STUDENTS' PREFERRED LEARNING STYLE AND ITS RELATIONSHIP WITH ACADEMIC ACHIEVEMENT AT UNIVERSITY LEVEL

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ABSTRACT

To explore the students' preferred learning style and its relationship with academic achievement at university level a quantitative survey was conducted. Learning Style Questionnaire was used as research instrument which was used and validated in the study of Shahzadi, U, 2020. Data was collected from two private and two public sector universities of Lahore and 400 B.ED HONS students of 7th semester participated in the study. For academic achievement 6th semester results were obtained from the sampled students. Data was analyzed through Statistical Package for Social Sciences (SPSS). Person r correlation was calculated for relationship analysis and percentage analysis was done to obtain information regarding most preferred learning styles of students. Result of this study revealed that visual learning style was the most preferred learning style of education students with the percentage of 47.5 from overall sample, verbal learning style was preferred by 38.25% students, tactile learning style was preferred by 14.25% students while not a single student marked kinesthetic as their preferred learning style. Correlation analysis depict that there is a weak negative correlation exist between verbal and tactile leaning style and academic achievement. For visual learning style there was a very weak positive correlation with academic achievement was calculated.

***Keywords:** academic achievement, preferred learning style, university students, relationship*

Introduction

Pakistani residents, as a part of inhabitants of a developing country, strive to keep up with emerging trends in order to become member of developed countries of the world. There is clearly potential for progress and modifications in all areas of regular life but the most important change is required in educational dimension of the country to initiate the progress in all other sectors, teaching methodology and teaching system needs to be rewind. Education is benchmark that each country must meet in order to attain the developmental goals which they have settled for their selves. The learning curve and cycle both benefit from having such detailed information about students' preferred ways and dislikes. By knowing this, both can improve their efficiency in the whole process of teaching and learning as this is a two-way process (Marlina & Kusumastuti, 2019). Learning style, according to Rita Dunn (2006), is "a unique approach established by pupils as he or she was learning difficult and new concepts." Even in the same educational setting, each person learns in a unique way. Individuals demonstrate varied techniques in the learning process, according to multiple studies and it is impossible for all individuals to learn using the same single strategy or approach. Unique learning styles of each individual can be formed by their diverse origins, interests, weaknesses, skills, objectives, amount of motivation and their methods of perceiving new information (Marlina et.al, 2019). Learning itself is process oriented which contain multiple levels like to plan something about the attainment of knowledge, apply already attained knowledge in practical conditions to learn more about something and to evaluate or judge the attained knowledge regarding its appropriateness.

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In the modern era of fast development, instructional strategies in relation with teaching process has also been developed in a more productive way. In various academic researches, multiple variables which may have an effect on students' performance were tested because students are the focal point of teaching learning process. In most of the papers, it is frequently mentioned that students' academic achievement is influenced by their various ways of learning which they apply during perception of new knowledge and these styles been shaped largely by their environmental factors and learning settings in which they used to learn most of the time (Yazici, 2017). Multiple meanings have been given to success but when we see success in educational point of view, it is considered as the knowledge and comprehension level of students in curriculum and also how they are performing in multiple class assessments on the basis of which we determine the purposefulness of our educational goals (Kayalar, 2017). Multiple styles may be utilized in combination to get learning to its apex of understanding. When compared to the materials delivered by the lecturers in class, learning style has a considerably greater impact on students' accomplishment. Due to the fact that each student has various biological and psychological aspects, it is thought that lecturers must pay attention to the students' learning style or the method through which the lecturers provide the material to the students. Most of the learners has a learning style that is physiologically linked to them. That is why instructors must pay attention to students' learning patterns in order to avoid trapping them in a loop of frustration, resulting in a better learning outcome. It should be the responsibility of the lecturers to get an understanding of various styles by using whom students interpret lesson in order to make their lessons more sensitive to the classroom variances brought about by the students (Arif, M. H., Khan, S. A & Yousaf, M, 2019). Learner styles are traits that should be taken into account while choosing the best methods, tactics, and learning strategies. Pupils normally have more than one perceptual style (regardless of which category or classification is used), and they have most probably a profile of styles even if one or more are dominant (Amini, Shamshirgaran, Sarbazyatan, Ghaffarifar & Aminisani, 2018).

Review of related literature:

A strong opinion hold by a number of researchers is that the styles in which students like to perceive new information impact their performance in the institution and it creates problems for student if they don't use learning style which is capable to compact with teacher's teaching style (Felder & Silverman, 1988; Felder & Spurlin, 2005). According to experimental learning theory, style resulted from two basic dimensions, one is how we perceive specific information & the second is how the learner process that information. Perception can be understood as how the learner's get an understanding of life experiences and then how learner interprets those experiences in their own life. There is a tendency that learner may just faces concrete experiences & may not perceive the abstract concept or they may just understand abstract content & not faces on concrete sensation of experiences. Over time multiple researchers explain their studies about how learners use different & sometimes multiple strategies to understand & transform the perceived content (Deem & Baird, 2020).

According to prior research on learning styles of students (i.e., Messick, 1976 & keefe 1982) variances in learning styles exist and there is a tendency for major implications in whole cyclic procedure of learning (Dabb & Zapalska, 2002). In the same way, Manochehr (2007) believes that understanding the styles of learning is vital for whole process of teaching and learning, since it allows students to achieve better school grades when they are in affection and harmony. Students who already have known to their preferred style of learning have a considerable effect on their achievement in class (Weng and Leung, 2007). According to Ivy and Leung (2003) the information regarding the preferred way of perceiving knowledge of students makes the environment of learning more pleasurable. To identify students' preference regarding learning style aids instructor in measuring their students' success, their motivational level regarding their learning and in directing how to maximize their academic activities. In meta-cognition to know one's own strong and weak points and to increase the power of self-recognition, identification of learning style can be helpful (Moseley, Ecclestone, Hall and Coffield, 2012). In reality, some of the learning style have been proved significantly and likely to be preferred by the learners. The other techniques are a little less energetic, but they do require practice and might developed with the right support of developer. The extent of reliance varies greatly among students. Some people extremely self-reliant while some are completely reliant. In the same way, some students may give favor solitude while some prefer collaboration. Disparities in the use of learning styles are caused by early events, real life and

academic experience, genetic edifice and the demands of current environment (Kolb, 1984; Dunn, 1993 and Manner, 1984).

Aspects of learning style

In recent year, practitioners and researchers focused to a great extent on learning styles. In the result of this work, a number of definitions, measures and models has been emerged for learning styles (Cassidy, 2005). A classification of learning style models under three categories which are broad in their nature has been made by Din in 2009. These modalities were named as, information processing, personality factors and perceptual modality.

Information processing

It's a habitual attribute to process information after its reception, recognition, arrangement and memorization (Dempsey & Reiser, 2007). A unique approach towards learning is linked with each learner to resolve their problems in learning and retaining data. To gain data in mind, sense experiences are viewed as vital sources. The standard and mode of sensory perception determines that what would be the level of perceptual information and how effectively it would be retrieved again. When information would be received through senses in an organized manner then the process of perception would be accomplished. Each individual is unique regarding their processes of retrieving, organization and retaining the new information (Din & Din, 2010).

Personality factors

Every individual is unique regarding their social, cognitive, physical and emotional traits through which the personality of an individual is recognized. These traits of each individual determines that how that individual will react and respond to a particular environmental condition (Din, 2010).

Perceptual Modality

Physical responses to environmental stimuli are referred as perceptual modalities. It denotes the various ways in which people used to in the perception of new knowledge. It refers to receiving the new information in a way that corresponds to a persons' style of processing information. Generally, researchers concentrated on four models. Auditory, kinesthetic, tactile and visual are the four senses by Din (2009). These four modes of leaning also known as sensory models because they allow learners to take in knowledge in different ways (Allen & Tanner, 2009). Tactile and kinesthetic learning are considered mostly by researcher as one mod of learning (Zapalska, 2000; Brozik & Sousa, 1997).

If we review some studies of late 90s, Cartnar and Diaz, 1999; Dabb and Zalpalska, 2000; Fleming, 1995 and Dunn, 1993 argued that a student may modify his/her preference regarding the style of learning over time according to their environmental adjustment but if a learning style suits best to a students' nature and they perform best with their learning style if the environment in which they are perceiving the knowledge corresponds to their preferred way of learning. Gregoric (1995) argued that performance of students could get effect from the match and mismatch of their learning style with the instructors' way of teaching.

A number of learning styles are being used by students to fetch information from different sources. One individual can have multiple learning styles and there is also a possibility that an individual change his/her learning style over time. Multiple factors can affect their approaches towards learning including gender, age, intelligence level, creative thinking and culture etc. (Foster & Robinson, 2010). If we see in history, multiple models for learning style has been presented including learning style model by Dunn & Dunn, learning styles by Felder-Silverman, experiential learning theory by Kolb, Gregore Learning styles model of Myers-Briggs, Honey & Mumford's model of learning style (Min & Chen, 2018).

Research Objectives:
Following are the objectives of the study

1. To explore the preferred learning styles of the university students.
2. To determine the relationship between learning styles and academic achievement of students at university level.

Research Questions:

1. What is preferred learning style of university students?
2. Is there any relationship between students' verbal learning style and academic achievement at university level?
3. Is there any relationship between students' visual learning style and academic achievement at university level?
4. Is there any relationship between students' tactile learning style and academic achievement at university level?
5. Is there any relationship between students' kinesthetic learning style and academic achievement at university level?

Instrumentation:

The instrument was adopted by the researcher from Shahzadi, (2020) learning style questionnaire. It was developed on the basis of existing learning style instruments. The instrument was used in the study with the permission of Shahzadi, (2020). Reliability and validity of the instrument was insured by the researcher herself. The questionnaire used in this study comprises total 30 items regarding four learning styles including visual learning style, verbal learning style, tactile learning style and kinesthetic learning style. Five point Likert Scale was used to collect responses of the learners.

Methodology:

In this research, deductive approach was adopted because the researcher examines the established theory and quantitative data was collected for this research. The study was conducted thoroughly by Quantitative approach (Descriptive Research) and all B.ED (HONS) male and female students of private and public sector at university level of Lahore district were the population of this study. Students were selected from two public and two private sector universities of Lahore through convenient sampling. Data collected from 400 students of B.ED (HONS) 7th semester from departments of education, 100 students from each university including University of Punjab, Lahore College for Woman University, Minhaj University and University of Management and Technology. The data obtained from students with a survey by using learning style questionnaire. For the achievement scores the previous semester results of the participated students were taken.

Data Analysis

Percentage analysis was done to check the most preferred learning style of students and Pearson r was used to check the correlation between students' learning styles and academic achievement.

Findings

On the basis of collected data, analysis was done on each leaning style with respect to the academic achievement of the students. All findings were drawn regarding the descriptive information about respondents of the study on different variables and inferential statistical analysis, consists of Pearson r and percentage analysis on each learning style. The mean score and standard deviation on verbal learning style for all respondents was (27.61, 9.896). The mean score and standard deviation on visual learning style for all respondents was (29.31, 2.758). The mean score and standard deviation on tactile learning style for all respondents was (19.74, 9.000) and for kinesthetic learning style mean and SD for all respondents was (12.03, 2.590). Pearson r correlation analysis was performed to check the relationship between students' preferred learning style and their academic achievement. Correlation analysis could not be performed for kinesthetic leaning style as kinesthetic learning style was not preferred by any student.

Table 1.1

Relationship between Learning Styles and Academic Achievement

Learning Style	N	r	Sig
Verbal	153	-0.051	0.528
Visual	190	0.083	0.255
Tactile	57	-0.246	0.065

The above table shows that the relationship between verbal learning style and student's academic achievement was analyzed and a correlation of r = -0.051 (p>0.01) was calculated. It shows that a very weak negative relationship exist between verbal learning style and student's academic achievement at university level. The relationship between visual learning style and student's academic achievement was analyzed and a correlation of r = 0.083 (p>0.01) was calculated. It shows that a very weak positive relationship exist between visual learning style and student's academic achievement at university level. The relationship between tactile learning style and student's academic achievement was analyzed and a correlation of r = -0.246 (p<0.01) was calculated. It shows that a weak negative relationship exist between tactile learning style and student's academic achievement at university level. No student prefer to use kinesthetic learning style that's why correlation analysis was not possible regarding this learning style.

Table 1.2

Percentage of respondents based on preferred learning style

Learning Style	Number	Percentage
Visual	190	47.5%
Verbal	153	38.25%
Tactile	57	14.25%
Kinesthetic	0	0%
Multimodal	6	1.5%

The above table shows that according to percentage analysis visual learning style was the most preferred learning style among education students at university level with the percentage of 47.5, second preferred leaning style was verbal learning style, third preferred way of learning remains tactile learning style and the least preferred way of learning was kinesthetic learning style with 0 number of students while 1.5% students from the whole sample were multimodal as they prefer to use more than one learning style during the perception of knowledge.

Conclusion

After analysis it was concluded that the most preferred learning style among university students remains visual learning style and least preferred was kinesthetic learning style. Almost one 3rd of the population prefer to use verbal learning style and around fourteen percent students prefer to use tactile learning style in the perception of new knowledge. Only few of the students give preference to use multiple styles of learning at a time. When the relationship between variables analyzed, the results depict that there is a weak negative correlation exist between verbal and tactile leaning style and academic achievement. For visual learning style there was a very weak positive correlation with academic achievement was calculated. No student give preference to kinesthetic learning style that's why correlation analysis for this learning style was not computed.

Discussion

The purpose of present study was to find out the preferred learning style of university students and its relationship with academic achievement at university level. Percentage analysis of the study revealed that visual learning style is the most preferred learning style among university students of education and kinesthetic learning style is least preferred way of learning. Similar results were found in a study conducted by Khan, Yousuf & Arif (2019) in Punjab province on graduate students of social sciences as 52.9% students were preferred visual learning style, verbal leaning style remains the second preferred learning

style, same as current study, kinesthetic learning style remained the least preferred style of learning among social sciences students. Same findings were drawn in a study by Wong & Cheng (2014). It was also observed by Dun & Dun (1997) that approximately 41% students used to be visual in their ways of perception and just 20 to 30 % students commonly used to prefer verbal learning style and other may possess tactile and kinesthetic learning style while on the contrary a research conducted in Malaysia 2021 by Omar, N., Anas, N., Isa, N.S. M., Ghazali, Z. M & Fatzel, F to find out the association between final year accounting students' learning style and academic achievement on final year students of accounting department found that kinesthetic learning style was the most preferred learning style among student and the other students have a balanced approach regarding learning styles. In a study on medical students in Saudi Arabia in 2015 by Almigbal, verbal learning style was found the most preferred learning style of medical students and tactile learning style was remained the least preferred learning style. Tuesca & Martinez, 2019 conducted a study on VARK modality in Colombia to identify the relationship between learning styles of medical school students with their gross anatomy test achievement and find out that students prefer to use kinesthetic leaning style and secondly they like to use aural or verbal learning style which is contrary to the current study results. To explore the learning styles of nursing students of Australia, a study was conducted in 2018 by Copnell, Lau, Butler & Mckenna and they find out that mostly students prefer to use kinesthetic learning style and the least preferred learning style was found to be aural or verbal learning style but as the students were from medical field so they were seems to be naturally interested in practical sought of learning style as kinesthetic learning style but current study was conducted on education students and they tend to read mostly theoretical base subjects so they naturally seems to have attraction toward visual and verbal learning style for the perception of knowledge. Some other studies also find out students preference for kinesthetic learning style and mostly they were found to be multimodal as they preferred to use more than one learning style at a time i.e., James, 2011; Alkhasawneh, 2013; Koch, 2011; Whitt & Canglosi, 2005. Some contrary results were found in a study on nursing students and associate nursing students of Chinese medical colleges and school students by Zhang, C., Zhang, H., Guo, H., Zeng, Wan, F., Zeng, H., & Zhu, H, in 2018. In this study kinesthetic way of learning was found most preferred style of learning and tactile style of learning was found the least popular learning style among young students.

Recommendations

Here are some suggestion and key dimensions for future researchers in this area of study:

1. As in this study results found that no student preferred kinesthetic learning style, the reason of this finding should be explored by the future researchers.

2. Other instruments which are commonly being used on international level regarding learning styles may can provide help in finding out some more useful exploration for this field.

REFERENCES

1. Abdelrahman, R. M. (2020). Metacognitive awareness and academic motivation and their impact on academic achievement of Ajman University students. *Heliyon*, *6*(9), e04192.

2. Aghaei, F., Soleymani, M. R., & Rizi, H. A. (2017). Information seeking anxiety among M.A. Students of Isfahan University of Medical Sciences. Journal of Education and Health Promotion, 6(1), 14.

3. Ahadi, B., Fathi, A., & AbdolMohamadi, K. (2014). Study of psychological factors affecting on job performance of East Azarbaijan NAJA staff. East Azarbaijan Military Knowledge, 4(15), 63–78.

4. Ahmed, S. F., Tang, S., Waters, N. E., & Davis-Kean, P. (2019). Executive function and academic achievement: Longitudinal relations from early childhood to adolescence. *Journal of Educational Psychology*, *111*(3), 446.

5. Alhadabi, A., & Karpinski, A. C. (2020). Grit, self-efficacy, achievement orientation goals, and academic performance in University students. *International Journal of Adolescence and Youth*, *25*(1), 519-535.

6. Alkhatnai, M. (2011). *Learning styles of EFL Saudi college-level students in on-line and traditional educational environments*. Indiana University of Pennsylvania.

7. Almasi, K., Bavani, S.M., & Mohammadpour, Y. (2018). Examining the Preferred Learning Styles (PLSs) of Nursing and Midwifery Students of Urmia University of Medical Sciences.

8. Almigbal, T.H. (2015). Relationship between the learning style preferences of medical students and academic achievement. *Saudi Medical Journal, 36*, 349 - 355.

9. Alvarez-Bueno, C., Pesce, C., Cavero-Redondo, I., Sanchez-Lopez, M., Garrido-Miguel, M., & Martinez-Vizcaino, V. (2017). Academic achievement and physical activity: a meta-analysis. *Pediatrics*, *140*(6).

10. An, D., & Carr, M. (2017). Learning styles theory fails to explain learning and achievement: Recommendations for alternative approaches. *Personality and Individual Differences*, *116*, 410-416.

11. Awang, H., Samad, N. A., Faiz, N. S. M., Roddin, R., & Kankia, J. D. (2017). Relationship between the Learning Styles Preferences and Academic Achievement. International Research and Innovation Summit.

12. Bacon, D. R., & Hartley, S. W. (2015). Exploring antecedents of performance differences on visual and verbal test items: Learning styles versus aptitude. *Marketing Education Review*, *25*(3), 205-214.

13. Balakrishnan, V., & Gan, C. L. (2016). Students' learning styles and their effects on the use of social media technology for learning. *Telematics and Informatics*, *33*(3), 808-821.

14. Barman, A., Aziz, R. A., & Yusoff, Y. M. (2014). Learning Style Awareness and Academic Performance of Students. South East Asian Journal of Medical Education, 8(1). Bhutkar, M. V., & Bhutkar, P. M. (2016).

15. Bayero, M. M., Dutse, A. Y., & Ahmad, A. (2017). EFFECT OF COMPUTER SELF-EFFICACY ON STUDENTS' ACADEMIC PERFORMANCE AMONG FEDERAL UNIVERSITIES IN NORTH-EAST NIGERIA. *ATBU Journal of Science, Technology and Education*, *5*(1), 166-177.

16. Bhalli, M. A., Khan, I. A., & Sattar, A. (2015). Learning style of medical students and its correlation with preferred teaching methodologies and academic achievement. *J Ayub Med Coll Abbottabad*, *27*(4), 837-842.

17. Bond, J., Cheng, A., & Kairuz, T. (2017). Relating variance in feedback effectiveness to learning styles. *Pharmacy Education*, *17*.

18. Boonk, L., Gijselaers, H. J., Ritzen, H., & Brand-Gruwel, S. (2018). A review of the relationship between parental involvement indicators and academic achievement. *Educational Research Review*, *24*, 10-30.

19. Bracci, E., Tallaki, M., & Castellini, M. (2019). Learning Preferences in Accounting Education: A Focus on the Role of Visualization. Meditari Accountancy Research, 28(2).

20. Buckley, P., & Doyle, E. (2017). Individualising gamification: An investigation of the impact of learning styles and personality traits on the efficacy of gamification using a prediction market. *Computers & Education*, *106*, 43-55.

21. Ceylan, V. K., & Kesici, A. E. (2017). Effect of blended learning to academic achievement. *Journal of Human Sciences*, *14*(1), 308-320.

22. Cheng, G., & Chau, J. (2016). Exploring the relationships between learning styles, online participation, learning achievement and course satisfaction: An empirical study of a blended learning course. *British Journal of Educational Technology*, *47*(2), 257-278.

23. Cuevas, J. (2015). Is learning styles-based instruction effective? A comprehensive analysis of recent research on learning styles. *Theory and Research in Education*, *13*(3), 308-333.

24. Dafouz, E., & Camacho-Miñano, M. M. (2016). Exploring the impact of English-medium instruction on university student academic achievement: The case of accounting. *English for Specific Purposes*, *44*, 57-67.

25. Davidson A, Ritchie KL. 2016. The early bird catches the worm! The impact of chronotype and learning style on academic success in university students. Teach Learn Innovat 18:1–11.

26. Dent, A. L., & Koenka, A. C. (2016). The relation between self-regulated learning and academic achievement across childhood and adolescence: A meta-analysis. *Educational Psychology Review*, *28*(3), 425-474.

27. Dobson JL, Perez J, Linderholm T. 2017. Distributed retrieval practice promotes superior recall of anatomy information. Anat Sci Educ 10:339–347. Drago WA, Wagner RJ. 2004. VARK preferred learning styles and online education. Manag Res News 27:1–13.

28. Dryer, R., Henning, M. A., Tyson, G. A., & Shaw, R. (2016). Academic achievement performance of university students with disability: Exploring the influence of non-academic factors. *International Journal of Disability, Development and Education*, *63*(4), 419-430.

29. Duckworth, A. L., Taxer, J. L., Eskreis-Winkler, L., Galla, B. M., & Gross, J. J. (2019). Self-control and academic achievement. *Annual review of psychology*, *70*, 373-399.

30. Duckworth, A. L., Taxer, J. L., Eskreis-Winkler, L., Galla, B. M., & Gross, J. J. (2019). Self-control and academic achievement. *Annual review of psychology*, *70*, 373-399.

31. Edussuriya, D.H., Ubhayasiri, S.K., Abeysiriwardhana, N., & Wickramasinghe, M. (2016). Learning preferences of medical students - a study conducted at the University of Peradeniya, Sri Lanka.

32. Isa, N. S. M., Omar, N., Fatzel, F. H. M., Ghazali, Z. M., & Anas, N. (2021). The relationship between students' learning styles and academic performance: Final year accounting students. *EDUCATUM Journal of Social Sciences*, *7*(1), 1-9.

33. Kayalar, F., & Kayalar, F. (2017). The effects of auditory learning strategy on learning skills of language learners (students' views).

34. Khan, S. A., Arif, M. H., & Yousuf, M. I. (2019). A Study of Relationship between Learning Preferences and Academic Achievement. *Bulletin of Education and Research*, *41*(1), 17-32.

35. Marlina, M., & Kusumastuti, G. (2019). Social participation of students with special eucational needs in inclusive elementary schools. *Specialusis ugdymas/special Education*, *1*(39), 121-131.

36. Mckenna, L., Copnell, B., Butler, A.E., & Lau, R. (2018). Learning style preferences of Australian accelerated postgraduate pre-registration nursing students: A cross-sectional survey. *Nurse education in practice, 28*, 280-284. 9–55.

37. McKenna, L., Vanderheide, R., Brooks, I., 2016. Is graduate entry education a solution to increasing numbers of men in nursing? Nurse Educ. Pract. 17, 74–77.

38. Shahzadi, U., Shah, A. A., & Fatima, S. Z. (2020). Exploring the Association of Selected Learning Styles and Academic Achievement at Post Graduate Level. *Global Social Sciences Review*, *1*, 190-197.

39. Yazici, K. (2017). The relationship between learning style, test anxiety and academic achievement. *Universal Journal of Educational Research*, *5*(1), 61-71.

40. Zhu, H., Zeng, H., Zhang, H., Zhang, H., Wan, F., Guo, H., & Zhang, C. (2018). The preferred learning styles utilizing VARK among nursing students with bachelor degrees and associate degrees in China. *Acta Paulista De Enfermagem, 31*, 162-169.

41. Sarbazvatan, H., Amini, A., Aminisani, N., Shamshirgaran, S.M., & Ghaffarifar, S. (2018). Learning Style and Academic Achievement among Students at Tabriz University of Medical Sciences, Iran. *Research and Development in Medical Education*.