learning: VARK. Depending on the mode by which a learner prefers to receive information one or more modes are often dominant and preferred by the learners. The present study focuses on the chosen modes of learning that medical students from EM and non-EM (NEM) tend to adopt during their 1st year of medical career.

Talking about the different modes of learning, visual learners learn through seeing drawings, pictures, and other image-rich teaching tools. Auditory learners tend to learn by listening to lectures, exploring material through discussions, and talking through ideas. Reading/Writing learners get to learn through interaction with textual materials, whereas kinesthetic learners learn through touching and experiences, which emphasize doing, physical involvement, and manipulation of objects.[7]

MATERIALS AND METHODS

The study was first attempted on 120 1st-year medical students in the Department of Physiology at Grant Government Medical College, Mumbai. An e-mail confirmation and consent to use this questionnaire for the study were also taken from Fleming, the developer of the VARK questionnaire. Proper approval from the Institutional Ethical Committee was taken for the study. Only those students who volunteered and were interested in the present study were taken into consideration for the study. Written consent was taken from the students too. Students also had the option of not participating for the study or withdrawing from the study at any stage, if they so wished. Out of the 120 students, four students did not wish to disclose their medium of instruction of schooling. Considering the non-taxing and open nature of the study, their views were respected and they too were excluded from the study, bringing down the number from 120 to 116 students. Out of these 116 students, 81 were educated from EM schools and the rest 35 were educated from vernacular mediums such as Hindi, Marathi, and Urdu where they had limited exposure to the English language.

Students were allowed to choose multiple answers per item to adequately describe their preferred responses to the situation presented. The total number of student responses was tallied for each of the four sensory modalities (V, A, R, and K) and all possible combination of modalities. The scoring algorithm on the VARK website was then applied to identify each student's modality preferences.[8]

Analysis

The number of students who preferred each mode of information presentation was divided by the total number of student responses to determine the percentage of students in each category.[8,9] A χ^2 analysis was performed to determine if significant differences exist for each of the following situations between the EM and the NEM students.

- Multimodal and unimodal preferences between the two mediums.
- Quadmodal, trimodal, and bimodal preferences between the two mediums.
- Specific multimodal preferences among the two mediums.

Statistical analysis for the study was done using the popular software GraphPad Instant Version 3.1

RESULTS

Three contingency tables, Table 1, Table 2, and Table 3, were designed and used to determine the relationship between the medium of instruction and

- Learning preferences (multimodal, unimodal V, A, R, and K).
- General multimodal learning preferences (quadmodal, trimodal, and bimodal).
- Specific multimodal learning preferences (VARK, VAR, VAK, VRK, ARK, VA, VR, VK, AR, AK, and RK).

Table 1: The relationship between medium of instruction and learning preferences (multimodal, unimodal V, A, R, and K)

Medium	Multi-modal	Single V	Single A	Single R	Single K	Total number of students
EM	55	2	6	3	15	81
NEM	20	0	3	2	10	35
Total	75	2	9	5	25	116

P value by Chi-square analysis comes to be 0.6058. EM: English medium, NEM: Non-English medium

Using the individual contingency tables thus plotted, *P* value for each table was evaluated using Chi-square analysis.

The percentages of EM and NEM students who preferred multimodal and unimodal styles of information presentation are as follows. 67.90% of EM students and 57.14% of NEM students preferred information to reach them by multiple sensory modalities (multimodal). Similarly, in unimodal presenters, their percentages were 32.09% for EM and 42.85% for NEM students. *P* value came out to be 0.2659 thus ruling out any differences in the percentages of EM and NEM students who preferred multimodal and unimodal styles of information presentation. Further breakdown of the unimodal presenters showed the following: (1) Students preferring single V (7.69 % EM vs. 0% NEM), (2) students preferring single A (23.07 % EM vs. 20% NEM), (3) students preferring single R (11.53% EM vs. 13.33 % NEM), and (4) students preferring single K (57.69 % EM vs. 66.67 % NEM). $P = 0.7183$, thereby again ruling out any differences in the percentages of EM and NEM students who preferred different unimodal modes of information presentation.

The percentages of EM and NEM students who preferred two, three, or four modes of information presentation are as follows. Some students preferred two modes (bimodal) 23.63% for EM versus 40% NEM, some students preferred three modes (trimodal) 20% EM versus 15% NEM, and some students preferred four modes (quadmodal) 56.36% EM versus 45% NEM. $P = 0.3764$, thereby again ruling out any differences in percentages of EM and NEM students who preferred bi-, tri-, or quadmodal styles of information presentation.

The breakdown of bi-, tri-, and quadmodal, preferences in the EM and NEM students are as follows. Out of the EM and NEM students who preferred two modes of information presentation, some preferred the combination of modes V and K (5.45% EM vs. 5% NEM), some students preferred V and A (1.81 % EM vs. 5 % NEM), some students preferred R and K (3.63 % EM vs. 15 % NEM), some students preferred A and R (3.63% EM vs. 0 % NEM), and some students preferred A and K (9.09 % EM vs. 15 % NEM). None of the students either EM or NEM in our study preferred the combination of V and R. Of the EM and NEM students who preferred three modes of information processing some students preferred the combination of modes V, R, and K (1.81% EM vs. 0% NEM), some students preferred the combination of modes V, A, and K (9.09% EM vs. 0% NEM), and some students preferred the combination of modes A, R, and K (9.09% EM vs. 15% NEM). Again none of the students either EM or NEM in our study preferred the combination of V, A, and R. Students preferring all four modes of information presentation, i.e. quadmodal were V, A, R, and K (56.36% EM vs. 45% NEM). $P = 0.4706$, thereby once more ruling out any differences in specific multimodal preferences between EM and NEM students.

Table 2: The relationship between medium of instruction and general multimodal learning preferences (quadmodal, trimodal, and bimodal)

Medium	Quad-Modal	Tri-modal	Bi-Modal	Total number of students
EM	31	11	13	55
NEM	9	3	18	20
Total	40	14	21	75

P value by Chi-square analysis comes to be 0.3764. EM: English medium, NEM: Non-English medium

Statistically no differences could be established in any of the specific preferences tested in either of the mediums, it was also worth mentioning that of the six possible bimodal combinations, i.e., VA, VR, VK, AR, AK, and RK, the combination VR, was neither represented in the EM nor the NEM student population. Likewise of the four possible trimodal combinations VAR, VAK, VRK, and ARK, again VAR failed to be represented in either of the mediums. Considering the trimodal combination VRK, it turned out to be poorly represented in EM students with the only one expressing this preference; it failed to be represented at all in the NEM students.

DISCUSSION

Students from elite schools are expected to perform good as these schools are usually rich in resources and facilities. Performance of the students is often influenced by the school ownership and the funds available to the school.[10] EM schools as compared to the vernacular medium schools

Table 3: The relationship between medium of instruction and specific multimodal learning preferences (VARK, VAR, VAK, VRK, ARK, VA, VR, VK, AR, AK, and RK)

Medium	VARK	VAR	ARK	VRK	VAK	VA	AR	RK	VK	AK	VR	TOTAL
EM	31	0	5	1	5	1	2	2	3	5	0	55
NEM	9	0	3	0	0	1	0	3	1	3	0	20
Total	40	0	8	1	5	2	2	5	4	8	0	75

P value by Chi-square analysis comes to be 0.4706. VARK: Visual, Auditory, Reading/Writing, and Kinesthetic, EM: English medium, NEM: Non-English medium

often tend be privately run, and due to their better funding, serious ownership, motivated faculty, and access to resources like computers often perform better than the government schools running vernacular mediums such as Hindi, Marathi, and Urdu. The additional funding and facilities provided in private schools often tend to enhance academic performance and educational attainment of their students. Studies done by Crosnoe *et al.* did show that the provision of facilities and availability of resources in school are an important structural component of the school.[11] Similarly, studies done on medical students in Nepal revealed differences in learning strategies between English and vernacular medium educated students.[4] It was often seen that the type of schools in which the student studies greatly influence the educational performance and academic achievement of the students. Birch and Miller summarized the views of many researchers and educationists in their study on the influence of high school attended university performance.[12] This study made the researchers predict that the background to the students positively correlates with the academic attainment of graduate students.[10] Taking this thing as a backdrop in our mind, we as researchers too thought over and decided to correlate the effect of medium of instruction given in the schools with the learning style preferences of the students in their professional courses, as the learning style preferences adopted by the students could ultimately reflect on the academic performance and achievement in their professional courses.

The present study was thus conducted on the EM and NEM 1st year medical students of Grant Government Medical College with an intention to assess differences in learning style preferences between them.

In this study, the VARK questionnaire of sensory modality preferences was administered to 1st-year medical students. It was done to ascertain if the medium of schooling really had an impact on the learning styles. The VARK questionnaire designed by Fleming was a standard 16-item, self-reported multiple choice questionnaire used for the purpose of evaluating the students preferred modes of information presentation.[6,7] Apart from the VARK questionnaire, various other instruments such as the learning style inventory, Lancaster's Approaches to learning inventory, Kolb's learning style inventory, and learning preferences inventory are used to investigate the styles of students.[4]

The positive point about the VARK questionnaire is that its questions and options are drawn from real life situations and respondents identify with the results that they receive; they affirm the face validity of the tool.[9]

In our study, preferences being primarily classified as multimodal and unimodal, we came across results which show modality preference to be quite similar between both mediums. Among the multimodal learners EM comes out to be 67.90% and NEM shows up to be 57.14%. Furthermore, in this study, EM and NEM preferred multimodal learning to such a same extent that, there existed a complete absence of preferences in both bi- and tri-modal learning preferences in some sets. For example, VAR in trimodal and the VR combination in bimodal failed to be represented in either of the mediums.

Considering the fact that the bimodal VR and trimodal VAR were not represented in either medium, an important coincidence could probably be seen in our studies, where a poor representation of combinations of V and R coexist. This could thereby call for a larger study group where the absence of students preferring bimodal VR or trimodal VAR could be properly investigated on.

Among the students, no significant differences in the percentages of students who preferred unimodal styles of information presentation existed (32.09% of EM students and 42.85% of NEM students reported a preference for a single modality).

Thus, from the results of our present study, we failed to observe any significant differences in learning style preferences between the EM and the NEM students in any of the modality combinations. This study being quite unique in its own kind in comparison to other studies available in the past had to depend more on the rationale and assumption of the authors and had to compare the findings with the hypothesis thought of by the authors explained subsequently in the article.

Medical students in India are taught their 1st-year subjects mostly in lecture mode where the students listen to lectures without much active involvement and thus are essentially a passive learning method that encourages memorization and note-taking as the means of assimilating the knowledge.

Now the language of instruction being in English, it seems to be arguably an advantage situation for those medical students with an EM background to grasp the teachings easily.[2,13] However, taking into consideration the results of our study, this hypothesis failed to pinpoint any notable differences in the students learning style and preferences. However, as researchers, we felt that, though the VARK questionnaire helped us in determining the learning preferences adopted by the students from the different mediums, it would be important to know if a correlation between learning style and actual performance in exams exists. In our present study, we did not provide or compare any data about medium oriented performance in the course. Furthermore, we did not conduct a follow-up study to assess knowledge retention. In future studies, we would like to study another course in which grades and performance are individualized and can be linked to student performance.[14]

A possible hypothesis and rationale behind students from different educational mediums and background not differing much in their learning styles and preferences could lie in the fact that all of these students had gained admission into the medical colleges after grueling sessions of entrance exam preparations which might have ironed off differences in their intrinsic ability for learning and grasping knowledge. Another fact could be that the teachers employed in the medical colleges themselves come from different educational mediums and backgrounds and thus often tend to adopt languages apart from English to impart knowledge to the students. This might act as a double-edged weapon conferring both advantages and disadvantages to students from different background mediums to grasp the teachings of their teachers.

CONCLUSION

Students, in general, have diverse backgrounds and vary widely in terms of culture, ethnicity, socioeconomic status, and medium of instruction. In the present VARK study, the medium of instruction is taken into account and remains the framework of the study. This study within its scheme did not find any significant difference in learning style preference among the EM and NEM students. The results thus do not suggest any effect of the medium of instruction during their schooling days on the aptitude and learning style attitude of the medical students in their professional degree courses. The present study leaves us with a scope in the future to compare and correlate student grades and performance with their inherent learning styles and preferences.

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