

# Visual or Auditory: The Effective Learning Modality in Multimodal Learners

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## Abstract

**Background:** One of the principle debates in the field of individual differences in 'learning style' has centred around the proliferation of constructs and measures irrespective of extensive theories and instruments. In the current digital world, audio-visual aids have grown exponentially with several multimedia such as educational DVDs, Power Point, YouTube and other online portals. With recent advances in Kinaesthetic/tactile learning styles that help the students to have hands on experience, it is easier to understand, analyse & reproduce the concept. This research intends to use VARK Questionnaire to study the learning styles and their preferences and determine the effective learning modality.

**Objective:** To study the effective sensory modality of learning using cognitive learning tests in multimodal learners.

**Materials and Method:** Study was conducted on 250 undergraduate medical students of BMCRI, Bengaluru. Informed written consent was taken. Subjects with visual and auditory abnormalities, motor disorders, diseases of upper limb were excluded. Using VARK questionnaire, Version 7.0, students were grouped into unimodal and multimodal learners based on the VARK scores. Design Learning test and Auditory Verbal Learning tests were used to assess learning ability. Statistical analysis was done with descriptive statistics and Student's t-test, p value <0.05 statistically significant.

**Results:** Majority of students were unimodal learners. Design learning test scores were significantly higher in multimodal learning group, with statistically significant p value of 0.032.

**Conclusion:** Among multimodal learners, visual modality of learning is found to be the best sensory mode of learning. This may help the educators to effectively design and tailor the teaching strategies, as per the learning needs of students.

**Keywords:** Learning styles, VARK, learning tests.

## Introduction

Whereas modern medicine owes much of its success to its reliance upon evidence-based treatments, most popular techniques of instruction have not been subjected to thorough empirical scrutiny.<sup>1</sup> Learning

style based instruction have proven the fact that the idea of customized instruction produces better learning than using the same kind of instruction for everyone.<sup>2-4</sup> The learning-styles concept appears to have wide acceptance not only among educators but also among parents and the general public.<sup>2</sup> In the current digital world, audio-visual aids have grown exponentially with several multimedia such as educational DVDs, Power Point, YouTube and other online portals. Kinesthetic/tactile learning can help the educators with finding new ways to engage students, stimulate critical thinking and improve clinical application in a rapidly changing and complex

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health care system.<sup>5</sup> While there are several tools to study learning styles of students, the visual, aural, read/write and kinesthetic (VARK) questionnaire is a simple, freely available, easy to administer tool that encourages students to describe their behaviour in a manner they can identify with and accept.<sup>6</sup> The questionnaire is designed to identify the following four sensory modalities: visual, aural, read/write, and kinesthetic<sup>6</sup> (hence the acronym VARK). Teachers can use this knowledge to facilitate student learning. Moreover, students themselves can use this knowledge to change their learning habits.<sup>7</sup> This research intends to use VARK Questionnaire to study the learning styles and their preferences and determine the effective sensory modality of learning using cognitive learning tests in multimodal learners.

## Materials and Method

**Study Design:** Cross-sectional study

**Study Place:** Bangalore Medical College & Research Institute, Bengaluru.

**Study Population:** 250 Undergraduate Medical students of BMCRI in the age group of 19-20 yrs

**Study Period:** April–May 2019

**Ethical Clearance and Informed Consent:** Taken

### Inclusion Criteria:

1. Healthy Men and Women
2. Age group of 19-20 yrs.

### Exclusion Criteria:

1. Subjects with visual and auditory abnormalities
2. Subjects with motor disorders.

3. Subjects with disorders of upper limb.

The study was started after the subjects fulfilled the inclusion criteria and were enrolled after obtaining consent. The study group includes a total of 250 participants in the age group of 19-20 years. Version 7.0 of the VARK questionnaire in a printed form was administered to the students.<sup>6</sup> 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.<sup>6</sup> Based on VARK scores the students were categorized into two groups of unimodal & multimodal learners. Design Learning Test (DLT) & Auditory Verbal Learning Test (AVLT)<sup>7</sup> were used to assess learning ability of the students.

**Statistical Analysis:** The data was analysed using descriptive statistics to match the subjects based on Age and Gender. Students 't' test was done to compare the differences of the learning test scores between the unimodal learning group and the multimodal learning group. analysis was done in Microsoft Excel version 2010. Data is expressed as mean  $\pm$  SD. P value <0.05 is considered significant.

## Results

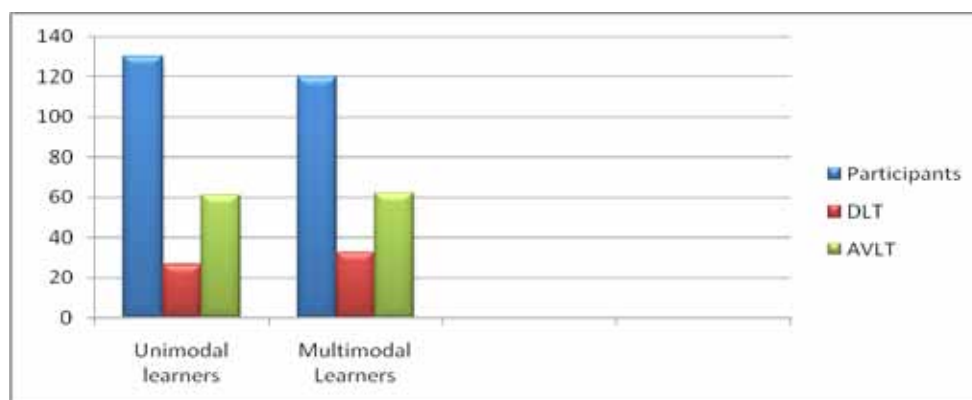


Figure 1

Figure 1 shows the distribution of participants in two groups. Out of 250 students 130 students preferred unimodal learning styles and 120 students preferred

multimodal type of learning based on the VARK Questionnaire.

**Table 1**

	<b>Unimodal Learners</b>	<b>Multimodal Learners</b>	<b>P Value</b>
Participants	130	120	
Males	63	55	
Females	67	65	
DLT	26.43 + 8.9	32.54 + 7.3	0.032*
AVLT	60.9 + 5.94	62.16 + 3.59	0.186

Table 1 shows the distribution of participants in the unimodal learning group and the multimodal learning group. It also shows the gender distribution in the two groups. The design learning test score which assesses the visual learning ability was found to be higher in the multimodal learning group which was statistically significant with p value of 0.032. The Auditory-Verbal learning test scores which assesses the auditory learning were higher in the multimodal learning but it was not found statistically significant.

### **Discussion**

Majority of the students in this study, 130 out of 250 belonged to the unimodal learning group, indicating most of the students preferring one type of sensory mode of learning (i.e Visual, Aural, Read/Write or Kinesthetic) whereas the rest of the 120 students belonged to the multimodal learning group similar to results reported by authors from different geographic locations.<sup>8-9-10</sup> Therefore this VARK tool not only helps in identifying the majorly utilized learning style for modulating the preferred instructional technique but also helps the students in understanding their own learning preferences thus improving their academic performance and clinical skills. The Design learning test and the Auditory-Verbal Learning tests which are effective cognitive learning tests showed higher value of these test scores in the multimodal learning group.<sup>7</sup> The DVT test scores were statistically higher in the multimodal learners indicating visual modality of learning as an effective sensory mode of learning among the multimodal learners. Teaching in most of the institutions predominantly include lecture classes using Power Point presentations and, to

some extent, chalkboard teaching. Practical classes are predominantly small-group teaching/demonstrations.<sup>11</sup> This type of teaching strategy can stimulate group of students with predominant visual and auditory learning style. Those who predominate with kinesthetic learning are least targeted in the current teaching method. The same is true for the other sensory modalities. The deficiencies in this type of teaching strategies is overcome by Multimodal learning up to some extent. Therefore the newer teaching strategies are required which need to stimulate the visual, aural, read-write and the kinaesthetic sensory modalities to encourage the critical thinking, problem solving and the decision making skills among students.

### **Conclusion**

Among multimodal learners, visual modality of learning is found to be the best sensory mode of learning. This may help the educators to effectively design and tailor the teaching strategies, as per the learning needs of students.

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**Conflict of Interest:** Nil conflict.

**Source of Funding:** Self.

**Ethical Clearance:** Taken.

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