

Learning style and teaching method preferences of Saudi students of physical therapy

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ABSTRACT

Context: To the researchers' knowledge, there are no published studies that have investigated the learning styles and preferred teaching methods of physical therapy students in Saudi Arabia. **Aim:** The study was conducted to determine the learning styles and preferred teaching methods of Saudi physical therapy students. **Settings and Design:** A cross-sectional study design. **Materials and Methods:** Fifty-three Saudis studying physical therapy (21 males and 32 females) participated in the study. The principal researcher gave an introductory lecture to explain the different learning styles and common teaching methods. Upon completion of the lecture, questionnaires were distributed, and were collected on completion. **Statistical Analysis Used:** Percentages were calculated for the learning styles and teaching methods. Pearson's correlations were performed to investigate the relationship between them. **Results:** More than 45 (85%) of the students rated "hands-on training" as the most preferred teaching method. Approximately 30 (57%) students rated the following teaching methods as the most preferred methods: "Advanced organizers," "demonstrations," and "multimedia activities." Although 31 (59%) students rated the concrete-sequential learning style the most preferred, these students demonstrated mixed styles on the other style dimensions: Abstract-sequential, abstract-random, and concrete-random. **Conclusions:** The predominant concrete-sequential learning style is consistent with the most preferred teaching method (hands-on training). The high percentage of physical therapy students whose responses were indicative of mixed learning styles suggests that they can accommodate multiple teaching methods. It is recommended that educators consider the diverse learning styles of the students and utilize a variety of teaching methods in order to promote an optimal learning environment for the students.

Key words: Education, Gregorc Style Delineator, physiotherapy

INTRODUCTION

Individuals use different styles of learning to adapt and manage everyday situations.^[1] The development of new skills and knowledge requires a variety of teaching methods and learning strategies.^[2] If the faculties use appropriate teaching methods which match the students' learning preferences, learning is efficient in a harmonious environment.^[2] This, in turn, has a positive impact on academic success and student performance,^[3] on the teaching and learning process, as well as on the

effectiveness of interdisciplinary team interactions and patient educational process.^[4] Theoretically, the most effective teaching methods and instructional activities that take students' preferred learning styles into consideration should optimize learning outcomes.^[5,6] In addition, it is crucial to acknowledge the students' most effective and efficient learning styles because of the vast amounts of information they have to learn within short periods.^[7] Therefore, healthcare educators need to be aware of and understand the learning preferences of their students in order to utilize the most effective teaching methods.^[2,4,8]

Previous research has suggested that students of specific professional groups,^[3] especially allied health,^[1] have particular preferences for learning styles. As an allied health specialty, physical therapy education must provide educational opportunities that lead to the mastery of the theoretical foundations and clinical approaches.^[5] Teaching and learning strategies must be examined to prepare

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students more effectively to meet new and rapidly changing practice and professional demands of physical therapy.^[9] In the literature on physical therapy, documented evidence on the best strategies for learning is lacking, particularly, studies on teaching methods^[5] compared to research on learning styles.^[1,4,5,9-11] This kind of research has mainly been conducted in the Western countries,^[1,5,11-13] although a recent study was conducted in Pakistan.^[14] A study in Saudi Arabia which investigated the preferred learning styles of medical students concluded that more research was needed in this area.^[15]

To the researchers' knowledge, no studies have been identified that determined preferences of learning styles and teaching methods of Saudi students, particularly in the field of physical therapy. The physical therapy department at our institution offers a 4-year full-time program with a total of 135 credit hours for a Bachelor of Science degree. English is the formal language of instruction. Each year of the program comprises two semesters consisting of 16 weeks (lecture, lab, and clinical sessions). There is a 1-year internship in the form of a supervised clinical practice in different authorized health care institutions. The program includes a balance of basic sciences, behavioral sciences, clinical/physical therapy sciences, clinical practice, and critical/scientific inquiry. In the second year, students begin to study the basic sciences of anatomy and physiology, biochemistry, histology, and some introductory courses in physical therapy. From the second to fourth year, emphasis is on physical therapy courses. The course instructors use different teaching methods based upon the type of course (lecture, lab, and clinical).

The primary purpose of this study was to determine the learning style and teaching method preferences of Saudi physical therapy students. The secondary purpose was to investigate the relationship between preferred learning styles and teaching methods. An understanding of the different learning styles of physical therapy students should help teachers to develop appropriate teaching strategies to improve physical therapy education.

MATERIALS AND METHODS

Ethical approval for the conduct of the study was obtained from the Committee of Biomedical Ethics at the University of Dammam.

Fifty-three Saudi physical therapy students (21 males and 32 females) from the Department of Physical Therapy, College of Applied Medical Sciences at the University of Dammam volunteered to participate in the study. The students' mean age was 20 ± 01 years (ranging from 19 to 21 years). They were enrolled in the second year of the

physical therapy program at the university. All students enrolled in the particular year were selected.

Questionnaires on preferred learning styles (Appendix A) and preference for teaching methods (Appendix B), as well as demographic information (gender, age, and number of years post secondary education) were used. The learning styles measured by the Gregorc Style Delineator fall on a continuum rather than on polar extremes. It is considered a powerful, widely used research-based self-assessment instrument for adults. It is designed for the identification and quantifying of the four main learning domains, namely, the practical (concrete-sequential), problem-solver (concrete random), studious (abstract-sequential), and expressive (abstract-random).^[5]

A questionnaire on teaching methods was constructed from items identified in the relevant literature that formed part of the common teaching methods for possible use in the teaching process. It was pilot tested. These methods included advanced organizers, brainstorming, demonstrations, dialog journals, discovery learning, discussions, hands-on learning, learning communities, project-based learning, multimedia activities, peer tutoring, questioning techniques, lecture, lecture with discussion, panel of experts, class discussion, small group discussion, worksheets/surveys, case studies, role play, report-back sessions, index card exercise, values clarification exercise, and e-learning. The previously mentioned teaching methods commonly used in physical therapy programs were collected from several articles and websites that deal with physical therapy education.

Data collection was done in one session. The principal investigator, who is an expert in the field of teaching methods and learning styles, handed the questionnaires to the students, and then immediately delivered an interactive detailed lecture of approximately 50 min, explaining all the learning styles and teaching methods listed in the questionnaires, allowing the same length of time and explanation for each item. Students were given instructions on how to complete the questionnaires. For learning styles, the students were asked to rate their preference for styles (practical, problem-solver, studious, and expressive). In order to indicate teaching method preferences on the questionnaire, the students indicated the number that best represented their preferences.

Appendix A: Learning styles questionnaire

Learning styles	Your interest					
Practical (find out)	0	1	2	3	4	5
Problem-solver (take a quiz)	0	1	2	3	4	5
Studious (reading)	0	1	2	3	4	5
Expressive (add a discussion)	0	1	2	3	4	5

0: No benefit; 1: Poor; 2: Fair; 3: Good; 4: Very good; 5: Excellent

On a scale from 0 to 5, they indicated their preferences by circling 5 to represent an item that was highly preferred and 0 to represent an item that was not liked. The questionnaires were collected upon completion.

The percentages were calculated for the learning styles and teaching methods using Microsoft Office Excel

2007 (Microsoft Corporation, Redmond, WA, USA). To investigate the relationship among all items of learning styles and teaching methods, Pearson's correlations were performed using SPSS 13.0 for Windows (SPSS Inc., Chicago, IL, USA).

RESULTS

Figure 1 shows the students' preference for learning styles. Thirty-one (59%) students rated the concrete-sequential learning style the highest. However, the students demonstrated mixed styles on the other style dimensions: Abstract-sequential, abstract-random, and concrete-random.

For simplicity, the highest preference for teaching methods rated by more than 50% of the students is demonstrated in Figure 2. The majority of the students rated the following teaching methods the most preferred: Hands-on training [46 (87%)], multimedia activities [33 (62%)], advanced organizers [32 (60%)], and demonstrations [28 (53%)].

Appendix B: Teaching methods questionnaire	
Teaching methods	Your interest
Advanced organizers (transfer or apply what students know to what they are learning)	0 1 2 3 4 5
Brainstorming (generating new useful ideas and promoting creative thinking)	0 1 2 3 4 5
Demonstrations (explore and view new learning tasks from a different perspective)	0 1 2 3 4 5
Dialog journals (keeping a dialog journal with a continuous written conversation)	0 1 2 3 4 5
Discovery learning (develops hypotheses to answer questions)	0 1 2 3 4 5
Discussions (comprehension and review questions to complex and critical thinking)	0 1 2 3 4 5
Hands-on learning (acquire knowledge and skills outside of books and lectures)	0 1 2 3 4 5
Learning communities (using classroom practice into the community)	0 1 2 3 4 5
Multimedia activities (by using video clips, models, animations, simulations, etc.)	0 1 2 3 4 5
Peer tutoring (A student cooperates with his colleague(s) to learn a skill or concept)	0 1 2 3 4 5
Project-based learning (association between knowledge and clinical practice)	0 1 2 3 4 5
Questioning techniques (students are introspective and reflective)	0 1 2 3 4 5
Lecture (presents material in direct logical manner)	0 1 2 3 4 5
Lecture with discussion (audience can question, clarify, and challenge)	0 1 2 3 4 5
Panel of experts (allows expert speakers to present different opinions)	0 1 2 3 4 5
Class discussion (pools ideas and experiences from group)	0 1 2 3 4 5
Small group discussion (students work together to maximize their own and each other's learning)	0 1 2 3 4 5
Worksheets/surveys (allow students to think for themselves without being influenced by others)	0 1 2 3 4 5
Case studies (allow for exploration of solutions for complex issues)	0 1 2 3 4 5
Role play (introduces problem situation and students assume the roles of others)	0 1 2 3 4 5
Report-back sessions (large group discussion of role play)	0 1 2 3 4 5
Index card exercise (opportunity to explore difficult and complex issues)	0 1 2 3 4 5
Values clarification exercise (explores values and beliefs giving structure for discussion)	0 1 2 3 4 5
E-learning (using computer and internet technology as in WebCT)	0 1 2 3 4 5

0: No benefit; 1: Poor; 2: Fair; 3: Good; 4: Very good; 5: Excellent

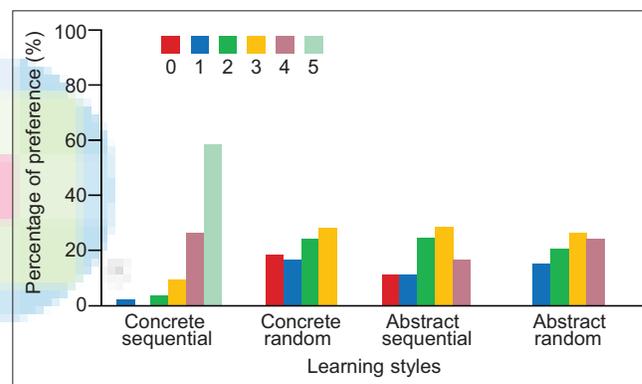


Figure 1: Learning style preferences by the students. Majority of the students preferred the concrete-sequential learning style the highest, although the students showed mixed styles on the other dimensions. 0 = no benefit, 1 = poor, 2 = fair, 3 = good, 4 = very good, 5 = excellent

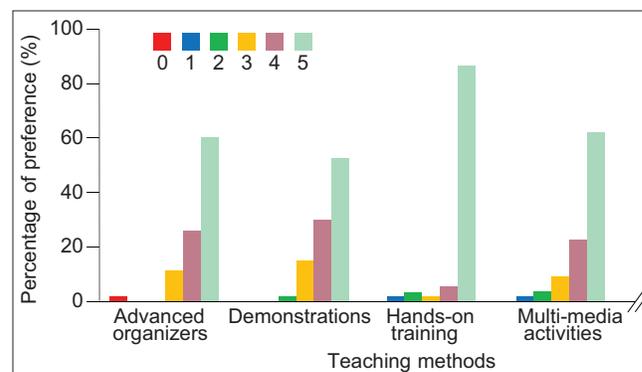


Figure 2: Preference for teaching methods. Note that the highest preference for teaching methods rated by more than 50% of the students is shown for simplicity. The highest preference is for hands-on training. 0 = no benefit, 1 = poor, 2 = fair, 3 = good, 4 = very good, 5 = excellent

All the correlations between and within preferred learning styles and teaching methods were weak (<0.5) [Table 1].

DISCUSSION

This study revealed that the majority of the physical therapy students rated the concrete-sequential learning style the most preferred, although they demonstrated mixed styles on other style dimensions. In addition, for the majority of these students, random training, multimedia activities, advanced organizers, and demonstrations were the most preferred teaching methods.

The results of the current study are similar to the findings of Olson^[5] who found that concrete-sequential learning style was predominant among 190 physical therapy students. She also found that a high percentage of students demonstrated a “dual” style, in which most had a concrete-sequential component. These findings support Kolb’s view that people with human-related professions were likely to adopt concrete learning styles and were person-oriented.^[13] Concrete-sequential learners, where the majority of the students fit, are structured, practical, predictable, inquisitive, independent, thorough, and more task-oriented than people-oriented. They have a low tolerance for details, and tend to be practical rather than scholarly.^[5]

Physical therapists must be competent in evidence-based practice that requires theory and critical inquiry, characteristics that reflect abstract-sequential and concrete-random learners, respectively.^[5] A consideration of the results of the current study and previous studies^[5,16] indicates that the physical therapy students have mixed learning styles. Abstract-random students are idealistic, people-oriented, creative, perceptive, and compulsive learners, whereas abstract-sequential students are logical, analytical, conceptual, compulsive, and studious, with low tolerance for distractions.^[5]

Using the Kolb Learning Style Inventory, several studies found that the predominant learning style endorsed by physical therapy students was converger, with a strong tendency toward abstract conceptualization or thinking,^[4,17] or toward active experimentation or planning.^[4,13] The converger learning style combines abstract conceptualization with active experimentation.^[4] In various studies, the second most common learning style was assimilator.^[9,18] This indicates that students combine thinking with either watching and listening or doing.^[9,18] The assimilator learning style combines abstract conceptualization with reflective observation. People with this learning style are interested in abstract ideas and concepts.^[4] Students who are convergers put ideas and theories into practice and are best at solving

Table 1: Results of pearson’s correlation coefficient between learning styles and teaching methods

Teaching methods	Learning styles			
	Concrete-sequential	Concrete-random	Abstract-sequential	Abstract-random
Advanced organizers	-0.129	0.363	0.159	0.278
Brainstorming	-0.003	0.173	0.182	0.096
Demonstrations	-0.163	0.006	0.301	-0.074
Dialog journals	0.036	0.130	0.341	0.220
Discovery learning	0.323	-0.298	0.066	0.170
Discussions	0.237	0.145	0.126	0.302
Hands-on learning	0.155	-0.022	-0.217	0.123
Learning communities	0.054	0.002	-0.052	-0.110
Multimedia activities	0.290	-0.070	-0.169	0.088
Peer tutoring	0.246	0.046	0.049	-0.016
Project-based learning	-0.078	0.106	0.145	0.032
Questioning techniques	-0.105	0.049	0.469	0.096
Lecture	-0.279	0.321	0.251	0.136
Lecture with discussion	-0.067	0.330	0.257	0.226
Panel of experts	0.252	0.046	0.359	0.113
Class discussion	-0.017	0.138	-0.003	0.174
Small group discussion	0.222	0.030	-0.179	-0.050
Worksheets/surveys	0.093	-0.019	0.379	0.015
Case studies	-0.058	0.221	0.162	0.205
Role play	0.308	-0.253	-0.229	-0.024
Report-back sessions	0.082	-0.084	0.034	-0.094
Index card exercise	-0.087	0.049	0.068	0.083
Values clarification exercise	0.103	-0.044	0.195	0.207
E-learning	-0.094	-0.242	-0.004	-0.012

problems and making decisions.^[4] In contrast, Brown *et al.*^[1] found that for physical therapy students, “assimilator” was the dominant learning style, implying a preference for theoretical problem solving and abstract concepts, as well as favoring lectures and exploring models in learning situations. Similar learning style preferences among physical therapy students and students of other allied health such as nursing, occupational therapy, and speech pathology were found by Hauer *et al.*^[4] and Zoghi *et al.*,^[13] although other researchers found differences.^[1,17]

The majority of the students (85%) in the current study rated “hands-on training” the most preferred teaching method. This characteristic is in accordance with the concrete-sequential learning style. In her thesis, Olson^[5] had similar results in which the ranked average means of instructional activities pointed to students who preferred a practical orientation and participated in learning by “doing.” Interestingly, in the present study, lectures were rated the highest preference by only 7.5% of the students. Although they indicated specific preferences, educators should not eliminate teaching methods that were identified as the least preferred.

There were no correlations within the teaching methods and learning styles or between the teaching methods and learning styles. Olson^[5] found a few statistically significant but weak relationship between learning styles’ scores and their teaching methods and instructional activities’ factor scores. She^[5] concluded that the Gregorc Style Delineator may be limited in predicting teaching methods in relation to the learning styles of physical therapy students.

A limitation to the current study was the fact that Gregorc learning styles were not identified by completing the Gregorc Style Delineator. Instead, the styles were explained to the students who were then asked to choose the preferred style following a 50-min presentation. Another limitation was that the sample was from one university only. This makes generalization of the results inappropriate. However, the results of this study support the findings of previous studies undertaken in non-Saudi universities, such as the study by Olson.^[5] In the current study, the preferences for learning styles and teaching methods were investigated at one stage of students’ undergraduate education. Although some authors^[4] have suggested that the assessment of the learning style of students should be done at different stages of their professional education, earlier studies found no significant differences in the learning styles throughout the 4 years of the training of the physical therapy students.^[9,16,18]

The findings of our study have important implications for physical therapy educators, especially in light of the current trend toward active and student-centered education. Effective educators should recognize students’

learning styles, identify students’ differences, and adjust the teaching strategies accordingly.^[2] Therefore, it is important that educators use a variety of teaching strategies that accommodate all learning styles^[19] and require students to become more active participants in their learning.^[9] Teaching strategies that are flexible, creative, and student-centered contain various learning styles, revive classroom presentations or clinical experiences, and maximize student learning.^[20]

The lack of compatibility between the learning styles of most students and teaching style of the teachers adds to student frustration and has a negative effect on learning.^[19] Educators should attempt to strike a balance of teaching strategies rather than try to teach each student exclusively according to his/her preferences.^[21] Therefore, it is important to harmonize the preferred learning styles to promote positive learning. However, students should also be flexible in their learning by using strategies outside their preferences in order to meet the demands of the challenging environment.^[5] Strengthening non-preferred learning styles helps individuals become amenable to various ways of learning and from various sources.^[1] Presenting material in a range of styles requires students to adapt to the presenting situation, and consequently helps develop students’ preferred and non-preferred learning styles.^[1]

CONCLUSION

Based on the available literature, this is the first study that has investigated the preferred learning styles and teaching methods of Saudi physical therapy students. The results show that the predominant concrete-sequential learning style is consistent with the most preferred teaching method, namely, “hands-on training.” The findings of mixed learning styles in a high percentage of students suggest their ability to accommodate multiple teaching methods. Therefore, it is recommended that physical therapy educators should apply a balanced variety of teaching methods in order to satisfy the different learning styles of students. Future research may include physical therapy students from different Saudi universities and compare students from different health professions.

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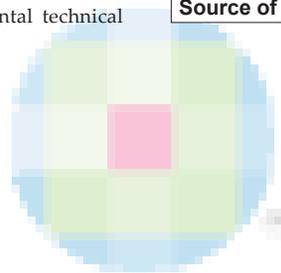
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