



## Learning style and teaching methodology preferences of dental students



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### ABSTRACT

The purpose of teaching is to encourage students to learn better so as to provide better knowledge and understanding of subject. Therefore it is also important for a teacher to acquire the different learning styles so as to provide the best education which can be easily understood by the student for better learning. Learning style assessment can be carried out by a Visual Auditory Reading Kinesthetic (VARK) questionnaire which is the most accepted one.

**Aim and objective:** To study the preferred learning style among the 3rd & 4th year dental students & the preference of teaching learning methodology.

**Method:** A cross-sectional study was conducted on 185 dental students of 3rd year & final year. Two questionnaires were used: The VARK questionnaire version 7.1 & a second questionnaire were prepared to obtain the basic demographic information of the student as well as the order of preference of teaching methodology.

**Results:** The majority of students had Quadrimodal VARK preference followed by Unimodal learning style. The kinesthetic learning style was the most predominant. The most preferred teaching methodology was Practical/Clinical which was in accordance with the results obtained from the VARK study.

**Conclusion:** Problem based teaching methods are currently being more preferred over traditional methods. No one single tailor-made teaching approach is superior to other teaching methods, no matter how good the teacher is, therefore, a more individualistic approach should be followed taking students preference of teaching method and understanding into consideration. More of student and teacher orientation programs are required to create a friendly learning environment for all.

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### 1. Introduction

A general concept is that individuals differ in their learning style. Learning styles refer to a range of theories that account for difference in an individual's style of learning. The concept of individual learning style became popular in 1970's and since then has greatly influenced education despite criticism received from some researchers along the way.

Learning style is an individual's way of receiving, perceiving, processing and retaining information for future use. Various educational researchers have hypothesized ways to include learning style theory in teaching methodology. Proponents recommend that we as educators assess the learning styles of

our students and try and adapt our classroom methods to best fit each students learning style.<sup>1</sup>

Various models have been developed over time to explain different learning styles. These models were further divided by researchers Claxton and Murell 1987 into broader subgroups: personality models, information processing models, social-interaction models, and instructional preferences.<sup>2</sup>

The personality model examines a person's personality traits or characteristics. Information processing model focuses on a person's way of taking in information and further processing it. The social interaction model determines as to how a person reacts or behave in a particular environment or classroom. Finally, the instruction preference model segregates students on the way in which the best receive or acquire information as to how the student learns best by listening, reading, visualizing or experiencing. We as educators need to concern ourselves with this method as to best provide information to students for their betterment. There are various learning style inventories available. The VARK

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inventory is one such instructional preference model. VARK was developed by Neil D. Fleming in 1987 in order to improve faculty and student learning development. It is one of the most common and widely used categorizations of the various types of learning styles.<sup>1</sup>

VARK stands for visual (V), aural (A), read/write (R) and kinesthetic (K) learning modalities. It is a questionnaire designed to determine a person's preference for sensory modalities. Visual is for learners who can process information best when they can see it. Auditory are learners who like to hear information. Readers and writers prefer to see written letters. The kinesthetic learners like to acquire information through experience and practice.<sup>1</sup>

Various instructional methods are used for teaching dental students which include lectures, tutorials, and practical/clinical and self study.

The students' preference for different learning methods usually depend more on familiarity and availability of method and more positive outcome based. Student learning style is one of the least explored fields of more beneficial outcomes. The information gained on basis of learning styles would further help students formulate more appropriate learning strategies for further study. Most of studies based on this have been carried out in the medical arena.<sup>3</sup> It is a vastly unexplored and underutilized field. However none of such studies have been carried out in the dental arena and further not much studies have correlated these with learning preferences of the students. Therefore the present study was designed to understand the learning style preferences of dental students and further correlate it with learning preferences of teaching methods.

## 2. Material and methods

This study was conducted on third and fourth year clinical dental students in Santosh Dental College & Hospital, Pratap Vihar Ghaziabad, NCR Delhi. A total of 185 students (37% males & 53% females) participated in the study. Two separate questionnaires were filled by the students. The first questionnaire was VARK questionnaire latest version 7.1 used to determine learning style pattern of students. The second questionnaire was used to obtain general demographic information i.e. name, age, gender as well as their preferences toward various teaching methodologies and their order of preference.

The VARK questionnaire was first developed by Neil Fleming in 1987, Christchurch, New Zealand. It was the first of series of systematic questionnaires with help sheets for students, teachers, employees, customers, suppliers and others to use in their own way. It is a short simple inventory with dimensions well understood and its applications are practical. It tells you something about yourself which you may or may not know. It helps you understand people and assists you and them to understand situations more effectively.

VARK questionnaire consisted of 13 questions with four options each and respondents could choose more than one options if they preferred. The VARK questionnaire was chosen for the present study because it was the most popular model and also because of its simplicity and reliability. It addressed the issue of learning styles, was open to modification, helped formulate learning strategies and finally had different strategy for each style.

The student who participated voluntarily in the study were asked to fill the VARK questionnaire of learning style preference (7.1) and the scores were noted and also the preferred learning style. The data obtained was filled in the second questionnaire along with their descriptive data and preference of teaching methods.

Descriptive statistics was used to analyze the student preference of various VARK components, as well as their preferences for

various learning methods. Student t-test was utilized to compare the VARK scores for males and females. Pearson's correlation coefficient was employed to analyze the correlation between learning style patterns and various teaching methodologies.

## 3. Results

In the present study according to VARK it was found that most students preferred a multimodal learning style; quadrimodal was most preferred 48% followed by unimodal 25.7%, bimodal (16.3%) & least preferred being trimodal (10%) (Graph 1).

The learning preferences of females were more varied compared to that of males: Quadrimodal was the most preferred learning style in females with kinesthetic preference being dominant over others whereas males usually had a more bimodal preference.

Kinesthetic was the most preferred learning style with the highest score of 10 and an average score of 6 followed by visual and aural which showed a highest score of 9 and an average score of 4 and the least preferred of all the four was read & write had an highest score of 7.

There was not much trimodal preference. Quadrimodal was followed by bimodal in which kinesthetic with visual was highest followed by kinesthetic with aural. This was followed by unimodal: kinesthetic followed by visual, then aural and last being read and write.

The learning methodologies were divided into: lectures, tutorials, clinical/practical and self study. Based on students preference clinicals and practical's were the most preferred method of teaching followed by lectures. Self study was the least preferred (Table 1).

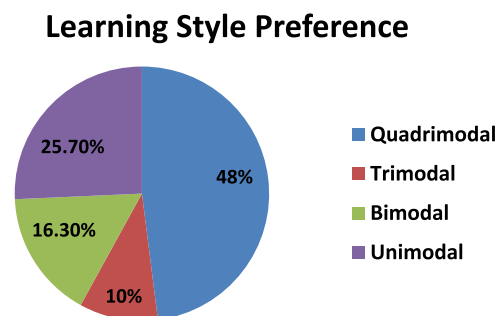
Out of the total no of students (38.2%) preferred clinical/practical as 1st choice followed by lectures as second choice (32.4%), tutorials ranked third with (29.4%) and 58.8% voted for self study as the last choice when asked to rank in order of preference (Graphs 2–5)

Based upon the preference in methods of study 54.5% had a quadrimodal approach utilizing all four modes followed a bimodal or trimodal approach both rating about 21.2% and the least being unimodal.

Correlation of leaning styles with modes of study was done, the results showed that kinesthetic was the most preferred VARK mode and practical/clinical was the most preferred in the methods of study. A positive Pearson's correlation was found between the two.

## 4. Discussion

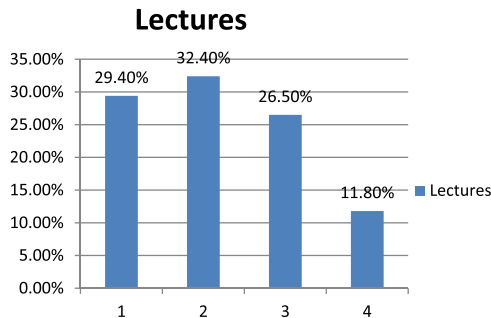
Current education system pays more emphasis on the way students are being taught than on the way they should be according to their teaching preference. The VARK questionnaire



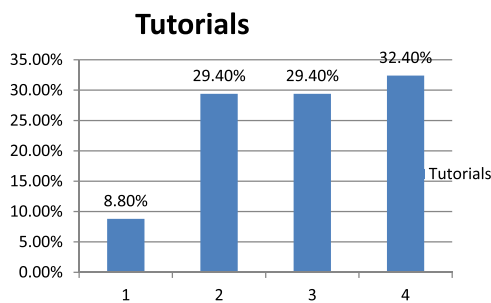
Graph 1. Learning Style Preference.

**Table 1**  
Order of preference of method of study.

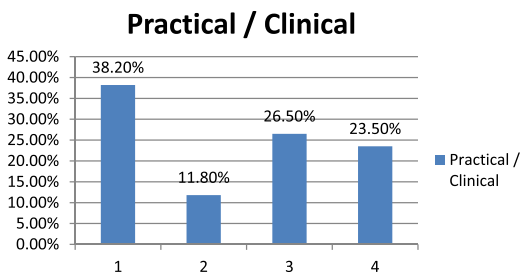
Teaching Methodology	Rank of Order of Preference			
	1	2	3	4
Clinical/practical	<b>38.2%</b>	11.8%	26.5%	23.5%
Lecture	29.4%	<b>32.4%</b>	26.5%	11.8%
Tutorial	8.8%	29.4%	<b>29.4%</b>	32.4%
Self study	8.8%	17.6%	14.7%	<b>58.8%</b>



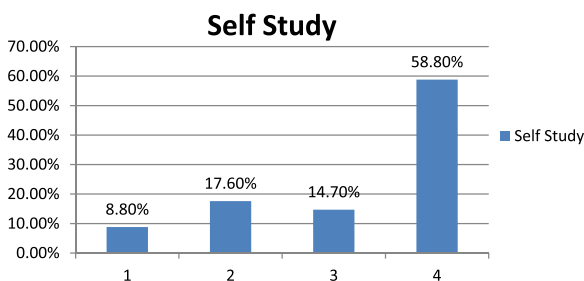
**Graph 2.** Lectures [preferred method of study].



**Graph 3.** Tutorials [preferred method of study].



**Graph 4.** Practical/clinical [preferred method of study].



**Graph 5.** Self study [preferred method of study].

has recently come into play by many researchers to determine the preferred learning styles of students.

According to the VARK model analysis, a student's preference of learning style is completely dependent on how one chooses to perceive received information. The preference may vary from a single mode (unimodal) to two modes (bimodal), three modes (trimodal) or all four modes (quadrimodal) of the options provided. It is also seen that students learn effectively when all the methods are blended together (visual, aural, read-write & kinesthetic sensory modalities).

A majority of students (70.5%) exhibited a multimodal preference which implied that these students preferred information from multiple modes. The results from various other previous studies have also reported similar type of results. This shows that learning methods which involve multiple activities or the information is provided in more than one mode is more beneficial for students and the students regain more information.<sup>4-7</sup>

Therefore for this reason multimodal teaching is increasing as it provides you with an opportunity to present information through multiple forms (text, audio, video, images and interaction). This helps students learn more effectively as it caters to all modes of learning styles.

Studies in neuroscience also support use of selective learning styles for better increased retention. Crossover interactions between different learning styles are based on a preferential model called 'Meshing Hypothesis'.<sup>8,9</sup>

In unimodal style of learning kinesthetic model was the more dominant followed by visual then aural with last being read & write. Kinesthetic learners are more of tactile learners who gain more through physical activities than through lectures and demonstrations. Therefore activity based programs are usually preferred by kinesthetic learners such as debates, competitions, modeling, simulations etc. Active learning encourages critical thinking, better evaluation and analysis, and high end problem solving and decision making.

Visual learners come second to kinesthetic learners. They prefer using images, pictures, colors, and maps to organize information and communicate with others and can easily visualize objects, plans and outcomes in mind's eye. They prefer presentations with more of charts or diagrams and flow charts as they remember what they see. They like clinical and practical demonstrations which are live instead of other telling them what to do. They are bad at following instructions.

Auditory learners have a preference for information that is "heard or spoken." They learn best from lectures, group discussion, speaking, web-chat and talking things through. The Aural preference includes talking out loud as well as talking to oneself. Often people with this preference want to sort things out by speaking first, rather than sorting out their ideas and then speaking. They may say again what has already been said, or ask an obvious and previously answered question. They have the need to say it themselves and they learn through saying it – their way, usually prefer passive learning strategy such as lectures and tutorials. Auditory learners usually preferred lectures.

Read & write learning method is information displayed as words. This preference emphasizes text-based input and output – reading and writing in all its forms but especially manuals, reports, essays and assignments. People preferring these modalities are often addicted to PowerPoint, Internet, diaries, dictionaries, thesauri, quotations and words.

The variations in learning patterns dominance of students usually varies in various countries, this can be explained based on difference in the teaching methodologies followed during the pre-clinical level of dental curriculum.<sup>10</sup>

In our study there was a difference in method of preference among males and females. Female had a more of quadrimodal

preference where as males usually displayed a bimodal approach. However a study done by Baykan and Nacar in first year medical students showed no sex predilection in method of preference.<sup>3</sup>

The results obtained from different learning style preferences were also correlated with preference of various teaching methods. In the present study the learning methodologies were divided into: lectures, tutorials, clinical/practical and self study.

The results obtained showed that clinical/practical approach was the most preferred. This can be correlated with the results of learning style preference which showed a predominance of kinesthetic approach. Kinesthetic style is more of a hands on method, thus these students prefer more of a practical way of doing things. This is in accordance with the study done by Kharb et al. on first year medical students for preferred style of learning and study methodology.<sup>1</sup>

The second in preference is lectures as study method which again correlates with the auditory and visual learning styles. Females have a more of a quadrimodal approach and they prefer to attend lectures and are more sincere in attendance.

However there is no single best method or style which may help making a learning strategy that works for every student. Therefore problem base learning is being more preferred nowadays as compared to traditional methods. No matter how good a approach, it may not work for all students. And unmatched learning styles and teaching methodologies may seriously affect a student's learning.<sup>11</sup>

The choice of teaching strategy is affected to a certain extent by the preferred learning style of students. Therefore tailor made instruction methods according to student's preference of mode of teaching is more of an advocated approach.

Providing teachers and students both more information about different learning styles is the need of the hour. A better understanding of different styles and learning methodologies is needed by both followed by a change in the curriculum and ways of teaching. Independent and more student oriented approach may help bring an amalgam shift in students' attitude towards learning.

It may increase interest in the system of education that is beginning to approach its downfall. And finally a change in society may come with the ease of study with better learned students.

In future more such studies may be conducted to keep an update of the changes in the preference of learning styles and correlate it with teaching styles.

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