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Original Article

Association of Learning Styles With Academic Performance of Final Year MBBS Students

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ABSTRACT

As the profession of medicine continues to be challenging demanding active learning practices with high concerns over immediate and informed decisions with concerns over the health practices **Objective:** To determine how the learning styles, as well as approaches, impact the medical students. **Methods:** This observational study was conducted at different Medical Universities in Quetta, Balochistan, from 1st March 2017 to 30th March 2018 **Results:** The results were concluded from 200 participants from different medical universities that became part of the study. The three main determinants of the study were activist, reflector, the rest where the mean values were illustrated as 6.82, 8.04, and 7.47 respectively. The highest number of participants were 35 in total with percentage as 17.5%. This was followed by 33 individuals (16.5%) **Conclusions:** Hence, it can be said that association of learning fits best with the primary goal of education that is reasoning and understanding towards the opportunities. Moreover, this practice develops the characteristic issue of life-long learning habits in medical students.

INTRODUCTION

Learning style is viewed in terms of information processing strategies or personality trait. It is a distinctive and habitual manner of acquiring knowledge, skill and attitude through study or experience. Learning style also has been defined as the characteristics cognitive, social and physiological behaviors that serve as relatively stable indicator of how learners perceived, interact with and respond to the learning environment [1]. Different learners have different learning habits; if the method of information delivery conforms to their learning habit they learn better [2]. While disparity can result in failure, that's why there is a great deal of interest amongst educators in identifying preferable learning style of their students. Learners and educator can derive clear benefits by identifying and evaluating an individual preferred learning style. The commonly referred mode in this regard have root in the Neurolinguistics programming (NLP) theory which proposes three learning style, visual, auditory, kinesthetic. Pask divided learner in serialistic (analytic) and holistic (gestaltic) types. Honey and Mumford proposed a classification of learning style into activist, reflector, Theorist and pragmatist. We will follow Honey and Mumford classification of learning style in our study and will use their structured learning style Questionnaire (LSQ) for learning style identification. Medical students are adult thus they have already developed their own learning style. Henceforth, it is essential for medical educators to" tailor instruction" in such a way that the medical students appreciate and follow it to learning. Many types of research have been conducted to determine the correlation of learning style preferences with performance. It has been repeatedly proved that the motivation and performance of the students are positively

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correlated with the instructions that are adopted to their predominant learning preferences. The aim of this study is to assess learning style preferences of medical students in Pakistan (Baluchistan). Moreover, this study is conducted to ascertain any relation between academic performance and preferred learning style among undergraduate medical students. Many studies in the past have identified the relationship with preferred learning styles in context with the performance of the students as well as students' orientation or background [3-6]. The differentiated number of learning styles practiced by the students where the most common included kinesthetic (VARK), association of learning, reading/writing, or visual assistance. However, all the identified learning mediums and styles are inclined towards a central point indicating that there is a great disparity present over these numerous learning styles where each one of them has its distinctive characteristics [7]. This appears to be a great deal to identify the most preferred learning styles among the different groups of students like medical, engineering, business, etc. [8] indicates that the relationship between the learning behaviors with the academic performance has no significant impact on each other. However, others, demonstrated that academic performances vary with the different learning behaviors. SDL learning behaviors were found to enhance the performance during the quiz, problem-solving, and teamwork [9]. In order to become an Association learner, the offered curriculum, students, level of understanding, and teacher attitude where the understanding regarding the learning attitude. Relating the context with medical students where they are asked to retain and apply the challenging amount of knowledge while they come across a variety of situations [10]. Apart from there, practical as well as theoretical expertise, the most crucial factor is the learning behavior or styles that must fit best with the study demands [11]. For this reason, self-direction learning over the years has become an interesting area to research and study while it is called with so many synonymous names like association of learning, independent study, self-planned learning, andragogy, autonomous learning, etc [12]. As per Knowles in 1975, association of learning is described as learning behaviors where students take the sole responsibility for their learning practices with or without the use of resources or assistance of others. They continue to diagnose their need while formulating and strategizing the goals to accomplish the learning demands [13]. Moreover, the learning behavior also makes use of effective and resourceful learning needs and practices while lately evaluating the success or progress that was able to be achieved [14,15]. In response to this, [16] presented a study while observing the habits of medical students' where the learning behavior positively influenced and enhanced the individual learning behavior while they became more responsible. Accountability and assertiveness are also enhanced that appears to be key attributes of the professional career of medical students [17]. Apart from this, medical educations are the continuous quest for knowledge that fit best with the SDL approach or learning behaviors that welcomes the knowledge, skill, or information sharing adhered by the critical thinking, recalling of information at suitable timing, and informed-decision making to maximize the outcomes [18]. Recent trends in higher education have also inclined the behaviors towards self-assessment, and self-efficacy that methods like Problem-based learning (PBL) that promotes SDL learning [12].The behavior of auto-didacticism appears to be an active process where the medical students not only plan their study practices but also select the resources as well as tools that fit as per their level of understanding and cognitive skills while developing motivation and increased enthusiasm towards academic practices [19]. The method, therefore, indicates that achievement of superior skills and knowledge is possible in the area of interest or chosen area where SDL is applied. Meanwhile, an innovative curriculum is studied to better associate with SDL learning rather than the conventional learning practices that are normally part of the academic culture. The feasibility of SDL is also inclined towards the culture of the learning environment where the medical schools incorporate both the theoretical as well as practical learning habits. The surrounding plays an important role where the environment that persuades the analytical thinking behaviors among the students enhances their academic performance [20]. This was supported by the research presented by [14] on the Ethiopian Medical Students where the second-year students were found with a better understanding of SDL in comparison with the first-year medical students. The idea of problem-solving practices was too better reflected in the learning behaviors of the second-year students in contrast to one that was the freshmen. While the earlier study considered the element of the practice of SDL by the students in context with their study year, the study by [21] presented insights over SDL practices in medical colleges with respect to gender difference. However, no significant impact was studied and no difference was found among the practices of males and females over learning behaviors. The motivational, as well as management levels, were equal and both groups were found making use of SDL learning style on an equal basis. Meanwhile, the most common learning styles adopted by medical students are oriented around self-reflective practices, one of the key

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elements of association of learning or autonomous learning. This makes it easier to diagnose that whether or not the information being processed is effectively utilized and learned. A study observed the learning behaviors of medical students in Pakistan where SDL practices optimistically enhanced the research activities among the undergraduates. Though, the research proved that learning disposition was significantly associated with the personality traits of students [22]. Hence, it can be said SDL recognizes the deficiencies through the ability of self-control and supports critical management by confidence and competence. [23] centered their study practices on the major goals perceived through self-determined learning. As per the analysis, three goals were considered a) Enhancing the ability of learning and become more self-reliant, b) Fostering the transformational learning attitude, and c) promotion of emancipatory learning and social actions as part of learning behavior [24] referred that the first goal focuses on the inner strength and indicates that enhanced learning outcomes can be achieved if individual practices motivation and dedication that comes from willingness. The sense of discovery and encountering new amendments is figured to be the keynote practice of SDL. Moreover, the learning behavior is shifted from dependency to self-facilitating the issues or challenges felt or medical students come across their learning journey [25]. The potency and effectiveness are enhanced while autonomous behaviors will aid in the future during the practical ground when attributes of critical thinki8ng and problem-solving needs are required. Following this, the second goal is well studied by [26] where the transformational learning attitude was placing a reflection and self-analysis over the personal traits and its effective use for enhancing the learning capacity and capabilities. Moreover, SDL indicates how intrinsic behaviors are necessary for consistency in association of learning, self-motivated, and independent behaviors [27,28]. The exercising control achieved by the candidates makes it easier to adapt and act flexibly in tough situations when no external assistance is provided or resource availability for learning is not possible [29]. The present study aims to determine how the learning styles, as well as approaches, impact the medical students. As the profession of medicine continues to be challenging, demanding, and active learning practices with high concerns over immediate and informed decisions with concerns over the health practices. Therefore, for medical students, it is necessary to adopt those learning styles that must come in parallel with the need of their academics as well as profession. The present study through a quantitative analysis will aid in finding out whether or not the SDL learning style positively impacts the learning outcomes and behaviors of the medical students.

METHODS

The study was conducted through a cross-sectional survey aimed to investigate the readiness and use of association of learning behaviors among the medical students at Bolan Medical College, Quetta. The quantitative research design was chosen to conduct a questionnaire-based survey study among 200 candidates. Non-probability sampling was done. The results were assessed through measuring the score of activist, reflector and theorist indicates how association of learning promotes creativity and love towards the learning apart from the initiative, and independence in learning. The study followed all the ethical considerations where all the data collected was kept confidential and only be used for the research purpose. SPSS was used for the analysis. The purpose of this study was to identify the association between learning styles and academic performances of MBBS final year students, their association between learning styles and academic performance in undergraduate medical students. For the format frame work of design, the research question is applicable (6). Undergraduates required for the study were easily recruited from final year MBBS class of Bolan Medical College Quetta.

Knowledge claim	Post positivism knowledge claim
Strategy of inquiry	Observational, co relational
Methods	predetermined closed ended questionnaire,
Practices of rese	Verifies explanation, identify variable, Observe validity and reliability, Employ statistical procedure.
Research design	Quantitative

Table 1: Post positivism knowledge claim

The purpose of identification of all these diverse learning styles and their association to result, had matching with teaching strategies, curriculum, and appropriate assessments methods. The presence of four learning styles (in variable association) in a class showed that having a single teaching technology for entire MBBS class will be inappropriate. This study could be beneficial in local context, learning style and their performance provide a base line for reconsideration of needed aspects of: Teaching strategies, Curriculum Context of institution and Appropriate assessment methods. In current study, the instrument of data collection is learning style questionnaire which is a pre-determined and structured questionnaire? It is close ended with a rating scale. Learning style questionnaire (LSQ) is used by Mumford in his article. It is worthy in validity and reliability. It is comprising a series of questions prepared by researcher that are answered by all respondents. It is commonly used

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to get demographic data. It allows the collection of larger data from large number of samples quickly and inexpensively. The degree of structure is close ended or fixed alternative. The data for the identification of learning style was collected by a structured questionnaire of learning style (LSQ). The data was collected in a single contact session with students. The session was planned after their routine classes. Purpose of that contact session and questionnaire was presented in an easy way to understand by students. Later the questionnaire was distributed and recollected after a due time among students. Data was analysed and categorized into four prescribed style of Mumford. The association between these identified styles and final year result score was identified. The judgment about an association rests on whether the association is: **Valid:** look for the alternative explanation including, confounding, chance and bias or **Repeatable:** the evidence taken from a number of sources supporting the judgment of causality. The role of confounding, chance and bias have to be evaluated in several clinical trials and other epidemiologic investigations where appropriate selection of the population to be studied is made and with proper study design, so that the results can be applied to other populations i.e., they are valid and generalize able.

Ethical Principles	Issues	Solution / Justification
Autonomy –	permission from gatekeeper,Informed consent.	Convinced/replaced by another candidate.
Beneficence-no harm to participant.	Nil	Nil
Non-Malfeasance-ensuring confidentiality	Nil	Nil
Justice ownership of the data and result should be delivered beforehand.	Nil	Nil

Table 2: Ethical Principles

RESULTS

The results were concluded from a total of 200 candidates from different medical universities that became part of the study. In the earlier section of the results, descriptive statistics were presented.

Variables	N	Minimum	Maximum	Mean	Std. Deviation
Activist	200	1	20	6.82	2.974
Reflector	200	1	20	8.04	2.858
Therist	200	3	20	7.47	2.286
Valid N (listwise)	200				

Table 3: Descriptive statistics

According to the descriptive statistics, the total number of individuals that answered the questionnaire was 200. The three main determinants of the study were activist, reflector, therist where the mean values were illustrated as 6.82, 8.04, and 7.47 respectively (Table 4).

Activist					
Valid		Frequency	Percent	Valid Percent	Cumulative Percent
	1	5	2.5	2.5	2.5
	2	6	3.0	3.0	5.5
	3	10	5.0	5.0	10.5
	4	15	7.5	7.5	18.0
	5	28	14.0	14.0	32.0
	6	27	13.5	13.5	45.5
	7	35	17.5	17.5	63.0
	8	33	16.5	16.5	79.5
	9	12	6.0	6.0	85.5
	10	21	10.5	10.5	96.0
	11	2	1.0	1.0	97.0
	16	2	1.0	1.0	98.0
	17	2	1.0	1.0	99.0
	20	2	1.0	1.0	100.0
	Total	200	100.0	100.0	

Table 4: Number of Candidates

From the table 4, the highest number of candidates were 35 in total with percentage as 17.5%. This was followed by 33 individuals that accounted for 16.5%. The lowest number of candidates as per the statistical analysis were found to be 2.

Reflector

Valid		Frequency	Percent	Valid Percent	Cumulative Percent
	1	2	1.0	1.0	1.0
	3	2	1.0	1.0	2.0
	4	11	5.5	5.5	7.5
	5	16	8.0	8.0	15.5
	6	21	10.5	10.5	26.0
	7	29	14.5	14.5	40.5
	8	35	17.5	17.5	58.0
	9	49	24.5	24.5	82.5
	10	23	11.5	11.5	94.0
	12	2	1.0	1.0	95.0
	16	6	3.0	3.0	98.0
	18	2	1.0	1.0	99.0
	20	2	1.0	1.0	100.0
	Total	200	100.0	100.0	

Table 5: Reflector analysis

According to the table 5, the reflector analysis indicated that highest frequency was observed under 9 with 49 individuals opting for it. This made up a total of 24.5%. Followed by this, was illustrated under 8 with 35 students concluding up 17.5%. The least percentage was observed with only 1 candidate that made up 1%.

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Valid		Frequency	Percent	Valid Percent	Cumulative Percent
	3	2	1.0	1.0	1.0
	4	8	4.0	4.0	5.0
	5	16	8.0	8.0	13.0
	6	46	23.0	23.0	36.0
	7	42	21.0	21.0	57.0
	8	31	15.5	15.5	72.5
	9	30	15.0	15.0	87.5
	10	17	8.5	8.5	96.0
	11	2	1.0	1.0	97.0
	14	4	2.0	2.0	99.0
	20	2	1.0	1.0	100.0
	Total	200	100.0	100.0	

Table 6: Scoring Chart

The table 6 also presented a scoring chart followed by the number of individuals and percentage. The highest number of candidates were demonstrated with 46 candidates that made up a total of 23%. The lowest frequency indicated was 1%.

DISCUSSION

The findings from the present study are clearly indicative of students' inclined behaviors towards association of learning practices. Habits of self-reflection to becoming independent and development of self-efficacy were observed after the interpretations. This comes in support of the previous literature including [15] that indicate that SDL makes the student compel to go backward and realize the gap between what is learned and what is left out while making the learner more independent and focusing on inner strength and potential rather than being dependent on teachers. A study presented by [10] took the stance from the faculty members of the medical institute regarding the SDL learning style among the students. To seek how it is perceived by the end of teachers, the faculty supported its implementation in the medical colleges and universities where the student itself acts as the owner of its learning ideas, tools, and resources to strengths and weaknesses. The current research study illustrates that SDL practices are also based on the individual understanding and idea towards association of learning habits. In context to this, another study indicated that the difference over the SDL practices among the groups of students belonging to different years in medical institutes is due to the traditional learning practices, teacher-based lectures, and failure of the curriculum to address the cognitive needs of the students [7]. Hence, to foster better behaviors of SDL it is necessary to modify and restructure the curricula where students must dictate themselves to gain better access to knowledge. The study practices indicate that the abilities of reflector, activist, and theorist were built open group discussion over the patient's issues, critical situations that might arise in the clinical settings to problem-based studies can foster the attitude in medical students to become more self-aware and directed. The previous studies also supported the idea of metacognition that s built with the adoption of the SDL learning style. The idea funds the self-reflection and increases the enthusiasm towards continual self-assessment. The study findings were in parallel with the earlier scholarly finding where the SDL learning style makes the students adhere and concentrate more on evaluation and examination resulting in better reasoning and diagnostic skills. Moreover, another major finding added by the research is the identification of the students about their strengths and weaknesses. Thus, making them aware of whether they need more attentive practices, how to detect the available opportunities and make effective use of them.

CONCLUSION

Hence, it can be said that association of learning fits best with the primary goal of education that is reasoning and understanding towards the opportunities. Moreover, this practice develops the characteristic issue of life-long learning habits in medical students. This is necessary because the entire medical career is based on openness towards learning and finding appropriate resources that can provide guidance for the future learning process. It was also studied that course activities supported by the lectures and practical clinical experiences can together support students in the medical profession. Moreover, medicine is associated with evidence-based learning that is possible through active learning gained from the SDL approach. From the literature review, it was diagnosed that earlier the undergraduate medical education was focused on teacher-centered learning practices with a highly-disciplined curriculum. One of the contributions of the SDL learning style was the problem-based learning attribute that enable the students to utilize the habit of critical thinking and enhanced knowledge-structuring in the clinical as well as non-clinical context.

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