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RESEARCH ARTICLE

# Learning style predilection among health professional learners – A comparative study among varied course groups in a medical college

**Brinda Srinivasagopalane[1], Abeetha S[1], Sureka V[1], Ganesh M[1], Poovaraghavan J[2]**

[1]Department of Physiology, ACS Medical College and Hospital, Dr. MGR Educational and Research Institute, Chennai, Tamil Nadu, India, [2]Department of Statistics, Dhanraj Baid Jain College, Chennai, Tamil Nadu, India

**Correspondence to:** Brinda Srinivasagopalane, E-mail: brindmbbs22@gmail.com

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## ABSTRACT

**Background:** The learning behavior of an individual is attributed to one's learning style. With varied learning styles been evident, identification of the best learning modality is a must to upgrade the student's knowledge. This study pertains to seven sensory modalities of learning such as visual, verbal, aural, physical, logical, social, and solitary. **Aim and Objective:** The aim of the study was to identification and comparison of learning style preferences among three categories of undergraduate health learners and gender differences in their learning styles. **Materials and Methods:** The study participants were 444 – 1st-year students of both the genders from Medicine, Physiotherapy, and Nursing course groups studying in ACS. The Medical College was included in the study. The Memletics questionnaire containing 70 questions was distributed and the students were encouraged to choose their best-preferred answer. Student identity, gender, and the course assigned were noted. **Results:** Statistical analysis was done using SPSS software version 23. One way analysis of variance (ANOVA) showed Medicine, Physiotherapy and Nursing group of students preferred multimodal learning. Further analysis with multiple linear regression model to compare the learning modality between the three groups showed visual, social and solitary modalities of learning were the best preferred learning style in common among all the three groups of students. Both the gender groups preferred social modality of learning in common. One way ANOVA results showed a significant difference between male and female students with regard to visual ($P = 0.023$), verbal ($P = 0.000$), and logical ($P = 0.002$) modalities of learning. **Conclusion:** With multimodal learning behavior been evident, implementation of appropriate teaching modalities to cater the students need, as well, exposing them to newer learning modalities will strengthen the teaching-learning process, their academic performance, and educative outcome to make the individual a complete professional.

**KEY WORDS:** Memletic Questionnaire; Learning Style Preference; Medical Undergraduates; Health Learners Physiotherapy; Nursing

## INTRODUCTION

Learning is defined as a process of acquisition of information and resultant changes in behavior. Hawk and Shah have reviewed six well-known learning models and have highlighted the characteristics of each on validity, reliability, and student performances.[1] In the yesteryears, teaching styles were pertained to follow the teacher's ideology on how they prefer to learn and what they best practiced. Education system in the modern world is perplexing and laborious. A varied number of professional courses has put the teachers under the responsibility of implementing a good education and to expand their style of teaching to achieve more effective learning according to student needs. The learning behavior varies from children to adulthood and

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identifying the same at each stage is essential as to make the learner actively involved in the learning process along with the facilitator.[2]

How does the need for learning preference arise? An article by Hutchinson has sensitized us that learning is an interlink process between the motivation and perception of relevance by the learners, these, in turn, are related to learners preferred learning style, previous experiences, and context and environment of learning.[3] There have been various learning styles proposed and their effectiveness has been validated. The need for identification of the learning style will apprehend the teachers on the teaching modality to be implemented. Education system has multiple teaching modality skills which are practiced among the facilitators. The students approach to each of this teaching modality is also varied and identification of the best modality at the beginning of a professional education is a must to upgrade their knowledge. A study by Chonkar *et al*. has identified that the students predominantly have a deep and strategic learning approach, which can be further enhanced by identifying their specific learning modality.[4] When students are given an opportunity to choose their comfortable modality, their learning becomes effective and forever. To the best of our knowledge, this study is first of the kind to discover and compare the best-appreciated modality of learning by the students of different course groups (medicine, physiotherapy, and nursing) studying physiology in common, in a medical institute.

### Objectives

- Identification and comparison of learning style preferences among the varied course groups (medicine, nursing, and physiotherapy) studying physiology
- Gender difference in the learning style preferences among these categories.

## MATERIALS AND METHODS

### Type of Study

This was descriptive study.

### Ethics

The study was performed after ethical committee clearance in accordance with the ethical principles in declaration of Helsinki.

### Methodology

The study was initiated after approval from the Institutional Ethics Committee. The study participants were 444 – 1st-year students of both the genders from the disciplines of medicine, physiotherapy, and nursing courses, who attends physiology classes at ACS Medical College and Hospital. Student's identity, gender, and the course assigned were noted in the questionnaire. The Memletics questionnaire used in this study had 70 questions, with ten questions structured for each of the seven learning styles (visual, verbal, aural, physical, logical, social, and solitary). The questionnaire was distributed among all the participant students of the three-course groups. An example of a question in the questionnaire is as follows: "*You have a private interest or hobby that you like to do alone*," for which the Score 0 – the statement is nothing like me, Score 1 – the statement is partially like me, and Score 2 – the statement is very much like me. The students were encouraged to choose one best preferred answer ("0," "1," or "2") for all the 70 questions. The sheets were collected and the scores were analyzed with the score sheet provided in the Memletics questionnaire. The total points for each learning style could range from 0 to 20, depending on the student preferences to the questions. The scorings for each learning style were tabulated in Excel sheet and the statistical analysis was done using SPSS software version 23.

## RESULTS

Statistical analyses used were descriptive statistics with mean and standard deviation, one-way analysis of variance (ANOVA) and multiple regression model. Specific mean values on the learning style preferences [Table 1 and Figure 1]

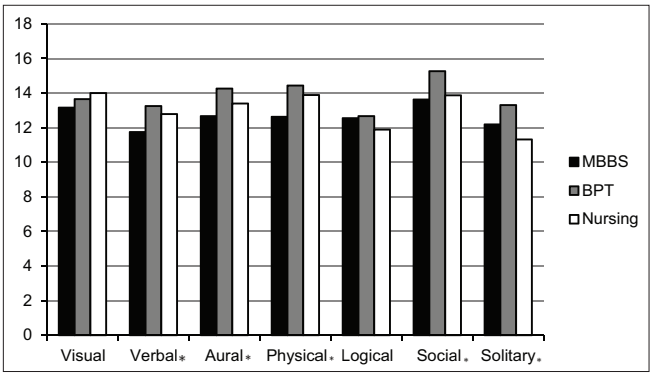


**Figure 1:** Mean values and standard deviations on learning styles of medical, physiotherapy, and nursing students

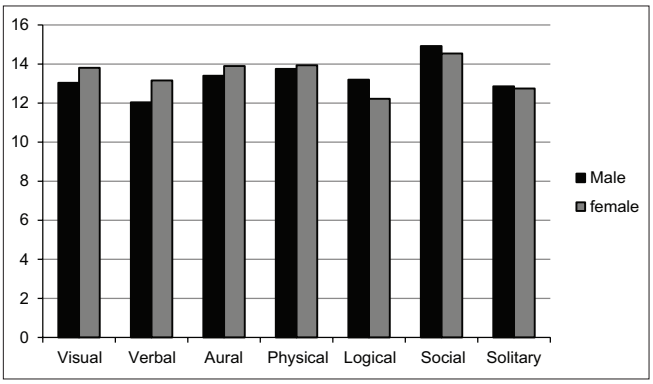


**Figure 2:** Mean values on gender difference with different learning styles

showed medicine and physiotherapy students preferred social modality of learning as their primary learning style. The nursing students preferred visual method of learning as their primary modality. The second preferred learning style was physical method, which was similar for physiotherapy and nursing students. The medical students preferred visual modality of learning as a second preference. Multiple linear regression model [Table 2] was done to identify a common learning modality among the three groups of students. The analysis was suggestive of three learning modality being best preferred among the seven learning modalities which were visual, social and solitary learning modalities, this further substantiating multimodal learning behavior among the students.

Gender-specific differences in the preferred learning modality were also analyzed [Table 3 and Figure 2]. The mean values showed both the male and female students of all the three-course groups preferred social modality of learning as their first preference with the highest mean = 14.92 and 14.94 among male and female students, respectively. One way ANOVA results showed a significant difference between male and female students with regard to visual ($F = 5.236$, $P = 0.023$), verbal ($F = 13.676$, $P = 0.000$), and logical ($F = 9.595$, $P = 0.002$) learning modalities. Further, the female students have a better preference in visual (13.81 ± 3.32) and verbal (13.16 ± 2.94), and male students prefer logical (13.2 ± 3.04) learning styles.

## DISCUSSION

The assessment of learning style by the Memletics questionnaire was analyzed by other researchers under varied categories of students such as English learners and engineering students. Our study is distinct, using the Memletics questionnaire among health professional learners and we also compared the learning styles among three different course groups (medicine, physiotherapy, and nursing). We also established gender differences in learning behavior among these students. Our study highlights a social preference of learning among the medicine and physiotherapy students primarily [Table 1]. Further, on analysis with one-way ANOVA test showed a significant difference in learning styles between the groups with no one common modality of learning in all the three groups, though they study physiology in common.

**Table 1:** Mean values and significance on learning styles of medical, physiotherapy and nursing students

| Learning styles | Medicine | Physiotherapy | Nursing | Significant |
|---|---|---|---|---|
| Visual | 13.16±3.474 | 13.65±3.453 | 14.00±2.405 | 0.254 |
| Verbal | 11.75±3.081 | 13.25±2.981 | 12.79±2.874 | 0.000* |
| Aural | 12.67±3.296 | 14.26±2.795 | 13.40±2.932 | 0.000* |
| Physical | 12.63±3.316 | 14.44±2.651 | 13.89±2.696 | 0.000* |
| Logical | 12.55±3.194 | 12.67±3.196 | 11.89±2.799 | 0.295 |
| Social | 13.63±3.407 | 15.27±2.730 | 13.87±2.810 | 0.000* |
| Solitary | 12.19±2.991 | 13.31±2.892 | 11.32±2.979 | 0.000* |

*$P<0.05$

**Table 2:** Multiple linear regression model

**Model summary**

| Model | R | $R^2$ | Adjusted $R^2$ | Standard error of the estimate |
|---|---|---|---|---|
| 1 | 0.361[a] | 0.130 | 0.116 | 0.639 |

[a]Predictors: Constant, solitary, social, visual, aural, logical, verbal, physical

**Coefficients[a]**

| Model | | Unstandardized coefficients | | Standardized coefficients | *t* | Significant |
|---|---|---|---|---|---|---|
| | | B | Standard error | Beta | | |
| 1 | (Constant) | 2.842 | 0.216 | | 13.174 | 0.000 |
| | Visual | 0.033 | 0.011 | 0.163 | 2.982 | 0.000* |
| | Verbal | −0.006 | 0.012 | −0.028 | −0.520 | 0.603 |
| | Aural | −0.020 | 0.012 | −0.090 | −1.743 | 0.082 |
| | Physical | −0.013 | 0.013 | −0.057 | −1.008 | 0.314 |
| | Logical | 0.013 | 0.011 | 0.061 | 1.164 | 0.245 |
| | Social | −0.046 | 0.012 | −0.207 | −3.796 | 0.000* |
| | Solitary | −0.058 | 0.011 | −0.257 | −5.184 | 0.000* |

[a]Dependent variable: Course, *$P<0.05$

**Table 3:** Gender differences with regard to learning styles

| Variables | *n* | Mean | Standard deviation | F-statistics | *P*-value |
|---|---|---|---|---|---|
| Visual | | | | | |
| Male | 150 | 13.04 | 3.39 | 5.236** | 0.023 |
| Female | 294 | 13.81 | 3.32 | | |
| Verbal | | | | | |
| Male | 150 | 12.04 | 3.16 | 13.673** | 0.000 |
| Female | 294 | 13.16 | 2.94 | | |
| Aural | | | | | |
| Male | 150 | 13.40 | 3.25 | 2.655 | 0.104 |
| Female | 294 | 13.90 | 2.90 | | |
| Physical | | | | | |
| Male | 150 | 13.75 | 3.06 | 0.435 | 0.510 |
| Female | 294 | 13.94 | 2.90 | | |
| Logical | | | | | |
| Male | 150 | 13.20 | 3.04 | 9.595** | 0.002 |
| Female | 294 | 12.22 | 3.16 | | |
| Social | | | | | |
| Male | 150 | 14.92 | 3.20 | 1.557 | 0.213 |
| Female | 294 | 14.54 | 2.93 | | |
| Solitary | | | | | |
| Male | 150 | 12.86 | 2.68 | 0.129 | 0.720 |
| Female | 294 | 12.75 | 3.15 | | |
| Overall | | | | | |
| Male | 150 | 93.23 | 14.08 | 0.639 | 0.424 |
| Female | 294 | 94.35 | 13.91 | | |

**Significant at 1% level

Hence, on comparing the learning modalities between the three groups with multiple linear regression model [Table 2], visual, social, and solitary modalities of learning were the best-accepted methods in common by all the three groups of students. In our study, the students of all the three groups medical, nursing, and physiotherapy exhibited multimodal learning style. Gender-specific differences in the preferred learning modality showed both the male and female students of all the three-course groups preferred social modality of learning as their first preference with the highest mean. With reference to other modalities of learning (visual, verbal, and logical), there was a significant difference between male and female students.

A study was done by Srijongjai, among the English language learners in Thailand, suggested a social modality of learning as a preference.[5] A study by Abidin *et al*. identified social modality of learning as the first preferred method among a group of engineering students.[6] A study by Kharb *et al*. has identified that practical classes, discussions, and lectures were the preference on the teaching methods which relate to the visual and social learning methods among the 1st year medical students,[7] this is also a substantiating result to our study wherein social and visual learning modalities were primary and secondary preferences. To add, a study by Ding *et al*. identified a preferred visual modality of learning among the students attending physiology lectures, further supporting our evidence.[8] In our study, the students of all the three groups medical, nursing, and physiotherapy exhibited multimodal learning style. Our study has further confirmed the findings of the previous studies that multimodality of learning being most appreciated by the students groups. A study by Baykan and Naçar and Lujan and DiCarlo has identified that the medical students exhibited multimodal learning style while using a Visual auditory read/write kinesthetic learning questionnaire.[9,10] With social modality of learning being the most preferred among the medical and physiotherapy student groups, as well among both the genders, a more teaching focus through small group discussions, problem-based learning, panel discussions, debate, role play, etc., can be implemented to enhance the student learning outcome. A review study by Keren *et al*. has highlighted the importance of the social modality of learning, and it is nature, utility, and value among the medical students.[11] Problem-based learning, a method of social modality of learning, had a better learning approach and outcome among students was highlighted in a study by Preeti *et al*.[12] The visual modality also been a common choice among all student groups can be enhanced by diagrams, pictures, models, and videos. Studies have identified that the application of e-learning resources (visual technique) to the teaching modality always add an advantage to the teaching-learning process providing a blended learning and adding richness to the teaching medium[13] and a greater student appreciation.[14] Assisting the students in self-directed learning can enhance the solitary modality of learning. A study by Premkumar *et al.* showed us the importance of self-directed learning in medical curriculum, wherein they have identified a decrease in the readiness of self-directed learning between the batches of medical students.[15] However, with solitary method of learning also being preferred here, encouraging the students on self-directed learning (solitary learning modality) from the initial years of education could enrich and help the students to have a better educative outcome.

Identifying and grouping the students according to the learning styles will have more positive attitudes toward their behavior of learning. Dunn *et al*. have grouped students according to their preferred learning style and have found better learning behavior when matched to their particular groups.[16] This adds as an added advantage in analyzing the learning styles among the students.

## CONCLUSION

We understand that the students of these different course groups studying physiology in common exhibit multimodal learning behavior. However, the social modality of learning is the preferred learning style among both the gender groups.

It is also the duty of the faculty members to design the learning experience of students to their preference and thereby minimize the mismatch between teaching and learning outcomes. Complementing the preferred learning styles to our versatile teaching methods can enhance the student's academic performance and overall educational outcome. This study is further planned to analyze the academic performance of the students and their learning behavior. To conclude, the students should also be made aware on the other modalities of learning to make them a complete professional and to benefit their future prospects. Learning called as "a state of art experience" implies to both the instructor and the learner! Hence, let us work toward to implement teaching-learning process wisely!

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