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ORIGINAL ARTICLE

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Previous Mode of Education and Future Learning Style Preferences among Medical Students: A Cross-Sectional Study

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ABSTRACT

OBJECTIVE: To find the association of different learning styles with gender and previous mode of education among 1st and 2nd year medical students at a private medical college in Lahore, Pakistan.

METHODOLOGY: A cross-sectional study was conducted on 1st and 2nd year MBBS students of Shalamar Medical & Dental College. Data was collected using a validated questionnaire comprising 44 questions in four domains, active/reflective, visual/verbal, sequential/global, and sensitive/intuitive.

RESULTS: The total number of participating students was 297, of which 132 were males and 165 were females. We found that students mostly preferred the active learning style over reflective and sequential over global, sensitive over intuitive, and visual over verbal. We also found that the previous mode of education was significantly associated with active/reflective and sensitive/intuitive.

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CONCLUSION: Most of the students preferred visual over active, sensitive, and sequential learning styles. The previous mode of education strongly impacts the preference of learning styles in professional academic careers.by adapting the previous mode of education of majority of students in future institutions, the outcomes of academic scores and conceptual learning can be improved, that is vital to make a good doctor.

KEYWORDS: Learning Styles, Medical Students, Index of Learning Style, VARK, Teaching Learning Strategies.

INTRODUCTION

Learning styles (LS) are the techniques of gathering, processing, and retaining knowledge or any other information. The different learning styles, adopted by students, are an important factor in their performance in the examinations.[1] Two main questionnaires have been used by the researchers to assess different learning styles. Neil Fleming developed a questionnaire, "VARK" in 1987 which describes four different sensory modalities: visual, aural, write/read, and kinesthetic (VARK).[2] Felder and Silverman developed the Index of Learning Styles (ILS), which classifies the learning preferences of students in four ways example: processing, input, understanding, and perception.[3]

ILS covers four different LS, i.e.; visual/verbal, sensing/intuitive, reflective/Active, and sequential/global.[4] Visual learners perform better in a setting where knowledge is provided to them through drawings or diagrams, while students with verbal LS, understands better with written and spoken methods.[5] Sensitive learners memorizes with help of different modalities of sensations while Intuitive are innovators.[6] Reflective learners prefer to work alone, while active learners participate in the group discussion for- example in problem-based learning (PBL) where a case is discussed in a group and related to clinical aspects.[1] Sequential learners prefer learning in sequential steps while global learns on a broader perspective.[7]

A recent study investigated a relationship between preferred LS and academic results and revealed, that when LS and teaching methods are compatible, students definitely learn more effectively, because they can easily corelate their knowledge with facts and figures.[8] Another study carried out in China, found that choices of LS are influenced by the prior educational experiences of students.[9] Students should be aware of their strengths and weaknesses and their learning style to help them understand concepts better[10]. Previous studies have reported

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severe consequences when there is a mismatch between the teaching style and learning preferences', such as poor performance, boredom, and ultimately giving up. Understanding the importance of learning styles can help students cope with poor performance and educators develop effective teaching strategies.

A national study in the same medical college used VARK model and concluded that if learners knows which learning method is best for them, then they can enhance self-directed learning. Another national study in Islamabad reported significance of VARK model with previous GPA but majority of students had less knowledge of LS.' A recent study in Islamabad revealed that majority of students had quad model LS preference.

We preferred ILS in our study because the VARK questionnaire is more inclined towards educational values and teacher directed learning while ILS is directed towards students learning. The aim of our study was to find the impact of previous mode of education on learning style preferences among the first and second year MBBS (Bachelor of Medicine and Bachelor of Surgery) students of a private medical college in Lahore, Pakistan.

Rationale of this study was to change the teaching methodologies according to commonly observed learning styles in order to improve academic score of our medical college.

METHODOLOGY

Study design: It was Descriptive cross-sectional study. Carried out at Shalamar Medical and Dental College, Lahore, Pakistan from April, 2018- 2019. Study population included 1st and 2nd Year students of the Shalamar Medical & Dental College, Lahore, Pakistan. A Sample size of 297 students participated in research, among them 132 were males, 165 were females. Inclusion criteria was based on voluntary participation of first 2 years of MBBS students while those students who did not gave consent or with incomplete questionnaire were excluded.

This study was approved from Institutional Review Board of Shalamar Medical and Dental College, Lahore. (SMDC/IRB/05-4/089) After taking a written informed consent, students were given a validated ILS Questionnaire. This questionnaire was well-explained to all the students. Questionnaire had two parts, first part covered the demographical details i.e.: name, age, gender and previous mode of education. Second part consisted of ILS questionnaire developed by Felder and Silverman. It had 44 questions with the options (a) or (b), covering four different domains of LS, as, Active/Reflective, Sensing/Intuitive, Visual/Verbal and Sequential/Global.

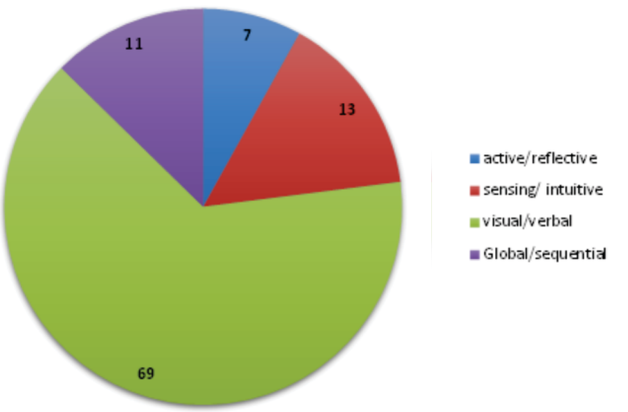
We separated, and then counted the number of responses 'a' and 'b' for each of the four dimensions of LS. After that, the smaller value of either “a” or “b” was subtracted from the one which was greater in number. (E.g., if there were 7 'a' and 4 'b' responses, then subtraction would result in 3 'a'). Now the final score of each domain of the LS was calculated. If the score was in the range of 1-3, we labelled it as a mild preference for that domain. If the score was in the range of 5-7, we labelled it as a moderate preference, and if the score was between 9 and 11, it indicated a strong preference exists for that dimension.

STATISTICAL ANALYSIS: Data was analyzed with IBM SPSS (24.0). Descriptive variables were expressed as mean ± S.D or frequency and percentages. Independent sample t-test was applied for assessing any significant difference between preferences of various domains of LS. Class, Gender, and Previous mode of education was compared with different domains of LS and their association was determined with Chi-square. P value of <0.05 was considered significant.

RESULTS

Our study included 297 research participants. 132 were males and 165 were females. We divided the responses of students into mild, moderate, and strong preference as described in methodology section, page no. 4. We used strong preference response as our major study parameter to distinguish student's preference for every LS.

Frequency distribution of preferred learning styles among medical students



Majority of students showed a strong preference for visual and verbal type of learning style with a percentage of 69%. (fig 1) when visual/verbal LS was broken down, our study population demonstrated a strong preference of visual (96.2%) while a preference for verbal type of LS was present in only 3.57% of study population (fig 2).

GENDER

We compared different LS based on basis of gender. When active-reflective approach was assessed, significant number of male and female followed both style i.e active and reflective.

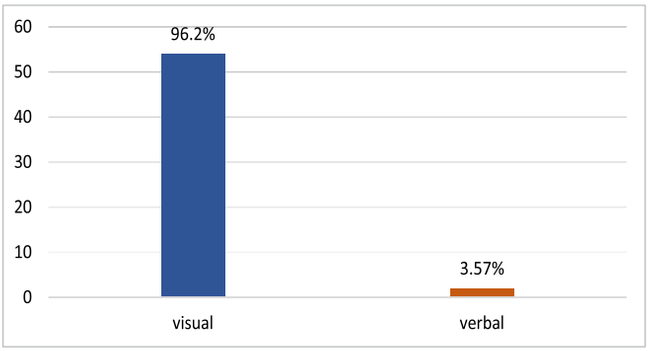


Figure : Distribution of visual and verbal preferences

67.87% of females and 65.9% of males preferred a balance between both approaches. Whereas a little percentage of female (16.3%) and males (18.1%) preferred active style. On the other side reflective preference was in only 15.7% of females and 15.9% of males and results were non-significant (p>0.05). 65.4% of females and 56.8% of male prefer a balanced approach for sensitive/Intuitive LS. Whereas a good percentage of female (23.6%) and males (29.5%) was observed to follow only sensitive approach. On contrary, intuitive were also in fewer counts as 10.9% of females and 13.6% of male preferred it, again the association was insignificant (p>0.05). In Visual/verbal LS, significant number of male and female follow visual methods (57.57% of females and 56.8% of males). Whereas a mild percentage of female (38.1%) and males (40.1%) tend to follow well balanced approach. Only 4% of female and 3% male find verbal method helpful but p value was >0.05. 68.4% of females and 71.2% of males preferred a well-balanced approach for Global/Sequential LS. Where a mild percentage of female (20.6%) and males (19.6%) tend to follow sequential style. On the other side global were also in less count as 10.9% of females and 9.09% of male prefer intuitive style. (Table 1). Different students responded to different LS, but we did not find any statistical difference between any of the LS preferences on basis of gender (p>0.05). It is concluded that there is no significance in learning style by gender as both follow approximately same approach.

CLASS

2nd year students preferred active learning over reflective because they might have gone through that subjects and knows better methods to understand their subject in a better way and they also learned techniques to get better grades as compared to first year students. This difference of class did not show any statistically significant difference (p>0.05).

Learning styles	Females n=165	Males n=132	p Value
Active-reflective			
Well balanced	112	87	0.912
Active	27	24	
Reflective	26	21	
Sensitive-Intuitive			
Well balanced	108	75	
Sensitive	39	39	
Intuitive	18	18	
Visual/Verbal			
Well balanced	63	53	0.829
Visual	95	75	
Verbal	7	4	
Global/Sequential			
Well balanced	113	94	0.839
Global	34	26	
Sequential	18	12	

Table 1: Learning style preferences based on Gender.

*Chi square test applied, p value of <0.05 was considered as statistically significant.

PREVIOUS MODE OF EDUCATION

First time, a study was conducted where students LS were compared with their previous mode of education. When we compared the students on basis of educational backgrounds like FSC and A- levels, we observed a statistically significant difference (p<0.05).

Among Active/reflective approach, 64.22% of F.sc students and 80.39% of A-level students preferred a balance for active LS. However, A level students showed 16% higher rate than F.SC. Whereas little percentage of F.SC (19.1%) and A-level (7.8%) follow active style. On the other side reflective were also in fewer count as 16.6% of F.sc and 11.7% of A-Level prefer reflective style. This working evaluates that previous mode of education matters in defining learning styles as A level students are in huge percentage as compared to F.SC students.

While considering Sensitive-intuitive approach with respect to previous mode of education, it was evaluated that majority of students prefer both sensitive and intuitive learning styles. When we further analyzed well balanced proportions, A level students were more in number than F.sc students. On the other side, large number of F.sc students followed sensitive style, it proves that previous mode of education matters in creating learning styles.

When Sequential-Global approach was compared according to previous mode of education basis, it was assessed that 67.8% of F.sc students and 78.4% of A-level students prefer a balance between both approaches. However, A level shows 11% higher rate than F.sc. Whereas little percentage of F.sc (21.5%) and A-

level (13.7%) follow sequential style. On the other side global were also in fewer count as 10.5% of F.sc and 7.8% of A-Level prefer global style. This working evaluates that previous mode of education matters in defining learning styles as A level students are in huge percentage as compared to F.sc students.

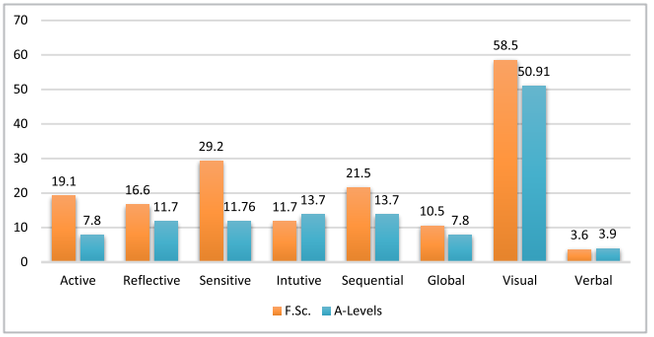


Figure : Learning style preferences with previous mode of education

Among the four LS, students from both backgrounds preferred visual/verbal LS. Among visual/verbal LS, majority of F.SC students choose visual and only a few preferred verbal LS, while majority of A-level students choose visual LS and only a few preferred verbal learning methods. (Figure 3, Table 02).

Previous Mode of Education FSc n= 246 A-Levels n= 51	Active-reflective n=297			p Value
	Well balanced	Active	Reflective	
F.SC	158	47	41	0.049*
A-levels	41	4	6	
Sensitive-Intuitive				
	Well balanced	Sensitive	Intuitive	
F.SC	145	72	29	0.022*
A-levels	38	6	7	
Visual- Verbal				
	Well balanced	Visual	Verbal	
F.SC	93	144	9	0.608
A-levels	23	26	2	
Sequential-global				
	Well balanced	sequential	Global	
F.SC	167	53	26	0.302
A-levels	40	7	4	

Table 2: Learning style preferences on basis of previous mode of education.

**Chi-Square Test for individual learning styles showed a significant association between learning strategies and previous mode of education in the active-reflective and sensitive-intuitive domains * p-value of < 0.05 was considered statistically significant.*

DISCUSSION

Our research examined the preferences of different learning styles among medical school students at a private medical college in Pakistan and its impact on gender, class, and previous mode of education on their learning style preference. Students learning style preferences of two years of medical students were analyzed over four dimensions of learning style namely active-Reflective, intuitive-sensing, visual-verbal and sequential-global. The analysis detects well balances approach in number of students preferring both active-reflective in their learning styles, the same case was uncovered for those preferring intuitive-sensing learning styles. When comparing global sequential preference, again a well-balanced approach was detected, but very clearly though there is significant difference of students preferring visual methods as compared to verbal ($p<0.05$). A study by smith et al. used VARK model in his systematic review and revealed that students exhibit diverse LS with a preference for specific modalities as, culture, race, and educational settings. His study revealed that western nations exhibit preference for visual LS while Asian people prefer kinesthetic LS.[18]

In our study, majority of students were females with frequency of 165 (55.5%). Our study found a strong association of previous mode of education with active/ reflective and sensitive/intuitive types of LS ($p<0.05$). Our study could not establish any association between gender, class seniority with any of the LS ($p>0.05$). This study is unique in Pakistan as it compared the previous mode of education with the learning style preferences of medical students. A study on LS reported that majority of students preferred visual LS (56.8%) which was consistent with our study.[19] Previous studies have also analyzed the relationship between learning strategies and academic outcomes[20] such as annual analysis outcomes, GPA, and performance in different subjects, and our results of academic outcomes and learning preferences were consistent with our study.[21] Another International study revealed that majority of males preferred multimodal LS while females preferred unimodal LS, while Aural/Kinesthetic remained the preference of choice both gender, again this difference is due to different model of LS.[22] Our study also revealed that Active learning was preferred over reflective learning, sensing was preferred over intuitive in the sensitive-intuitive domain, sequential was preferred over global in the sequential-global domain, and visual was preferred over verbal in the visual-verbal domain. A similar study conducted among first-year medical students in Kazakhstan also reported like our results.[23] A study revealed that males students preferred multiple learning styles while females

preferred only one learning style throughout academic career.

In our study we found that majority of our student preferred visual/verbal type of LS and gender wise prevalence was unimodal (students used only one learning style). Frequency of female students, preferring visual/verbal was more (57.57%) as compared to male students (56.8%) but there was no significant difference, when compared to learning styles. A study in Saudi Arabia revealed aural/verbal LS as the predominant one,[24] this difference can be due to different teaching standards and they included only one semester students while in our study two levels were considered. A study done in Asia revealed similar results with preponderance of multimodal LS for male students and unimodal LS was the preference of females.[25]

LIMITATIONS: Limitations of this study are small sample size and inclusion of only one medical college. We can take this research to advance level by comparing different medical Colleges in curriculum, learning styles adopted by students, examination protocols.

FUTURE RECOMMENDATION: Due to the gap in data collection and publication, perspective of students towards LS might have changed so this study recommends a follow-up and comparison with perspective of Gen-Z with different approaches of LS.

CONCLUSION

This study has indicated that previous mode of education is most significant in affecting results of students. Most of the students' needs will be met by a variety of teaching methods. An effective learning environment for the students may be ensured by the educators' awareness of the students' learning styles and their efforts to match those learning styles with the methods of instruction. Our results can help in changing teaching strategies not only in medical colleges but also at primary and secondary level to enhance creativity and scores of students.

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CONFLICT OF INTEREST

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AS: Conception, Design of the work, Data collection, and Drafting, Reviewed, Final approval, Agreement to be accountable.

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