

Learning Styles of First Year Students of Dentistry And Its Application In Second Year Microbiology Teaching – Learning

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Abstract: Introduction: A student's learning style is the preferred way in which information is processed and strategies are adopted for effective learning. The VARK survey instrument developed by Neil Fleming in, distributes the learning styles according to the sensory modes of perception i.e Visual / Aural / Read-Write / Kinesthetic. Objective: To know how students of 1st year dentistry learn and offer them academic support. Methods: After obtaining Institutional Review Board (Institutional Ethics Committee) permission, this qualitative, questionnaire based study was conducted for 1st yr BDS students. The VARK questionnaire version 7.8 (2014) was used due to ease of its administration. The VARK questionnaire along with the demographic data form and individual consent form was distributed to the students and they were asked to fill up the same. Results: The VARK mean scores showed that kinaesthetic preference ranked highest (7.02), followed by aural (5.84), read-write (5.14) and visual (4.74). Twenty seven students (62.8%) were multimodal while 14 students were (32.6%) unimodal. Conclusion: The learning preference showed a preference for multimodal pattern, typical of adult learners with preference for kinaesthetic mode. [A Sharma, Natl J Integr Res Med, 2018; 9(2):55-58]

Key Words: Dentistry, Surveys and Questionnaires, Learning style, VARK.

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Introduction: Learning style is the preferred way in which information is processed and strategies are adopted for effective learning¹. It is important for teachers to be aware of this fact and to reflect on the effectiveness of their modes of instruction². The VARK questionnaire, a survey instrument, was developed by Neil Fleming in 1987 in New Zealand. It distributes the learning styles according to the sensory modes of perception, viz., Visual / Aural / Read-Write / Kinaesthetic. Visual learners have a preference for assimilating information in the form of flow charts and graphs. Auditory learners learn by listening, reading out the written material to themselves. Read/Write learners prefer to learn by reading the printed text in books or their written in their notes. Kinaesthetic learners learn by 'doing it themselves' for e.g role play, making a model, performing a particular experiment or going on a field trip and living that experience. Depending on their preferences, there are various styles of learning, unimodal and multimodal. Multimodal learners learn via two or more sensory modalities whereas unimodal learners have a strong preference for a particular sensory modality³⁻⁷.

Methods: Institutional Review Board (Institutional Ethics Committee) permission was taken for this qualitative, questionnaire based study involving 1st year BDS of a Central University. The VARK questionnaire version 7.8 (2014) was used after taking online permission from Neil Fleming. The VARK

survey instrument is a questionnaire with 16 questions. Each question has four options as answers and categorizes the learning style preference of the student. For each question, a student can select anywhere from zero to four response choices⁴. During a Microbiology lecture hour, a brief overview of the learning styles was given to the students. They were informed that the exercise was a voluntary one. The VARK questionnaire along with the demographic data form and individual consent form was distributed to them and they were asked to fill up the same. Blinding was not done.

Scoring : Preferences were calculated by totalling all A responses (Visual), all B responses (aural), all C responses (read / write) and all D responses (kinaesthetic). The dominant preference was defined by determining the category which received the highest responses. Scoring for each student was done by the Stepping -Stone method, given in the website⁴.

Results: Of the forty three students, 35 (81%) were females and 8 (19%) were males. The response rate was 100%. They hailed from regional areas of northern India, i.e Uttar Pradesh (39.5%), New Delhi (32.6%), Bihar (18.6%), Haryana (7%) and an eastern state, Odisha (2.3%).

The VARK mean scores & S.D values showed that kinaesthetic preference ranked highest (7.02),

followed by aural (5.84), read-write (5.14) and visual (4.74) [Fig.1] & [Table 1].

Fig 1: Mean of VARK scores of 1st year bachelor of dentistry students (n=43)

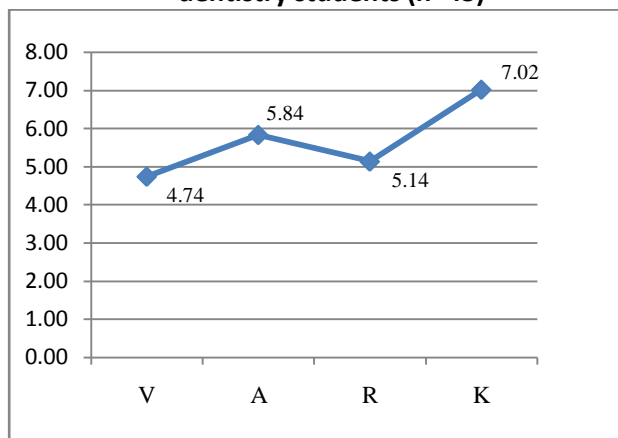


Table 1: Mean & S.D values of VARK scores of 1st year bachelor of dentistry students (n=43)

	Mean	S.D Values
V	4.74	3.02
A	5.84	2.59
R	5.14	2.40
K	7.02	2.14

There were nine types of quadrimodal preferences, VAKR, ARVK, RKAV, AVRK, ARAK, KAVR, KARV, VKAR, & KVAR, seven types of trimodal preferences RVK, AKR, KRA, KVA, AKV, KAR, & VRK & five types of bimodal preferences KA, RV, KR, AK and KV and three unimodal preferences A, K and V with R/W registering a zero. The mode could not be ascertained in 2 students (4.7%), because the minimum score of 16, required for using the stepping stone method was not reached [Table 2]. Twenty seven students (62.8%) were multimodal while 14 students were (32.6%) unimodal. Of the 27 multimodal students, 12 were quadrimodal, 09 trimodal and 06 bimodal. 11.62% of quadrimodal students were decisive (score < 30) while 15.67% were less decisive (score ≥ 30) [Fig. 3]

Table 2: Learning preferences of 1st year students of dentistry (n=43)

Learning Preferences	No	Combinations	Gender		No	%
			M	F		
Quadrimodal	1	VAKR	1	1	2	5
	2	ARVK	1	1	2	5
	3	RKAV	0	2	2	2

Trimodal	4	AVRK	0	1	1	2
	5	ARAK	0	1	1	2
	6	KAVR	0	1	1	2
	7	KARV	0	1	1	2
	8	VKAR	0	1	1	2
	9	KVAR	0	1	1	2
	1	RVK	0	1	1	2
	2	AKR	0	1	1	5
	3	KRA	0	2	2	2
Bimodal	4	KVA	0	1	1	2
	5	AKV	0	1	1	5
	6	KAR	1	1	2	2
	7	VRK	0	1	1	2
	1	KA	1	0	1	2
Unimodal	2	RV	1	0	1	5
	3	KR	0	2	2	2
	4	AK	0	1	1	2
	5	KV	0	1	1	2
	1	V	1	0	1	2
Unimodal	2	A	1	3	4	9
	3	R/W	0	0	0	0
	4	K	1	8	9	21
**	Non calculable	0	2	2	5	

Fig 2: Learning style distribution of 1st year bachelor of dentistry students (n=43)

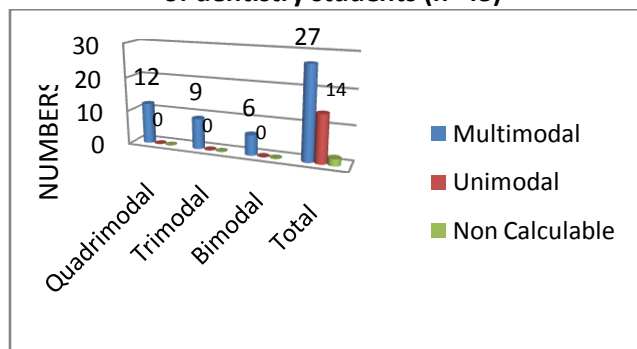
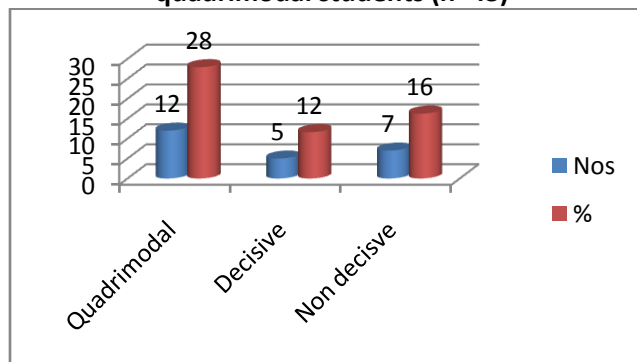


Fig 3: Decisiveness of 1st year bachelor of dentistry quadrimodal students (n=43)



Discussion: Our study was done with a query 'How do our students learn?' and we found that 62.8% of the 1st year dental students were multimodal adult learners which included bimodal, trimodal and quadrimodal learners. Some were less decisive than than the others. Learning Styles are the various methods used in perception, creation and information processing to form concepts and principles. However it does not necessarily mean In previous studies, by Saran et al in 2012, Mane et al and Sabiha et al in 2015, it was observed that that 1st year dental students preferred multimodal style [33.7%,41.1%and50%respectively]^{6,7-10}. Nasser et al in 2018 found that multimodal learning was the preferred mode amongst dental undergraduate students¹¹.

Teaching multimodal students is a challenge to the educator, because teaching- learning has to be made interesting by blending together visual, aural, read/write and kinaesthetic activities¹².

Our students hailed from diverse geographical, social, cultural, religious and economic background from the northern and eastern areas of India in quest of educational opportunities and inclination towards dentistry. It is known that culture, nature of course and student's characteristics contribute to a students' learning style¹².

The VARK mean scores & S.D values showed that kinaesthetic preference ranked highest (7.02), followed by aural (5.84), read-write (5.14) and visual (4.74). A higher aural mean score in our study also indicated that that lectures with power-point-presentations, flowcharts, illustrations, pictures and audio-visual demonstrations of various exercises would definitely benefit the 1st year dental students In a study by Saran et al, mean score for kinaesthetic preference was (7.45), although that for aural was higher, i.e (7.50), followed by visual (6.10) and read/write(5.35). Kinaesthetic learners use fine motor skills and learn best through hands on approaches, actively exploring their environment .This is very important for students of dentistry as they need to be active, along-with watching and listening, to gain in -depth understanding. They are motivated by projects, videos, computer software, role plays and team work. This is an asset for them as team-work shall be a part of their future career. A very interesting observation we made was that, amongst the unimodal

preferences, read / write registered a zero. Similar observation was made by Mane et al in 2015 amongst dental students and by Bataduwaachchi et.al among first year medical students, where only 3(3.9%) students showed preference for read / write. It has been documented by Tierney & Brunton in 2005, that science and engineering students were kinaesthetic learners while business students prefer predominantly read/write learners^{6,7, 13,-16}.

Interventions done: Feedback was given to the students before they started studying Microbiology subject in 2nd Year. To address their kinaesthetic needs, they were given project work on sterilisation processes in various departments of faculty of dentistry (here they saw various sterilisation methods used in dentistry), various case studies, streaking sterile culture media with a sterile inoculating loop along with the routine microscope handling (Kinaesthetic), staining techniques and hanging drop experiments, during their practical hours .To enhance the visual components, students were asked to observe microscopy slides, media, instruments and express their observations .To enhance their reading component, students were asked to read from the bench -aids made by Faculty of Microbiology. They were also encouraged for reading in groups during practical hours from Text Book of Microbiology by Ananthanarayan &Panicker as also Text book of Parasitology by Chatterjee followed by reflection and putting down their knowledge on charts in a diagrammatic form. To address their writing component, home assignments and class assignments were given. These were followed by giving them feedback as to structure & content of an answer, diagrams, labelling and usage of colours. To address both the multimodal and unimodal students, due emphasis was given during lecture hours on power points, with interactive discussion, quiz and answer writing sessions.

Limitations: This study was done with a small sample size, in a single center and only in the pre-clinical phase of the dental curriculum. Also, there was a subjective bias in the understanding and comprehension of the questions in the VARK questionnaire.

Future Studies and interventions: Further studies need to be done with large sample size including

students at different phases of the dental curriculum at the start of the session .

Conclusion: This study has helped us to acknowledge the learning differences that exist among the students and to give them effective feedback to help them in becoming competent. Knowing their strengths and lacunae, from their undergraduate years itself, shall help them to improve themselves under their mentors. Motivation for reading/writing habits needs to be strengthened by utilisation of library hours and writing skills improved, through manuals , assignments and making notes .

Acknowledgment: The authors are grateful to Neil Fleming for giving permission to use VARK questionnaire, copyright version 7.0 (2014) held by Neil D. Fleming, Christchurch, New Zealand. Heartfelt gratitude to the Dean , Faculty of Dentistry , Jamia Millia Islamia, New Delhi, Dr Saranjit Singh Bhasin for his encouragement , to Dr Keya Sircar , Member Secretary of Institutional Ethical Committee (Institutional Review Board) and all the members of IEC(IRB) of Faculty Of Dentistry , Jamia Millia Islamia , New Delhi -110025.

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Conflict of interest: None
Funding: None
Cite this Article as: A Sharma, A Wadhwa. Learning Styles of First Year Students of Dentistry And Its Application In Second Year Microbiology Teaching. Natl J Integr Res Med 2018; 9(2):55-58