



ASSESSMENT OF LEARNING STYLE PREFERENCES AND ITS ASSOCIATION WITH PAST ACADEMIC PERFORMANCE OF UNDERGRADUATE DENTAL STUDENTS IN DAVANGERE CITY-A CROSS SECTIONAL SURVEY

Puja C Yavagal¹, Divyapriya GK*², Chiplunkar Bhat Jnanashree³, Kavyashree DK⁴, Gauthami G⁵ and Xianyi Ho⁶

¹Department of Public Health Dentistry, Bapuji Dental College and Hospital, Davangere

²Department of Public Health Dentistry, Rajah Muthiah Dental College and Hospital, Chidambaram

³Bapuji Dental College and Hospital, Davangere

⁴Oxford Dental college and Hospital, Bangalore

⁵Bapuji Dental College and Hospital, Davangere

⁶Dental practitioner, Malaysia

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ABSTRACT

Aim: To assess the learning style preferences of undergraduate dental students in Davangere city and to investigate whether learning style preferences is associated with past academic performance.

Methodology: A descriptive cross-sectional survey was conducted. Totally, 377 undergraduate dental students participated in the study. Learning style was assessed using a VARK questionnaire containing sixteen items with four answer selections corresponding to the four sensory modalities (Visual, Aural, Read/write, Kinaesthetic) and past academic performance was collected from the college authorities. Descriptive statistics was applied and Chi-square test was used to assess the association between learning style preferences and past academic performance.

Results : Majority of undergraduate dental students were polymodal (73%) with bimodal type being predominantly prevalent (35.5%), followed by trimodal (20.4%) and quadmodal (17.2%). 27% of students were unimodal with kinaesthetic type being predominant (13.3%) followed by aural (7.7%), verbal (3.4%) and read and write (2.4%). There was no significant association between learning style preference and past academic performance of the students ($p = 0.9$).

Conclusion: Multimodal learning preference was predominant among the undergraduate dental students of Davangere city.

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INTRODUCTION

Dentistry is not only a science of factual knowledge about oral health and diseases, rather it is a systematized knowledge, which is so intricate, vast and comprehensive. Learning of dental subjects is a very challenging task for students. One of the reasons for students' frustration towards the curriculum is inconsistency between learning content and instructor's teaching methods.^[1] In dental education, the emphasis on covering a fixed syllabus in a limited period with the didactic lectures provides little scope for assessment of learning styles. With the growing interest in newer teaching methods, it is an opportune moment to change the age old teaching styles with due diligence. Various strategies are being practiced with the purpose of facilitating students to become better dentists in

future. One of them is to identify the learning style of the students. A learning style is an umbrella term covering a spectrum of modalities, preferences, and strategies under which, learners most efficiently and effectively perceive, process, store, and recall what they are attempting to learn.^[2-4] One learning style is neither preferable nor inferior to another but is simply different, with different strengths and weaknesses.^[5]

There are different techniques for determining learning styles, the latest is the visual-aural-read/write-kinesthetic (VARK) questionnaire.^[6] This approach categorizes students into four classes according to their interaction and response to learning environment: 1. Visual (V): learners who learn better through seeing visual educational material (diagrams and pictures) with explanation; 2. Aural (A): learners who learn better through hearing and verbal teaching; 3. Read/write (R): learners who learn better if they take notes during the lecture or while reading written or printed material; 4. Kinesthetic (K): learners

*Corresponding author: **Divyapriya GK**

Department of Public Health Dentistry, Rajah Muthiah Dental College and Hospital, Chidambaram

who learn better when they perform practical tasks and object manipulation by physical processes.^[7]

The information about learning style would help the students in formulating the appropriate learning strategies as well as teachers in preparing their lesson plans.^[8] Hence, this study aimed to assess the learning style of undergraduate dental students of Davangere city and to assess the learning styles based on past academic performance.

METHODOLOGY

The present study is a cross sectional survey. Ethical clearance was obtained from Institutional review board of Bapuji Dental College and Hospital, Davangere. The sampling frame comprised of undergraduate dental students of two dental colleges in Davangere city. The study was conducted at the premises of both the colleges. Out of 400 students who were approached to participate in the study (convenient sample) 377 students participated with 94.25% response rate. Written informed consent was obtained from the participants before the administration of VARK questionnaire. Permission to collect the relevant data about past university academic performance was obtained from college authorities. Data regarding participant's name, college, age, year of under graduation and past academic performance was collected and VARK questionnaire version 7.1 developed by Fleming was administered.^[9] Satisfactory levels of reliability and validity of the VARK have been reported using factor analysis techniques.^[10] The questionnaire comprised of sixteen questions with four answer selections corresponding to the four sensory modalities was distributed to students and 30 minutes time period was given to complete the form. No interaction was allowed among the participants while they answered the questionnaire. The completed forms were collected on the same day. Incompletely answered questionnaires were not considered for data analysis. The respondents were allowed to select more than one answer to each question, which was necessary for the identification of the poly modal modes of perception and learning.

The questionnaires were scored and tabulated to determine the distribution of VARK preferences. Preference rankings were calculated by totaling all "V" responses (visual), all "A" responses (aural), all "R" responses (read/write), and all "K" responses (kinesthetic).

Data Analysis

The collected data was organized, tabulated and subjected to statistical analysis by using statistical package of social sciences (SPSS) software version 21. Descriptive statistics were generated in terms of percentages. Chi-square test was used to assess the association between learning style preferences and past academic performance. Significance level was set at $p \leq 0.05$

RESULTS

Totally, 377 undergraduate students participated in the study. Subjects were divided based on their learning styles as V (visual), A (Aural), R (Read/write), K (Kinesthetic), bimodal (VA, VR, VK, AR, AK, RK), trimodal (VAR, VAK, VRK, ARK) and quadmodal (VARK) learning style preferences and likewise the academic performance were classified into first class (65-75%), second class (50-65%), distinction (>75%) and

fail. The data obtained from the study was subjected to statistical analyses.

Majority of undergraduate dental students were polymodal (73%) with bimodal type being predominantly prevalent (35.5%), followed by trimodal (20.4%) and quadmodal (17.2%). 27% of students were unimodal with kinaesthetic type being predominant (13.3%) followed by aural (7.7%), verbal (3.4%) and read and write (2.4%). (Table 1).

Majority of the first year students preferred trimodal type of learning (33.3%) followed by bimodal (30%) and quadmodal (15%) and very few belonged to other types like kinaesthetic (8.3%), visual (6.7%), read and write (5%) and aural (1.7%). The second year students preferred majorly bimodal type of learning (34.7%) followed by trimodal (22.1%) and quadmodal (20%). Similarly 33.7% of third year students, 36.6% of final year students and 48.6% of interns had preference for bimodal type of learning (Table 2).

Among students who preferred visual learning, majority students had secured first class in their previous university exam and there were no distinction students in this category. Among aural and kinaesthetic type, majority had secured first and second class. In the read and write category, there were only first and second class students. The number of distinction students in bimodal category was high compared to other categories of learning. In the trimodal and quadmodal group, maximum students had secured first class and second class. There was no significant association between learning style preferences and past academic performance ($p = 0.9$) (Table 3).

DISCUSSION

The present study determine the learning preferences of undergraduate dental students in Davangere city and whether there was any association between learning styles and past academic performance.

Most of the students preferred multimodal learning style. Similar findings have been reported in various studies among undergraduate dental students.^[11-14] In dental education, students have to remember as well as conceptualize knowledge and apply it in practical sessions. Perhaps this is the reason for multimodal type of learning being predominant. However a study done in India showed that majority had unimodal learning preferences with read and write being predominant.^[15] Another study done among the dental undergraduate students of Islamabad clearly demonstrated that students preferred kinesthetic and aural learning at a higher percentage.^[16] These contrary findings point out that a variety of factors like age, gender intelligence, level of persistence, culture and creative thinking may influence the preference for learning style.^[17]

Another important finding of this study was that there was no association between learning style preferences and past academic performance and similar finding was observed in a study done among medical students in India^[13] however, a statistically significant association was found between the academic performance and learning style preferences in a study done among first year dental students in Saudi Arabia.^[18] Past academic performance is often used as a predictor of current or future performances.^[19]

Dental students are a part of population of adult learners who come into professional school with different styles of learning

acquired through many years of study. A better understanding of learning styles by the faculty can help reduce the students' level of frustration and improve teaching methods. When students' awareness level of their preferred learning modality is raised, it can improve students' learning outcomes and help them to actively cope with the academic demands of dental school.^[20]

A simple intervention such as administering a learning style inventory can lead to improved learning outcomes and can make the journey of dental education interesting both for educators and learners. Faculty members who are consciously aware of their students' learning styles as well as their own are in a position to make more informed choices in course material design, and learning processes that broaden the opportunities for effective learning in their courses.^[21]

In the present study, students were informed that the learning preference results provided were a method of self-knowledge and were not intended to label them to a certain mode of learning. Knowing one's learning style can be beneficial if learners take the next step and consider how and when they learn as part of a reflective, metacognitive process, with action to follow.^[3]

In contrary to this, Stellwagen has warned against misapplication of learning style inventories that may lead to stereotyping and prejudicial labeling of individuals. Learning preferences should be viewed as a continuum. Some dental students may undergo a shift in learning preferences as the learning environment changes from lecture hall to preclinical laboratory to patient clinic.^[22]

When learning styles do not fit the task, learning inventories may help realize the preference of learning and make the task easy. If variety of teaching methods and styles are used then learners are exposed to familiar ways of learning that provide comfort during the process, ultimately giving the learners multiple ways to excel.^[23]

VARK questionnaire administered in the present study, characterized by simplicity and availability online in different languages. However, VARK is not a complete learning style inventory but rather provides basic sensory preferences.^[16]

The present study has limitations. The sample was convenient sample of students from two dental colleges in the same city hence sample may not represent the population of dental students across India. Further multi-centric studies with larger sample size from multiple institutions are recommended. In addition, longitudinal studies tracking the effect of creating awareness of learning style preferences among students on their academic performance may throw some insights towards improving dental education.

CONCLUSION

Multimodal learning preference was predominant among the undergraduate dental students of Davangere city. There was no significant association between learning style preference and past academic performance of the students. The results of this study may help students improve their learning patterns and help the educators to tailor make the teaching modules which will match the learning preferences of the students thereby improving the standards of education at dental colleges.

Table 1 Distribution of undergraduate dental students according to learning style preferences

Distribution of Learning style preferences according to modes.	Learning style preferences	Number of students
Unimodal (27%)	Visual	3.4%(13)
	Aural	7.7%(29)
	Read and write	2.4%(9)
Multimodal (73%)	Kinesthetic	13.3%(50)
	Bimodal	35.5%(134)
	Trimodal	20.4%(77)
	Quadmodal	17.2%(65)
Total		100%(377)

Table 2 Distribution of dental students according to learning style preferences

Learning style preference	First year N (%)	Second year N (%)	Third year N (%)	Final year N (%)	Interns N (%)
Visual	4(6.7)	4(4.2)	4(3.8)	1(1.4)	0(0)
Aural	1(1.7)	8(8.4)	11(10.6)	6(8.5)	3(6.4)
Read and write	3(5)	2(2.1)	1(1)	1(1.4)	2(4.3)
Kinesthetic	5(8.3)	8(8.4)	17(16.3)	17(23.9)	3(6.4)
Bimodal	18(30)	33(34.7)	35(33.7)	26(36.6)	22(48.6)
Trimodal	20(33.3)	21(22.1)	21(20.2)	5(7)	10(21.3)
Quadmodal	9(15)	19(22)	15(14.4)	15(21.1)	7(14.9)
Total	60(100)	95(100)	104(100)	71(100)	47(100)

Table 3 Distribution of undergraduate students based on learning style and past academic performance

Learning style preference	Academic performance				*p value
	Fail	First class	Second class	Distinction	
Visual	0.3%(1)	1.9%(7)	1.3%(5)	0.0%	3.4%(13)
Aural	1.1%(4)	3.2%(12)	3.2%(12)	0.3%(1)	7.7%(29)
Read/ write	0.0%(0)	1.3%(5)	1.1%(4)	0.0%(0)	2.4%(9)
Kinesthetic	1.6%(6)	6.9%(26)	4.5%(17)	0.3%(1)	13.3%(50)
Bimodal	4.2%(16)	16.2%(6)	13.3%(5)	1.9%(7)	35.5%(134)
Trimodal	2.4%(9)	12.2%(4)	5.3%(20)	0.5%(2)	20.4%(77)
Quadmodal	1.6%(6)	9.8%(37)	5.3%(20)	0.5%(2)	17.2%(65)
Total	11.1%(2)	51.5%(19)	34%(128)	3.4%(13)	100%(377)

*Chisquare test; NS – Not Significant.

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