



ORIGINAL RESEARCH PAPER

Biochemistry

EFFECT OF CONVENTIONAL TEACHING ON THE ACADEMIC PERFORMANCE OF STUDENTS WITH DIVERSE LEARNING STYLES

KEY WORDS: learning style, academic performance, Visual, Aural, Kinesthetic

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ABSTRACT

Learning style preferences includes Visual (V; learning from diagrams), Auditory (A; learning from hearing) and Kinesthetic (K; learning from doing). Present study examines the effect of conventional teaching on the academic performance of first year undergraduate dental students with distinct learning style preferences. Learning style preferences and academic performance of 98 Dental students were determined using VAK questionnaire and average marks of scored by each student in the academic year respectively. Learning style preferences of students were 18% visual (V), 19% aural (A), 13 % kinesthetic (K), 10% Visual Aural (VA), 6% Aural Kinesthetic (AK), 13% Visual Kinesthetic (VK) & 21% Visual Aural Kinesthetic (VAK). Students with kinesthetic approach (K, AK, VK &VAK) as one of their preferred learning style are grouped together as K learners & those with V, A & VA learning style are grouped as VA learners. Academic performance of students was assessed based on marks as low (< 60%), medium (60-80%) & high achievers (<80%). Among the low achievers, K learners were predominant i.e. 68% compared to 32% of VA learners. Whereas, both medium & high achievers were predominantly VA learners (67%) compared to K learners (33%) (p<0.05). Visual & Aural learners were better academic performers than students with kinesthetic learning style. Appropriate teaching approaches should be formulated to accommodate the needs of kinesthetic learners.

INTRODUCTION:

The knowledge and skills a student develop during their graduation is critical to serve well in their career (Carroll, 2005). So, there is a serious need to improve learning and retention of facts to enhance student's knowledge. As facilitators, we need to find ways to improve student learning and retention. One way is to understand the relationship between learning style preferences and academic performance of students based on which we can modify our teaching strategy.

Learning style preferences are efficient and effective way of perceiving, processing, storing, and recalling of information by a learner (James and Gardner, 1995). VAK learning style is the simplest model that uses three major sensory modalities defined by the neural system for receiving information like Visual (V), Auditory (A), and Kinesthetic (K). Students with a V preference learn best by seeing or observing (reading, writing, drawings, pictures, diagrams, demonstrations, etc). Learners with A preference learn by listening to or recording lectures, discussing material, and talking through material with themselves or others. K-style learners learn by using physical experiences: touching, performing an activity, moving, lessons that emphasize doing, and manipulation of objects (Fleming, 1995).

Every person's learning style may either be a single sensory mode or a combination of auditory, visual, or kinesthetic in terms of the way he or she learns best. Learners with a single learning style are referred to as unimodal, whereas others preferring two and three styles are bi- and trimodal learners (Wehrwein et al, 2007).

Conflicting results are available in the literature on the relationship between sensory modality preferences and academic performance. Baykan and Nacar (2007) found no relationship between learning style preferences and medical school grade point average, but Alkhasawneh et al. (Alkhasawneh et al, 2008) did find a significant relationship between learning style preferences and course grades. The present study aims at understanding the relationship between learning style and academic performance of students.

METHODS:

This study was carried out in the Department of Biochemistry, ACS Medical College & Hospital. VAK questionnaire help students to identify their best learning style and teachers to modify their way of information transfer. The following internet links were used for downloading the VAK questionnaire: <http://www.businessballs.com/vaklearningstyletest.htm> and [http:// www. Business balls. com/freepdfmaterials/ vak learning styles questionnaire. pdf.](http://www.Businessballs.com/freepdfmaterials/vaklearningstylesquestionnaire.pdf)

Ninety eight undergraduate first year Dental students participated in the present study. After explaining to the students about the study, the VAK questionnaire was administered. It consisted of 30 questions with 3 options for each. Each option correlates to a particular sensory modality preference. The questions were related to situations encountered in day to-day life, thereby an individual can easily choose the options. Students were asked to choose the options that appropriately portray their personality. They were allowed to choose more than one option or leave blank as applicable to them. Since students can select more than one option, various modalities of different combinations could be obtained.

Questionnaires were evaluated on the basis of previously validated scoring instructions using stepping stone method. Students with unimodal Visual (V) & Aural (A) learning styles & bimodal Visual Aural (VA) learning style are grouped together as VA learners. Students having kinesthetic learning styles like unimodal Kinesthetic (K), bimodal Visual Kinesthetic (VK) & Aural Kinesthetic (AK), and multimodal Visual Aural Kinesthetic (VAK) are grouped together as K learners.

Biochemistry, a subject taught in first year for dental students involves lecture classes and laboratory work. Lecture classes were taken using conventional power point methods Academic performances of students were evaluated by taking average of three best performances of each student in the six assessment tests conducted in the academic year. The students were grouped into three groups as low achievers (<60%), medium achievers (60-80%) & high achievers

(>80%) based on the average marks scored by them in the unit tests.

STATISTICAL ANALYSIS:

Scores of individual VAK components are expressed as percentage. Comparison of academic performance of VA & K learners was done using χ^2 test. A p value less than 0.05 was considered significant.

RESULTS:

A total of 98 Dental students took part in the present study. Among them 71 were Females & 27 were Males. Majority of the students preferred Unimodal learning style (54%), of which 18% were V learners, 19% were A learners & 13% were K learners. Bimodal learners were 24%, of them VK (13%), AK (11%) & VA (6%). Trimodal VAK learning style preference was (21%). Learning style preferences of students are shown in Figure 1.

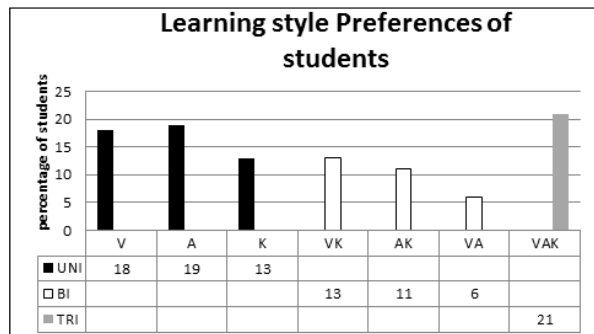


Figure 1. Learning style preferences of Undergraduate Dental students. UNI- unimodal, BI- bimodal & TRI- trimodal learning style. V - Visual learners ; A- Aural learners; K- K learners.

In the present study, high achievers with average marks more than 80% had the following learning style preferences: V(28%), A(25%) & VA (14%), K(8%),VK(3%),AK(5%) & VAK(17%). Similarly, learning style preferences of Medium achievers with average marks between 60-80% were V (21%), A (23%), K (16%), VA (9%), VK (6%) & VAK (23%). In case of low achievers with average marks <60% learning style preferences were as follows: V (11%), A (7%), K(18%), VA (14%), AK (18%), VK (7%) & VAK (25%). Learning style preferences of low, medium & high achievers are shown in figure 2.

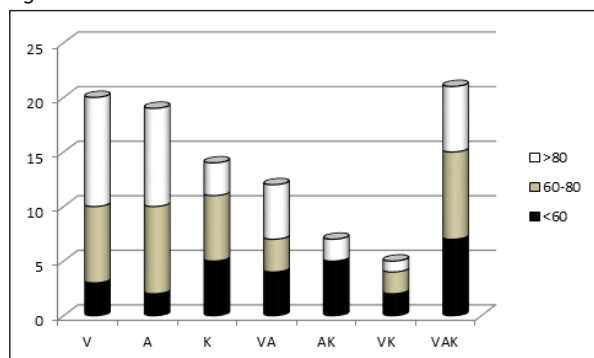


Figure 2. Learning style preferences of low (<60), medium (60-80) & high achievers (>80).

The relationship between the above mentioned learning style preferences and academic performance was not statistically significant. But it is very obvious that in high achievers group, V, A & VA learners predominate than other learners. So, we divided the students into VA learners & K learners. VA learners include V, A & VA learners whereas K learners were students with kinesthetic learning as one of their learning style like K, VK, AK & VAK learners.

After grouping, 51% of the students were VA learners & 49% were K learners. Among the low achievers, K learners were predominant i.e. 68% compared to 32% of VA learners. Whereas, both medium & high achievers were predominantly VA learners (67%) compared to K learners (33%). The association of VA learning style with academic performance analyzed using χ^2 test was statistically significant (p<0.05) as shown in Table 1.

Learning style	AVERAGE MARKS			χ^2 value = 9.224 p- value = 0.01
	(< 60%)	(60 – 80 %)	(> 80%)	
VA learners	45.6±13.1 (n=8)	70.1± 6.2 (n=18)	86.1±3.5 (n=24)	
K learners	49.4±7.7 (n=20)	70.4± 6.7 (n=16)	87.3±4.3 (n=12)	

DISCUSSION:

In our study on learning preferences and its influence on academic performance, majority of the students had unimodal learning style (54%). Our results are in line with study done by Wherwein et al (2007). But this study is in contrast with other studies where most preferred sensory modality was multimodal (Urval et al, 2014, and Nuzhat et al, 2011). The reason for this disparity is due to predominant presence of female students (72%) in our study. According to Wherwein et al (2007) females preferred unimodal learning style compared to multimodal learning style preferred by males.

The predominant sensory modality of learning among unimodal learners was aural (38%) followed by visual (36%). In our Department, classes are taken using PowerPoint presentations where visual & aural learners will be benefitted more compared to kinesthetic learners. As seen in figure 1. Also important is the fact that kinesthetic learning was an important component in the majority of the multimodal learners (Table 1).

The main concept of learning theory is different individuals use different sensory modality for imbibing information presented to them. Learning is never a burden if the new information which has to be grasped is presented in a style that is favorable to the students (Urval et al, 2014). So it is essential that the teachers should use different teaching styles to accommodate all the students needs.

In our study, the academic performance performance of the students were influenced by their learning styles, especially visual and aural learners were better achievers compared to kinesthetic learners. Contradictory results are available in the literature regarding the academic performance and learning styles. In one study multimodal learning was related to good performance (Alkhasawneh et al, 2008). In some other studies, the authors were not able to derive relationship between learning style and academic performance (Baykan & Nacar, 2007). In studies done by Dobson kinesthetic modality was related to poor performance (Dobson, 2009 & 2010) this is in favor of our study. The reason for this discrepancy could be difference in evaluation tools for measuring academic performance.

Our study has limitations. We have used VAK questionnaire for evaluating the learning style instead of VARK questionnaire. The only difference between the two is lack of read/write sensory modality. But, according to the literature review VAK sensory modality is predominant So the findings from the present study cannot be neglected.

CONCLUSION:

From our study on dental students it is clear that kinesthetic learners were less benefitted from conventional teaching methods. So it is the responsibility of the teachers to utilize various teaching methods to cater the needs of all types of learners.

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