Research Article

Visual, aural, read/write, and kinesthetic: An assessment of learning styles among undergraduate medical students of M R Medical College, Kalaburagi

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ABSTRACT

Background: Globally, research on education states that there will be unique learning style for an individual and it differs from person to person. There is a need for the students and even the teachers a starting place for thinking about and understand how students learn to achieve the maximum benefits from existing various modern teaching methodologies. **Objectives:** The present study was undertaken to assess the learning styles among undergraduate (UG) medical students of Mahadevappa Rampure Medical College, Kalaburagi, Karnataka. **Materials and Methods:** A descriptive cross-sectional study was conducted among UG medical students belonging to two consecutive batches in the 1st and 2nd year of medical training were invited to participate in the exercise. Of the total 250 students who invited, 213 (85.2%) participated, and the data were collected by administering a printed form of Version 7.8 visual, aural, read/write, and kinesthetic questionnaire. The sample size was drawn using convenient sampling technique. Learning style preference was assessed depending on the score for each question. Statistical analysis was done in terms of percentages and proportions and using chi-square tests. **Results:** The majority of students in our study was unimodal learners (54%). The predominant sensory modality of learning was kinesthetic (65.2%), followed by aural (20%). Unimodality was the preferred learning style more among males (58.3%), but females were more kinesthetic learners (75%). **Conclusion:** We use a combination of teaching methods in our daily routine as teachers, but there has not been an active effort to determine whether these methods adequately meet the requirements of different types of learners. We hope that the data from the present study will help us to adopt better approaches in teaching and training the students and make learning a more fruitful experience.

KEY WORDS: Visual-aural-read/write-kinesthetic; Learning Style; Gender

INTRODUCTION

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.[1] The research in education states that the learning style will be unique for an individual and it differs from person to person. This is also observed among students in the classroom in the different ways that students acquire information. A learning style is a description of a process or preferences.[2]

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Different learning styles can be explained by various modes. Claxton and Murrell described the learning styles in terms of following four categories: Personality models, information-processing models, social-interaction models,

and instructional preferences models. VARK (an acronym for visual, aural, read/write, and kinesthetic, different way of learning styles) is a learning inventory belongs to the "instructional preference" modal which differentiates students by the way in which they best acquire information.[3] The VARK inventory is a tool which is easy to use and can give students information on how to maximize their learning. It is designed to be a starting place for a conversation among teachers and learners which is a useful step toward understanding, and hence, improving learning.[2]

The students with an aural (A) preference in the questionnaire provide a set of strategies for "learning by ear;" the students who prefer use reading and writing as their first preferences for taking in information are reader/writers (R) or "R and W." The students who like information to be written in the form of graphs, charts, and flow diagrams, draw maps of their learning sequences, or create patterns of information are known as visuals (V). They are sensitive to different or changing spatial arrangements and can work easily with symbols. The group who like to experience their learning using all their senses, including touch, hearing, smell, taste, and sight, are kinesthetic (K). They want concrete, multi-sensory experiences in their learning.[4]

VARK questionnaire is one such instrument that determines a person's sensory modality preferences used to process information. It is also important to note that this questionnaire was not designed to be predictive or diagnostic of one's abilities. A learner's preferences do not necessarily equal what they assume to be their strengths. For example, if a person was found to have an aural preference then this would not simply negate the fact that for him/her reading/writing style was also beneficial. Thus, the main goal of the inventory is to help students who are having some difficulty with their studies.[5]

Critics have attacked frequently about the learning style as it is very difficult to measure learning, especially if one wants to know when learning happens. Knowing one's learning style does not improve learning but will 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.[2] With a vast but fixed syllabus and limited time period to cover with conventional teaching methods in medical training, there is a little scope to assess the learning styles of the medical students. Even the Medical Council of India under regulations on graduate medical education, 1997, states that lecture alone is generally not adequate as a method of training and every effort should be made to encourage the use of modern educational technology in medical education.[6] As teachers, our first step is to notice the preference of the students and accordingly help them to know their learning style preference so that they can perceive the subject to the maximum understanding. Hence, the present study was conducted to assess the learning styles among undergraduate (UG) medical students of M R Medical College, Kalaburagi, Karnataka.

MATERIAL AND METHODS

The present study was conducted at M R Medical College, Kalaburagi, involving 213 UG students belonging to two consecutive batches in their 2nd-year graduate medical training. The purpose of the study was explained to the students, and written informed consent was obtained before the VARK questionnaire Version 7.8 in a printed form was administered.[7] No incentive was given for participation.

It consisted of 16 questions with 4 options for each. Each option correlates to a particular sensory modality preference. Hence, the modality that received the highest marks was the preferred sensory modality. Since students were free to select more than one option, multiple modalities of varying combinations could be obtained. The questions describe situations of common occurrence in daily life, thereby relating to an individual's learning experience. Students were instructed to choose the answer that best explained their preference and circle the letter(s) next to it. They could choose more than one option or leave blank any question that they felt was not applicable to them. Questionnaires were evaluated on the basis of previously validated scoring instructions and a chart.[7] Each of the answers represents a sensory modality preference, and the same was calculated for an individual participant by adding up the responses for all 16 questions. The entire exercise was completed in 15-20 min, after which the students were asked to return the questionnaire. The approval of the Institutional Ethics Committee was taken. Sensory modality preferences/VARK mode distributions are expressed as percentages of students in each category. Comparison of unimodal sensory modality preference and VARK mode distribution among both the sexes was done using a Chi-square test. SPSS (Version 16.0) was used for statistical analyses. Statistical significance was set at $P < 0.05$.

RESULTS

Of the 213 UG students who consented to provide demographic details and answer the VARK questionnaire, 120 (56.3%) were males and 93 (43.7%) females.

Table 1 was calculated using all the choices (except VARK) for all respondents for each question. Many respondents had to choose more than one option for some questions, and hence, the excess over 100% for the total column. For 11 of the 16 questions, there is at least one mode with more than half of the respondents. Read/write (7) and visual (5) have the lowest percentage of choices in 11 of the 16 questions. Aural is the lowest in three and kinesthetic in two of the 16 questions. Conversely, kinesthetic has six most popular choices, followed by aural with five, visual has four, and read/write with only one question as a most popular option.

Table 1: Distribution of participants who chose the learning style option as all, or part, of their answer

Question	Percentage who chose the option as all, or part, of their answer (includes double counting)				Total	Most popular option	Least popular option
	V (%)	A (%)	R (%)	K (%)			
1	62 (29.1)	146 (68.5)	18 (8.5)	29 (13.6)	119.7	A	R
2	155 (72.8)	65 (30.5)	15 (7)	68 (31.9)	142.2	V	R
3	31 (14.6)	37 (17.4)	31 (14.6)	159 (74.6)	121.2	K	VR
4	98 (46)	43 (20.2)	54 (25.4)	58 (27.2)	118.8	V	A
5	32 (15)	62 (29)	36 (16.9)	121 (56.8)	117.7	K	V
6	36 (16.9)	16 (7.5)	158 (74.2)	55 (25.8)	124.4	R	A
7	44 (20.7)	84 (39.4)	18 (8.5)	129 (60.6)	129.2	K	R
8	67 (31.5)	91 (42.7)	19 (8.9)	89 (41.8)	124.9	A	R
9	36 (16.9)	127 (59.6)	88 (41.3)	29 (13.6)	131.4	A	K
10	89 (41.8)	82 (38.5)	70 (32.9)	22 (10.3)	123.5	V	K
11	15 (7)	35 (16.4)	76 (35.7)	136 (63.8)	122.9	K	V
12	102 (47.9)	49 (23)	62 (29.1)	66 (31)	131	V	A
13	55 (25.8)	80 (37.6)	5 (2.3)	143 (67.1)	132.8	K	R
14	35 (16.4)	80 (37.6)	49 (23)	78 (36.6)	113.6	A	V
15	10 (4.7)	114 (53.5)	94 (44.1)	69 (32.4)	134.7	A	V
16	50 (23.5)	49 (23)	17 (8)	164 (77)	131.5	K	R

V: Visual, A: Aural, R: Reading/writing, K: Kinesthetic

The most common VARK mode distribution among students was unimodal 115 (54%) learning style preference, followed by bimodal (32%), trimodal (12%), and quadmodal (2%). The number of students preferred more than one sensory modality for learning was 98 (46%). The percentages of students who preferred two, three, and four sensory modalities of learning are shown in Figure 1. Among the unimodal group, 65.2% of the students were kinesthetic learners, followed by 20% were auditory learners. Preferred sensory modalities among unimodal learners are shown in Figure 2. The preferred combinations of sensory modalities among the bimodal and trimodal groups are shown in Table 2.

The unimodal preference was more among male respondents 58.3% as compared to 48.4% among females. No significant gender difference was seen in terms of unimodal or multimodal learning preferences (Figure 3). The kinesthetic mode was preferred style among both the sexes but more so among females (75%). There was also no difference in individual sensory modality preference among unimodal learners (Figure 4).

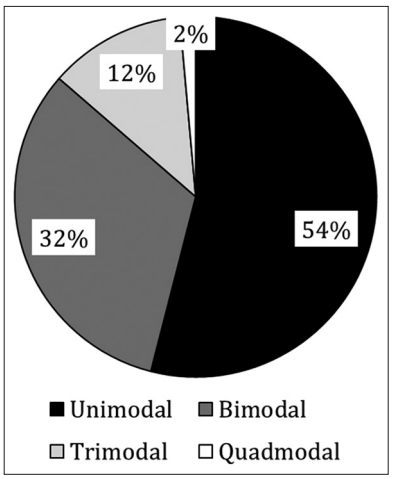

Figure 1: Visual, aural, read/write, and kinesthetic mode distribution among undergraduate medical students (values expressed in percentage*, $n = 213$)

DISCUSSION

The present study conducted to know about the learning style preferences among the UG medical students revealed that majority of the students were males (56.3%). More than half of the total respondents (54%) preferred unimodality as learning preference, of which majority were kinesthetic learners. Of the bimodal styles, aural and kinesthetic mode (43.5%), and of trimodal learning style, aural, read/write, and kinesthetic styles (38.5%) were preferred. Unimodality was preferred mode among both the sexes but more so among males (58.3%). In the present study, kinesthetic was the preferred mode among unimodal learners among both the sexes which more in females (75%). In our study, there was no significant relationship between gender and sensory modalities of learning styles.

Urval et al.[8] and Nayak et al.[9] in their study reported multimodality (68.7%) as the preferred mode where as our study reported unimodality as the preferred one. Similar report as our study was given by Baykan and Naçar.[10] in which he found kinesthetic mode was most preferred style

Table 2: VARK mode distribution among bimodal and trimodal groups

Bimodal group		Trimodal group	
VARK style	**Number of students (*n*=69 total) (%)**	**VARK style**	**Number of students (*n*=26 total) (%)**
VA	4 (5.8)	VAR	3 (11.5)
VK	16 (23.2)	VAK	5 (19.2)
AR	5 (7.2)	VRK	8 (30.8)
AK	30 (43.5)	ARK	10 (38.5)
RK	14 (20.3)		

V: Visual, A: Aural, R: Reading/writing, K: Kinesthetic

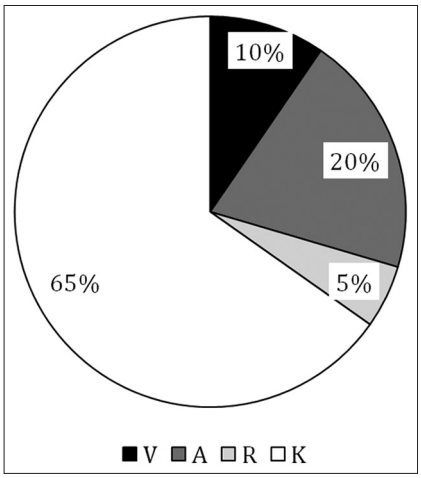

Figure 2: Sensory modality preference among students with unimodal learning style (values expressed in percentage*, *n* = 115)

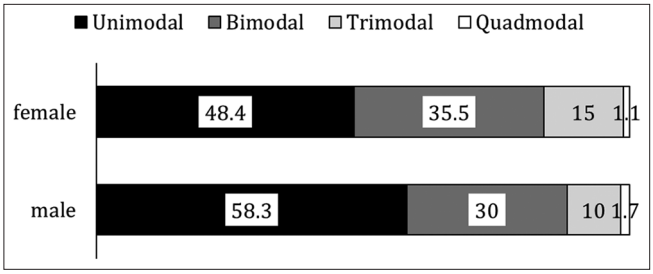

Figure 3: Visual, aural, read/write, and kinesthetic (VARK) mode distribution among undergraduate medical students based on gender (values expressed in percentage*, *n* = 120 for males, *n* = 93 for females). *P* > 0.05 for gender comparison of VARK mode distribution, Chi-square test

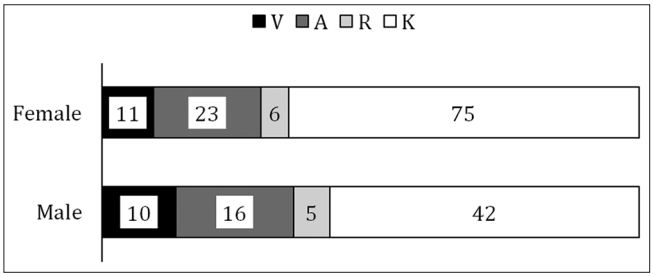

Figure 4: Sensory modality preference among students with unimodal learning style based on gender (values expressed in percentage*, *n* = 70 for males, *n* = 45 for females). *P* > 0.05 for gender comparison of sensory modality preference, Chi-square test

among unimodal learners. Similar to our study, aural and kinesthetic bimodality (46.7%) and trimodality, i.e., aural, read/write, and kinesthetic styles (55.1%) were reported more by Urval et al.[8] Unimodality more preferred among males in our study, but Erica et al.[11] reported more of females (54.2%) were unimodal learners. Baykan and Naçar.[10] reported that among those with unimodal preferences, female students were predominantly aural (49.3%), whereas an equal number of male students preferred aural and kinesthetic (40%).[7] There was no significant relationship between gender and sensory modalities of learning (*P* > 0.05) similarly reported by Nayak et al.[9]

The present study revealed no influence of gender on learning style preferences; a larger study sample might have shown a statistically significant difference. Probably inclusion of other medical colleges in the region could have been better for a large sample. The present study could have assessed about the academic performance and its improvement by altering the teaching methods according to student learning styles.

The present study is an attempt toward understanding the learning preferences of the UG medical students of a institute. Most of the students were unimodal learners, and there was no influence of gender on learning style preference, which indicates that there is no innate difference in ability to learn among both the genders. We as teachers as well as health professionals need to develop several skills involving visual (interpreting graphs and charts), auditory (i.e., listening), reading, and writing as well as kinesthetic (i.e., physical examination and procedures) simultaneously. Furthermore, there is a need to utilize different visual aids such as black boards, overhead projectors, slides, and LCD projector and must organize our teaching so that this approach provides and maintains interest and enthusiasm among the students toward learning.

CONCLUSION

We use a combination of teaching methods in our daily routine as teachers, but there has not been an active effort to determine whether these methods adequately meet the requirements of different types of learners. We hope that

the data from the present study will help us to adopt better approaches in teaching and training the students and make learning a more fruitful experience.

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