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Educational Article

Associations between approaches to study, the learning environment, and academic achievement

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الملخص

أهداف البحث: يهدف هذا البحث إلى الكشف عن أساليب التعلم لدى الطلبه، واستقصاء وجهات نظر الطلبة نحو بيئتهم التعليمية. كما يهدف أيضا إلى الكشف عن أي علاقة محتملة بين التحصيل الدراسي للطلاب وأساليب التعلم والبيئة التعليمية.

طرق البحث: تم إجراء دراسة وصفية مقطعية في مايو ٢٠١٢م. باستخدام النسخة المختصرة من استبانة "لانكستر" لأساليب التعلم لاستكشاف طرق التعلم لدى الطلبة. كما استخدم مقياس داندي الجاهز للبيئة التعليمية المعروف بـ"دريم" لمعرفة وجهة نظر الطلبة نحو بيئتهم التعليمية.

النتائج: تمت تعبئة ١٥٧ استبانة من أصل ١٦٦ وزعت على الطلبة الجامعيين في السنة الأولى للعلوم الطبية التطبيقية (معدل استجابة ٩٤٪). أظهرت الدراسة أن الطلبة لديهم ميل لاستخدام الأسلوب "التحصيلي"، و"الاستراتيجي"، و"إعادة الإنتاج" بشكل متكرر أكثر من الأساليب الأخرى للدراسة. كما اعتبروا بيئة التعلم لديهم بأنها أكثر إيجابية. وكانت هناك علاقة ذات دلالة إحصائية بين أساليب التعلم والبيئة التعليمية. وأيضا كانت هناك علاقة ذات دلالة إحصائية بين التحصيل الأكاديمي وتصور الطالب الذاتي لتحصيله الأكاديمي.

الاستنتاجات: أظهرت الدراسة أن الطلبة يستخدمون جميع أساليب التعلم المختلفة. ولكن استخدام الأسلوب التحصيلي، والاستراتيجي، وإعادة الإنتاج كان أكثر استخداما. كما كانت تصورات الطلبة نحو بيئتهم التعليمية أكثر إيجابية، كما أنهم كانوا راضين عن تعلمهم، وعن المعلمين، ومناخ الدراسة، والحياة الاجتماعية. تأثرت أساليب التعلم لديهم بوجهة نظرهم نحو بيئتهم التعليمية. أيضا كان تحصيل الطلاب الدراسي مرتبطا إيجابيا مع وجهة نظرهم نحو البيئة التعليمية خاصة مع تصور الطلبه الذاتي لتحصيلهم الأكاديمي.

الكلمات المفتاحية: أساليب التعلم; البيئة التعليمية; التحصيل الأكاديمي

Abstract

Objectives: This study aimed to explore students' approaches to studying, their perceptions about their learning environments, and any possible relationships between their academic achievement and the approaches to studying scales and the learning environment.

Methods: A cross-sectional descriptive study was conducted in May 2012. A modified version of the Lancaster Approaches to Study Inventory (ASI) was used to understand the students' approaches to learning, and the Dundee Ready Education Environment Measure (DREEM) was used to assess students' perceptions of their learning environment.

Results: Of 166 first-year undergraduate students from the College of Applied Medical Science, 157 completed the survey, yielding a response rate of 94%. Students showed a tendency to use achievement, versatility, and reproduction approaches more frequently than other approaches when studying for their courses. They also perceived their learning environments to be more positive than negative. There were significant relationships between approaches to study and learning environments, and there was also a significant relationship between academic achievement and student academic self-perception.

Conclusion: This study showed that while students used all of the identified approaches to learning, the most

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frequently used learning styles included achievement, versatility, and reproduction. Moreover, students' study approaches were influenced by their perception of their learning environment. At the same time, student academic achievement was positively associated with their perception of their learning environment, particularly with their academic self-perception.

Keywords: Academic achievement; Approaches to study; Learning environment; Self-perception

Introduction

The general objective for higher education is to teach, facilitate, and encourage students to learn.[1] To achieve these objectives, factors that affect student learning should be explored. According to Newble and Entwistle,[2] these factors can be classified into two categories: a) those related to students' characteristics, such as learning style and approaches to learning, and b) those related to the learning environment, such as teaching pedagogy. Because the main goal of learning in higher education is to emphasize the value of understanding and meaning rather than just focussing on recognition and reproduction in student learning[3] and because the learning approach used by students may directly influence learning outcomes,[4–8] it is important to understand student learning styles and student approaches to learning. There are several theoretical frameworks for elucidating student learning styles, though no specific theory has supremacy over another.[9] These various models are, in part, derived from various definitions of learning styles and from various research methodologies.[10] One of the initial investigations into learning styles and study approaches was a series of experiments conducted by Marton and his colleague[11,12] to investigate how students read an academic article and what their common approach to studying a textbook is. These approaches were initially portrayed as deep-level and surface-level processing, but they were subsequently renamed as approaches to learning[13] to signify that the word 'approach' entails a process as well as an intention. In general, the deep approach entails a dynamic effort to understand the overall meaning, clarify the evidence and relate it to the conclusion with the intent to comprehend. On the other hand, the surface approach entails an effort to memorize unrelated facts or information with the intent to fulfil course requirements. Several inventories have been developed to assess student learning, one of which is the Approaches to Studying Inventory (ASI).[14] This inventory has been widely used in research with respect to higher education,[13,15,16] and it has shown high reliability in a number of studies.[17,18]

Student learning is affected not only by the student's learning style but also by the environment where the learning is taking place.[7,14] Studies on learning environment have found that the environment does not only affect the student's approach to learning[16,19,20] but also the student's academic outcome,[2,21,22] level of motivation,[23] and degree of learning effectiveness.[24] In addition, an assessment of the learning environment is considered a crucial aspect in delivering high quality education.[24] Consequently, a considerable amount of research has been conducted to assess students' perceptions of their educational environment. One of the instruments used to measure student perception of the learning environment is the Dundee Ready Education Environment Measure (DREEM),[25] which has been used in various educational settings[25–30] with a high degree of proven reliability.[25,27,31–33]

The DREEM creates a profile of a specific educational institution's environmental strengths as well as its problematic areas and opportunities for enhancement. Within the context of Saudi Arabia, the DREEM was used to assess the educational environment in single medical schools[30,34–36] and was also used to compare medical schools that had adopted contrasting educational strategies.[37,38] It has also been used to reassess the perceptions of medical students to determine the change over time from a previous assessment.[39] In the findings of previous studies, the overall DREEM mean score has ranged from 89.9 to 131 out of 200.

This paper explores the approaches to study, used by first-year female students at the College of Applied Medical Sciences, University of Dammam, Saudi Arabia, as measured by the ASI, and their perceptions toward their learning environment as measured by the DREEM. It also examines the possible association between academic achievement as measured by student self-reported grade point average (GPA) and both the ASI and the DREEM.

The findings of this study will contribute to the international medical educational literature on approaches to study and on the effects of learning environment.

Material and Methods

Study setting

The study was conducted at the College of Applied Medical Sciences (CAMS) – Female Section, University of Dammam, Saudi Arabia.

Study design

The cross-sectional study was conducted in May 2012.

Target population and sample size

The target population for the study was all first year students in the academic year 2011–2012 (n = 166) at the college of Applied Medical Sciences – Female Section, University of Dammam, Saudi Arabia. The female section consists of the following seven departments: laboratory technology, respiratory care, health information management and technology, physical therapy, radiology, cardiac technology, and clinical nutrition. The academic programs span four years plus one internship year in Saudi Arabia. During the first year, all students study similar compulsory courses – general and scientific English, English study skills, two biology courses,

Table 1: Means and standard deviations for scales of the Approaches to Study Inventory (ASI).

Item (/maximum score)	Mean	Std. deviation
Achieving (/24)	18.0446	2.63688
Reproducing (/24)	16.8344	3.24600
Meaning (/24)	15.4013	3.94328
Comprehension learning (/24)	16.1210	3.22520
Operational learning (/24)	14.0828	3.54452
Versatile approach (/48)	34.3057	6.11080
Learning pathologies (/48)	28.1338	5.79245
Improvidence (/12)	5.3057	2.50810
Globetrotting (/12)	5.9936	2.45340
Prediction for success (/120)	72.2166	8.59362

chemistry, and physics. In addition, three general courses are offered – learning skills, Islamic culture, and Islamic ethics. The college offers a traditional curriculum with the following characteristics: it is a teacher-centred, discipline-based curriculum where the teachers are the main providers of information. It offers only compulsory courses and no elective courses. For first year students, lectures and tutorials are held in classrooms and practicums are held in laboratories, all within the main campus of the university.

Data were collected through a self-administered anonymous questionnaire. The researcher of this study presented the goals of the study to the students at the end of one of their lectures. Verbal consent was secured prior to the distribution of the questionnaires, and their right to opt out was emphasized. It took approximately 20 min to complete the questionnaire.

Instruments

Two instruments were used.

(1) The short form of the Lancaster Approaches to Study Inventory (ASI) developed by Ramsden and her colleague[40,41] and translated into Arabic by Al-Qahtani[42] was used to measure student study approaches adopted by first year female students at the Applied Medical College. The ASI consists of 30 items and eight scales that describe different orientations toward studying. These include meaning orientation, reproduction orientation, achievement orientation, comprehension learning, operational learning, versatility approach, learning pathologies, and prediction for success. The instrument uses a five-point Likert scale that ranges from 4 = strongly agree to 0 = strongly disagree (the meanings and scoring of the scales are presented in Appendix 1).

(2) The Dundee Ready Education Environment Measure (DREEM), which was developed by Roff and her colleagues[25] and translated into Arabic by Al-Qahtani,[42] was used to assess student perception of the learning environment. The DREEM questionnaire consisted of 50 statements. For each statement, a Likert scale was used where 4 = strongly agree, 3 = agreed, 2 = uncertain, 1 = disagree, and 0 = strongly disagree. The scoring was reversed for negative statements (statements 4, 8, 9, 17, 25, 35, 39, 48, and 50) such that a higher score indicated a more positive perception for all items. This implies that the overall possible maximum score on the DREEM was 200 and the minimum possible score was 40. The maximum scores for the subscales on the DREEM were as follows:

Student Perception of Learning (SPoL)	*12 × 4 = 48 maximum score.*
Student Perception of Teachers (SPoT)	*11 × 4 = 44 maximum score.*
Student Academic Self-perception (SASP)	*8 × 4 = 32 maximum score.*
Student Perception of Atmosphere (SPoA)	*12 × 4 = 48 maximum score.*
Student Social Self-perception (SSSP)	*7 × 4 = 28 maximum score.*

The interpretation of the overall DREEM subscales and the individual item scores are presented as suggested by McAleer and Roff.[43]

Statements with mean scores ≥3.5 are considered as highly positive points. Statements with mean scores between two and three indicate aspects of the environment that could be improved. Statements with mean scores ≤2 indicate possible problem areas that should be addressed. McAleer and Roff[43] suggest that an overall DREEM mean score of 0–50 is indicative of a very poor environment, a mean score between 51 and 100 indicates there are numerous problems with the learning environment, a mean score between 101 and 150 is indicative of a more positive than negative environment, and a mean score between 151 and 200 indicates that the students perceive the educational environment to be excellent.

A pilot study was conducted with a group of five students in April 2012 to identify any possible ambiguities in the questionnaires. The results found that both questionnaires were clear and there were no ceiling or floor effects in the pilot study.

Statistical analysis

A statistical analysis was performed using the Statistical Package for Social Sciences (SPSS, IBM, Chicago, Illinois, USA) version 16, and descriptive statistics were reported as the mean and the standard deviation. A Pearson test was calculated to assess the association between a) students' approaches to studying and their perceptions of their learning environment and b) students' academic achievement and both subscales of approaches to studying and the learning environment. A P-value ≤ 0.05 served as the cut-off value for statistical significance.

Results

Of 166 questionnaires, 157 were completed, yielding a response rate of 94%. All respondents were female students, and their mean age was 18.67 ± .58 years. More than half (56%) of the students achieved grades of 'A', while 40% achieved grades of 'B' in their general medical courses.

Student approaches to studying

Table 1 reveals that students recorded higher mean scores for achievement followed by versatility and reproduction

orientations. The lowest mean scores were reported for operational learning followed by learning pathology.

Student perceptions of their learning environments

Table 2 shows the mean scores for the overall DREEM and the five subscales. In our study, the overall DREEM score was 118.6/200 (sd = 22.9). This indicates that our students perceived the learning environment as more positive than negative, and the mean scores for all five domains fell within the satisfactory range. This indicates that students perceived a more positive approach (28.5/48) for their learning; had a more positive attitude (21.1/32) toward their academic self-perception; felt their teachers were moving in the right direction (25.8/44); had a more positive perception of their learning environment (27.6/48); and regarded their social self-perception as being not too bad (15.7/28).

An item analysis of the student perception of learning (SPoL) subscale (Table 2) reveals that all items, except numbers 7 and 25, on this subscale scored between 2 and 3, thus suggesting that each of these specific areas referenced by the subscale could be improved. Item number 7, which asked students whether the teaching is often stimulating had a mean score of 3.4 (sd = .997). However, a minimum score of 3.5 was needed to confirm an item as indicative of strength. Accordingly, this item, which reflects the degree of stimulation in the teaching process, must be further developed and explored.

Item number 25, a negative item that asked students whether the teaching over-emphasises factual learning scored a 1.08 (sd = .997), thus denoting student agreement with this item. This could signify a problem area that should be examined more thoroughly.

With regard to student perceptions of teachers, all items, except number 39, received scores between 2 and 3, again indicating that components of this domain could be improved. Item number 39, a negative item that asked students whether teachers get angry in class, received a score of 1.19 (sd = 1.116), indicating student agreement with this item. Such result suggest that there is a problem that should be more fully investigated.

With regard to the students' academic self-perception subscale, all items except numbers 10 and 45 scored between 2 and 3, thus revealing an area of the domain that could be improved. Item number 10, which asked students whether they are confident about passing their courses this year, and item number 45, which asked students whether what they are learning is relevant to a career in healthcare received scores of 3.09 (sd = 1.10) and 3.04 (sd = 1.11), respectively. As previously noted, a score of at least 3.5 is needed to consider an item a point of strength. Therefore, these two areas − student confidence and relevancy of coursework − should be further analysed.

With respect to students' perceptions of the learning atmosphere, four out of 12 items received scores below 2. These were item number 12, "the time-table of this school is well-organised"; item number 23, "the atmosphere is relaxed during lectures"; item number 42, "the enjoyment outweighs the stress of the course"; and item number 43, "the atmosphere motivates me as a learner". As the students expressed strong disagreement with each of the above items, it is evident that as these are possible problem areas, they should be more thoroughly investigated. Furthermore, item number 33, "I feel socially comfortable in class", received a score of 3.03 (sd = 1.17), thus suggesting that it, too, should be more closely examined.

With regard to student social self-perceptions, three out of seven items indicated problem areas. The specific items were number 3, "There is a good support system for students when they feel stressed"; number 4, "I am too tired to enjoy the course"; and number 14, "I am rarely bored in this course". These three items had mean scores that range between 1.22 and 1.62 (sd. between 1.05 and 1.50). The other items scored between 2 and 3, suggesting a need for further improvement.

In summary, the item analysis found that six items (numbers 7, 10, 15, 19, 33, and 45) scored above 3.00, thus suggesting that these are areas that should be further developed. Another 35 items scored between 2.00 and 3.00, indicating that if these were improved, it would enhance the learning environment of this college. A total of 9 items (numbers 3, 4, 12, 14, 23, 25, 39, 42, and 43) scored below 2.00, indicating that these are serious problem areas that require urgent intervention.

Relationship between study approaches and the learning environment

Table 3 shows the correlation coefficients (r) and probabilities (P) between the ASI scale scores and the DREEM subscales scores. The achievement scale was statistically and positively correlated with academic self-perception ($r = .198$, $P = .013$). The meaning, operational, and versatility scales were statistically and positively correlated with all subscales of the DREEM (r ranged between .173 and .460, $P \leq .030$). The comprehension scale was statistically and positively correlated with social self-perception ($r = .160$, $P = .015$).

Relationship between academic achievement and approaches to studying and the learning environment

A correlation analysis between the learning approaches scales and academic achievement reveals no significant associations between these variables.

A correlation analysis between learning environment subscales and academic achievement shows that there is a positive and significant relationship between academic achievement and student academic perceptions (SAP) ($r = .232$, $P = .004$). This suggests that students who have a higher GPA are more likely to exhibit higher scores on the SAP subscale.

Discussion

Students' approaches to studying and their educational environment are important factors that affect their learning and their academic outcomes. Therefore, the aim of this study was to assess students' approaches to studying and to evaluate the learning environment as perceived by medical students at the University of Dammam, Saudi Arabia. The objective was to determine the associations between and

Table 2: Means and standard deviations for each item and for the subscales of the Dundee Ready Educational Environment Measure (DREEM).

No	Item	Mean	SD
Student perceptions of learning (SPoL)		28.4586	6.7686
1	I am encouraged to participate in class	2.28	1.462
7	The teaching is often stimulating	3.14	.997
13	The teaching is student centred	2.28	1.372
16	The teaching helps to develop my competence	2.31	1.239
20	The teaching is well focused	2.96	1.085
22	The teaching helps to develop my confidence	2.68	1.291
24	The teaching time is put to good use	2.73	1.333
25	The teaching over-emphasizes factual learning	1.08	.997
38	I am clear about the learning objectives of the course	2.96	1.082
44	The teaching encourages me to be an active learner	2.13	1.348
47	Long-term learning is emphasized over short-term learning	2.73	1.206
48	The teaching is too teacher-centred	2.10	1.336
Student perceptions of teachers (SPoT)		25.777	6.55705
2	The teachers are knowledgeable	2.57	1.058
6	The teachers are patient with the students	2.23	1.012
8	The teachers ridicule the students	2.82	1.285
9	The teachers are authoritarian	2.20	1.436
18	The teachers have good communication skills with students	2.19	.810
29	The teachers are good at providing feedback to students	2.34	1.319
32	The teachers provide constructive criticism	2.36	1.204
37	The teachers give clear examples	2.93	.948
39	The teachers get angry in class	1.19	1.116
40	The teachers are well prepared for their classes	2.62	1.077
50	The students irritate the teachers	2.33	1.298
Student academic self-perceptions (SASP)		21.1083	4.95697
5	Learning strategies that worked for me before continue to work for me now	2.68	1.406
10	I am confident about passing this year	3.09	1.100
21	I feel I am being well prepared for my profession	2.52	1.124
26	Last year's work was a good preparation for this year's work	2.40	.960
27	I am able to memorize all I need	2.34	1.333
31	I have learned a significant amount about empathy in my profession	2.70	1.059
41	My problem solving skills are being well developed	2.34	1.313
45	Much of what I have to learn seems relevant to a career in healthcare	3.04	1.111
Student perceptions of atmosphere (SPoA)		27.6115	7.27804
11	The atmosphere is relaxed during ward teaching	2.22	.984
12	This school implements a good time schedule	1.35	1.405
17	Cheating is a problem at this school	2.69	1.314
23	The atmosphere is relaxed during lectures	1.87	1.296
30	There are opportunities for me to develop interpersonal skills	2.44	1.211
33	I feel socially comfortable in class	3.03	1.174
34	The atmosphere is relaxed during seminars/tutorials	2.45	1.217
35	I find the experience disappointing	2.90	1.427
36	I am able to concentrate well	2.97	1.028
42	The enjoyment outweighs the stress of the course	1.59	1.410
43	The atmosphere at this school motivates me as a learner	1.94	1.422
49	I am able to ask questions	2.16	1.289
Student social self-perceptions (SSSP)		15.7325	3.77981
3	There is a good support system for students when they experience stress	1.22	1.054
4	I am too tired to enjoy the course	1.60	1.344
14	I am rarely bored in this course	1.62	1.500
15	I have good friends in this school	3.59	.824
19	My social life is good	3.04	1.049
28	I seldom feel lonely	2.61	1.399
46	My accommodations are pleasant	2.05	.758
	Overall DREEM	118.687	22.9731

Table 3: Correlation between approaches to study and the learning environment (results for significant correlations only).

	Social self perception (SSP) r (P)	Perception of atmosphere (SPA) r (P)	Academic self perception (SAP) r (P)	Perception of teacher (SPT) r (P)	Perception of learning (SPL) r (P)
Achieving			.198 (.013)		
Meaning	.249 (.002)	.315 (.000)	.336 (.000)	.319 (.000)	.426 (.000)
Comprehension	.160 (.015)				
Operation	.173 (.030)	.201 (.011)	.303 (.000)	.229 (.004)	.369 (.000)
Versatile	.296 (.000)	.325 (.000)	.419 (.000)	.220 (.006)	.460 (.000)
Prediction for success	.223 (.005)	.231 (.004)	.324 (.000)		.294 (.000)

among students' approaches to studying, their perceptions of their learning environment and their academic achievement.

Student approaches to studying (ASI)

The results reveal that students employ all approaches when studying. However, the extent to which the approaches are used varies. For example, our study finds that achievement orientation and versatility were used more frequently than other study approaches. These were followed by reproduction orientation. This suggests that students' study methods were well-organized. Moreover, while their study methods tended to vary according to what the students felt was required of them, the students were also motivated by competitiveness and achievement. Students' recorded higher scores on the reproduction scale than on the meaning and operational scales, a result that suggests that such high scores on the reproduction scale may be partially due to the assessment methods – mainly multiple-choice questions – used at this particular college. This puts pressure on the students to deal with course requirements rather than to understand the content in a more meaningful way, a result that aligns with Ramsden,[44] Entwistle and Entwistle,[45] Newble and Gordon,[46] and Newble and Jaeger[47] who claim that students will adopt a particular approach based on what they perceive to be the major requirements for the examination. If the examination requires recall of information, i.e., an objective-type test with multiple-choice questions, they tend to use the reproduction/surface approach.

Student perceptions of the learning environment (DREEM)

The overall learning environment was perceived by the students to be more positive than negative. The mean scores for all five domains indicate that students had positive perceptions about their learning, about the learning atmosphere, and about their academic status. They also believed that their teachers were moving in the right direction and that their social lives at the college were not too bad.

The results of the item analysis indicate that students perceived the teaching to be stimulating and focused, though they also felt that it over-emphasized factual information. Students indicated that they were clear about the learning objectives of the course. Second, students believed that the teachers were knowledgeable of their content, used clear examples, were well prepared to teach their classes, and provided students with constructive criticism. However, the scores also indicate that teachers lost their temper in class. Third, students were confident about their ability to pass their exams and felt that much of what they had learned was relevant to their career. They further indicated that they had learned to show empathy, and they stated that their memorization skills and problem-solving skills were well developed.

Fourth, students perceived the learning atmosphere as good. They felt socially comfortable in class, they were able to concentrate, and they were given the opportunity to develop their interpersonal skills. However, they also felt that the atmosphere did not motivate them to learn. Additionally, while students perceived that their social life in college was good as they had made good friends, they also felt that there was not a good support system for students experiencing stress.

Correlations between the ASI and DREEM scales

The correlation analysis between the ASI and DREEM scales indicates the following. First, students who scored higher on academic self-perception were more likely to have higher scores on the achievement, meaning, operational, versatility, and prediction scales. This suggests that students' perceptions of their academic development influenced their approaches to studying. Students who were more positive in their perceptions of their academic development were more likely to adopt the achievement, meaning, operational, and versatility approaches. In addition, their predictions of success tended to be high. Students revealed that they were confident about passing exams, felt well prepared for their profession, had learned about empathy, had well-developed problem solving skills, and had learned content that was relevant to their careers in healthcare. Consequently, the students were more likely to employ a step-by-step sequentially detailed approach to studying, to adopt different study methods, and to be strongly motivated to do their best and achieve high grades compared to their classmates. Moreover, their predictions of success tended to be high.

One possible explanation for the association between the achievement scale and student academic self-perception may be embedded in the characteristics of the students admitted to this particular college – the applied medical sciences. Students studying the medical sciences in Saudi Arabia are usually those who received high grades in their secondary school education and who successfully completed additional rigorous entry requirements. This likely results in a high concentration of competent students at this particular college. Therefore, students use the achievement approach because they are in an environment where competence is exemplary and where students exert themselves to achieve the best results. In addition, they tend to have high scores with respect to their predictions

of success, which may explain why students in the present study correlated their use of the achievement approach to their academic self-perception.

Second, students who scored higher on student perceptions of learning were more likely to have higher scores on the meaning, operational, versatility, and prediction scales, thus indicating that students' perceptions of their learning influence their approaches to studying. Those who showed greater satisfaction with their learning were inclined to use meaning, operational, and versatility approaches. In addition, their predictions of success were high. Students' high levels of satisfaction with their learning were evidenced by their class participation, confidence and competence development, and active learning as well as their claims that they found the teaching to be stimulating. In such an encouraging environment, students tend to use a deeper, step-by-step, sequentially detailed approach when studying as it results in their understanding of the subject. Furthermore, they tend to also, vary their study methods according to the demands of the learning tasks.

Third, students who scored higher on student perceptions of atmosphere were more likely to have higher scores on the meaning, operation, versatility, and prediction scales, thus indicating that students' perceptions of the atmosphere definitely affect their approaches to studying. Students participating in this study felt that the atmosphere was conducive to a socially comfortable classroom, that it fostered good concentration, and that it provided them with the opportunity to develop their interpersonal skills. Such positive perceptions of the atmosphere likely lead them to adopt meaning, operational, and versatile approaches to studying. Consequently, students were more likely to apply the versatility approach to their studying as it allowed them to adapt their study methods according to the demands of the task, it ensured that they understood the subject, and it furthered their interest to study the medical sciences. Moreover, such positive feelings may result in higher predictions of success scores.

Fourth, students who scored higher on student perceptions of teachers were more likely to have higher scores on the meaning, operational, and versatility scales. Ramsden,[48] Entwistle and Tait,[49] and Entwistle and Ramsden[41] argue that the methods of teaching, the degree of teacher enthusiasm, the clarity of the course goals and objectives, the constructive feedback given to students, the degree of teacher commitment, and the structure, pace and level at which information is offered impact student approaches to studying. Accordingly, in our study, positive student perceptions of their teachers influenced students to adopt meaning, operation, and versatility approaches. Furthermore, their prediction of success was more likely to be high.

Finally, students who scored higher on student social self-perceptions were more likely to have higher scores on the *meaning, operation, versatility, comprehension* and *prediction* scales. Students indicated satisfaction with their social life in college by stating they had good friends at school and were pleased with their accommodations. A positive perception of their social life may influence their approach to studying.

Based on the findings of Kember et al.[50] and Loup et al.,[51] the educational environment is positively associated with meaning orientation and negatively associated with reproduction orientation. In the current study, however, the five subscales of the DREEM exhibit significant and positive relationships with meaning orientation scales. In contrast, all five subscales of the DREEM display a non-significant relationship with reproduction orientation. Therefore, the results of this study are consistent with the findings of Kember et al.[50] and Loup et al.[51] with respect to the association between the learning environment and meaning orientation.

In summary, the above results imply that there is a positive relationship between student learning approaches and their perceptions of their learning environment. In addition, they support the findings of Ramsden,[48] Trigwell and Prosser,[20] Enwistle and Tait,[49] Entwistle,[52] and Entwistle and Ramsden[41] who claimed that the characteristics of the learning environment influence the approaches students adopt for studying.

Correlation between academic achievement and the ASI and DREEM subscales

A correlation analysis between learning approaches (ASI) and student academic achievement reveals no significant relationships between any of the learning approach scales and academic achievement. This result might indicate that student approaches to studying are not a significant determinant of academic achievement at the Applied Medical College. Thus, it is possible that factors other than learning approaches to studying might play a significant role in student performance. This finding, however, is not consistent with the Entwistle et al.[7] model with respect to the association between learning approaches and learning outcomes. Our result is also not in accordance with the findings of Burton and Nelson,[4] Duff et al.,[5] and Duff[6] as they found significant correlations between the different approaches to learning and academic achievement. However, the results in this study are consistent with the findings of Fogarty and Taylor,[53] Provost and Bond,[54] Leiden et al.,[55] and Clarke,[18] researchers who found no significant association between student learning approaches to studying and student academic performance.

A correlation analysis between student perceptions of their learning environment (DREEM) and their academic achievement reveal a significant positive relationship between student academic achievement and their perception of their academic success. This result is, to some degree, consistent with the findings of Vahala and Winston,[56] Primparyon et al.,[57] and Mayya and Roff,[58] all of whom claimed there is an association between student academic achievement and student perception of the educational environment.

Conclusions

The following conclusions have emerged during this study.

First, first-year students have a tendency to use achievement, versatility, and reproduction approaches more frequently than other approaches when studying.

Second, the students revealed appreciation for the positive characteristics of the learning environment. These included offering stimulating and focused teaching,

developing student competence and confidence, creating an atmosphere conducive to learning, having knowledgeable and well-prepared teachers, and providing students with constructive feedback. Conversely, dissatisfaction with some aspects of the learning environment was also noted. Students were displeased with the rigidity of the core courses, the displays of anger by teachers during class, the lack of a good support system for students experiencing stress, and the teacher-centred approach to teaching. Based on these results, it is concluded that elective courses should be offered, the quantity of factual information should be reduced, the predominantly teacher-centred approach should be modified to a more student-centred teaching style; the awareness of the influence of teachers' personal characteristics on student learning should be raised, the style of teaching change from an oppressive style to a congenial one, and a support system should be established for students. Implementing these changes would likely increase the value students place on their studies, encourage active rather than passive learning, improve their attitudes toward their teachers, and result in a positive effect on student learning.

Third, there is an association between student approaches to studying and student perceptions of their learning environment. Accordingly, it is important to vary the teaching styles, strengthen the rapport between teachers and students, promote positive feedback, and build a relaxed, non-threatening learning environment that encourages students to adopt the more desirable deep approach to learning and dispense with the undesirable superficial learning approach.

Fourth, there is no association between learning approaches and academic achievement with respect to grade point average. It could be that other factors play a significant role in student performance. However, further study is recommended to explore the impact of learning approaches on a variety of student achievement indicators to verify the possibility of such associations.

Fifth, student perceptions of the learning environment, particularly academic self-perception and academic achievement, are significantly and positively correlated. Therefore, it is important to enhance the student's level of confidence regarding the passing of exams in a non-threatening learning environment, to highlight the importance of empathy, to develop skills in problem solving, and to stress the importance of student discipline with respect to their careers in healthcare as these factors will influence their academic achievement.

Limitations of the study

This study was limited to first year students in Applied Medical Sciences. In addition, the study was conducted in only one college at the University of Dammam. Accordingly, any generalizations of the results should be limited to other colleges with similar features.

Conflict of interest

I confirm that I have no conflict of interest in relation to this work.

Study funding

None.

Appendix 1. The scoring and meaning of scales of ASI

The inventory contains seven scales. Scales (A), (B), and (D) contain six items each. Scales (C), (E), (F), and (G) contain three items each. Each scale may be used separately or in combination with others, thus yielding the following 8 dimensions/scales:

1. The (A) scale yields a score for achievement orientation.
2. The (B) scale assesses student reproducing orientation.
3. The (D) scale measures the meaning orientation.
4. The combination of the (C) and (G) scores provides a measure of the comprehension learning style.
5. The combination of the (E) and (F) scores provides a measure of the operational learning style.
6. An index of a versatile approach to learning is provided by adding scales (C), (D), and (E) together.
7. An index of leaning pathology is derived by combining scales (B), (F), and (G).
8. The best predictor of overall academic success is likely to be produced by combining dimension 1 with dimension 6 and subtracting dimension 7 (with a constant).[14]

Scale	Meaning
Achieving orientation	Well-organized study methods Competitiveness Hope for success or motivated to achieve
Reproducing orientation	Rote-learning and memorization Extrinsic motivation Influenced by attraction of qualifications Superficial approach to learning
Meaning orientation	Deep approach to learning Interested in topics and courses for their own value Intrinsic motivation
Operation learning	Step-by-step sequential and detailed approach
Comprehension learning	Holistic approach
Versatile approach	Ability to adopt either approach according to demands of learning task
Learning pathologies	Jumping to conclusions on insufficient evidence (globetrotting) Failing to see how topics fit into the overall picture Over-emphasis on details (improvidence)
Prediction for success	Best prediction for overall academic success Highly organized study methods with versatile approach Strong motivation Some tendency towards competitiveness Lack of doubt or fear of failure

References

1. Winston RB, Vahala ME, Nichols EC, Gillis M, Wintrow M, Rome KD. A measure of college classroom climate: the college classroom environment scales. **J Coll Stud Dev 1994**; 35(1): 11–18.
2. Newble DI, Entwistle NJ. Learning styles and approaches: implication for medical education. **Med Educ 1986**; 20: 162–175.
3. McKeachie WJ. Foreword to: the experience of learning: implications for teaching and studying in higher education. In: Marton F, Hounsell D, Entwistle NJ, editors. *The experience of learning: implications for teaching and studying in higher education*. Edinburgh: Scottish Academic Press; 1997. vii–viii.
4. Burton LJ, Nelson LJ. The relationships between personality, approaches to learning and academic success in first-year psychology distance education students. Critical visions: thinking, learning and researching in higher education. In: *Proceedings of the 29th HERDSA Annual Conference. Perth: Western Australia*; 2006. p.10–p.12.
5. Duff A, Boyle E, Dunleavy K, Ferguson J. The relationship between personality, approach to learning and academic performance. **Pers Indiv Differ 2004**; 36: 1907–1920.
6. Duff A. Quality of learning on an MBA programme: the impact of approaches to learning on academic performance. **Educ Psychol 2003**; 23(2): 123–139.
7. Entwistle N, McCune V, Hounsell J. *Approaches to studying and perceptions of university teaching-learning environments: concepts, measures and preliminary findings. Enhancing teaching-learning environments in undergraduate courses project*. Occasional Report 1. Paterson's Land, Holyrood Road, Edinburgh EH8 8AQ: Higher and Community Education, School of Education, University of Edinburgh; September 2002.
8. Newble DI, Hejka EJ, Whelan G. The approaches to learning of specialist physicians. **Med Educ 1990**; 24: 101–109.
9. Bonham LA. Learning style use; in need of perspective. **Lifelong Learn 1988**; 11(5): 14–17. 19.
10. De Bello TC. Comparison of eleven major learning styles models: variables, appropriate populations, validity of instrumentation, and the research behind them. **J Read Writ Learn Disabil Int 1990**; 6(3): 203–221.
11. Marton F, Saljo R. On qualitative differences in learning: I-outcome and process. **Br J Educ Psychol 1976a**; 46: 4–11.
12. Marton F, Saljo R. Symposium: learning processes and strategies-II: on qualitative differences in learning-II outcome as a function of the learner's conception of the task. **Br J Educ Psychol 1976b**; 46: 115–127.
13. Kember D, Gow L. Cultural specificity of approaches to study. **Br J Educ Psychol 1990**; 60: 356–363.
14. Entwistle N. *Styles of learning and teaching: an integrated outline of educational psychology for students, teachers, and lecturers*. Chichester: John WileY; 1981.
15. Abouserie R. Self-esteem and achievement motivation as determinants of students' approaches to studying. **Stud High Educ 1995**; 20(1): 19–26.
16. Newble DI, Clarke RM. The approaches to learning of students in a traditional and in an innovative problem-based medical school. **Med Educ 1986**; 20: 267–273.
17. Rishardson JT. Gender differences in responses to the approaches to studying inventory. **Stud High Educ 1993**; 18(1): 3–13.
18. Clarke RM. Students' approaches to learning in an innovative medical school: a cross-sectional study. **Br J Educ Psychol 1986**; 56: 309–321.
19. Davis J, Sales E. Dental and life science students: a comparison of approaches to study and course perceptions. **Med Educ 1996**; 30(6): 453–458.
20. Trigwell K, Prosser M. Improving the quality of student learning: the influence of learning context and student approaches to learning on learning outcomes. **High Educ 1991**; 22: 251–266.
21. Schmidt HG, Machiels-Bongaerts M, Hermans H, Ten Cate TJ, Venekamp R, Boshuizen HP. The development of diagnostic competence: comparison of a problem-based, an integrated, and a conventional medical curriculum. **Acad Med 1996**; 71(6): 658–664.
22. Wolf TM, Balson PM, Faucett JM, Randall HM. A retrospective study of attitude change during medical education. **Med Educ 1989**; 23: 19–23.
23. Harth SC, Bavanandan S, Thomas KE, Lai MY, Thong YH. The quality of student-tutor interactions in the clinical learning environment. **Med Educ 1992**; 26: 321–326.
24. Dent JA, Harden RM. *A practical guide for medical teachers*. 4th ed. Elsevier Churchill Livingstone; 2013.
25. Roff S, McAleer S, Harden RM, Al-Qahtani M, Ahmed AU, Deza H, et al. Development and validation of the Dundee ready education environment measure (DREEM). **Med Teach 1997**; 19(4): 295–299.
26. Al-Naggar R, Abdulghani M, Osman M, Al-Kubaisy W, Daher A, Nor Aripin K, et al. The Malaysia DREEM: perceptions of medical students about the learning environment in a medical school in Malaysia. **Adv Med Educ Pract 2014**; 4(5): 177–184.
27. Yusoff MSB. The Dundee ready educational environment measure: a confirmatory factor analysis in a sample of Malaysian medical students. **Int J Humanit Soc Sci 2012**; 2(16): 313–321.
28. Arzuman H, Yusoff MSB, Chit SP. Big Sib students' perceptions of the educaitonal environemnt at the school of medical sciences, Universiti Sains Malaysia, using Dundee ready educational environment measure (DREEM) inventory. **Malays J Med Sci 2010**; 17(3): 40–47.
29. Said NM, Rogayah J, Arzuman H. A study of learning environments in the Kulliyyah (Faculty) of Nursing, International Islamic University Malaysia. **Malays J Med Sci 2009**; 16(4): 15–24.
30. Al-hazimi A, Al-hyiani A, Roff S. Perceptions of the educational environment of the medical school in King Abdul Aziz University, Saudi Arabia. **Med Teach 2004**; 26(6): 570–573.
31. Jakobsson U, Danielsen N, Edgren G. Psychometric evaluation of the Dundee ready educational environment measure: Swedish version. **Med Teach 2011**; 33(5): 267–274.
32. Dimoliatis I, Vasilaki E, Anastassopoulos P, Ioannidis J, Roff S. Validation of the Greek translation of the Dundee ready education environment measure (DREEM). **Educ Health 2010**; 23(1): 348.
33. Roff S, McAleer S, Ifere OS, Bhattacharya S. A global diagnostic tool for measuring educational environment comparing Nigeria and Nepal. **Med Teach 2001**; 23: 378–382.
34. Al-Ayed IH, Sheik SA. Assessment of the educational environment at the College of Medicine of King Saud University, Riyadh. **East Mediterr Health J 2008**; 14: 953–959.
35. Makhdoom N. Assessment of the undergraduate educational environment in clinical years in College of Medicine. **J Taibah Univ Med Sci 2009**; 4(1): 42–52.
36. Al-Mohaimeed A. Perceptions of the educational environment of a new medical school, Saudi Arabia. **Int J Health Sci (Qassim) 2013 Jun**; 7(2): 150–159.
37. Zawawi AH, Elzubeir M. Using DREEM to compare graduating students' perceptions of learning environments at medical schools adopting contrasting educational strategies. **Med Teach 2012**; 34(Suppl. 1): S25–S31.
38. Al Sheikh MH. Educational environment measurement, how is it affected by educational strategy in a Saudi medical school? A

multivariate analysis. **J Taibah Univ Med Sci 2014**; 9(2): 115–122.
39. Mojaddidi M, Khoshhal KI, Habib F, Shalaby S, EL-Bab MEF, AL-Zalabani AH. Reassessment of the undergraduate educational environment in college of Medicine, Taibah university, Almadinah Almunawwarah, Saudi Arabia. **Med Teach 2013**; 35: S39–S46.
40. Ramsden P, Entwistle NJ. Effects of academic departments on students' approaches to studying. **Br J Educ Psychol 1981**; 51: 368–383.
41. Entwistle NJ, Ramsden P. *Understanding student learning*. London: Croom Helm; 1983.
42. AL-Qahtani MFM. *Approaches to study and learning environment in medical schools with special reference to the gulf countries* [PhD thesis]. Dundee: University of Dundee; 1999.
43. McAleer S, Roff S. A practical guide to using the Dundee ready education environment measure (DREEM). In: Genn JM, editor. *AMEE medical education guide no 23 curriculum, environment, climate, quality and change in medical education: a unifying perspective*. Dundee: Association of Medical Education in Europe; 2002.
44. Ramsden P. *learning to teach in higher education*. London: Routledge; 1992.
45. Entwistle N, Entwistle A. Contrasting forms of understanding for degree examinations: the student experience and its implications. **High Educ 1991**; 22: 205–227.
46. Newble DI, Gordon MI. The learning style of medical students. **Med Educ 1985**; 19: 3–8.
47. Newble DI, Jaeger K. The effect of assessments and examinations on the learning of medical students. **Med Educ 1983**; 17: 165–171.
48. Ramsden P. The context of learning in academic departments. In: Marton F, Hounsell D, Entwistle N, editors. *The experience of learning: implications for teaching and studying in higher education*. Edinburgh: Scottish Academic Press; 1997. pp. 198–216.
49. Entwistle N, Tait H. Approaches to learning, evaluation of teaching, and preferences for contrasting academic environments. **High Educ 1990**; 19(2): 169–194.
50. Kember D, Sandra NG, Harrison TSE, Wong ETT, Pomfret M. An examination of the interrelationships between workload, study time, learning approaches and academic outcomes. **Stud High Educ 1996**; 21(3): 347–358.
51. Loup KS, Ellett CD, Chauvin SW, Lofton G, Evans L, Hill FH. Student perception, student engagement and student achievement correlates of a comprehensive, classroom-based learning environment assessment system. In: Fisher DL, editor. **The study of learning environments, research monograph of the study of learning environments SIG of the American educational research association**, vol. 7. Launceston, Australia: University of Tasmania; 1993. pp. 72–95.
52. Entwistle NA. Model of the teaching-learning process. In: Richardson JTE, Eysenck MW, Piper DW, editors. *Student learning research in education and cognitive psychology*. milton Keynes: Open University Press; 1987. pp. 13–28.
53. Fogarty GJ, Taylor JA. Learning styles among mature-age students: some comments on the approaches to studying inventory (ASI-S). **High Educ Res Dev 1997**; 16(3): 321–330.
54. Provost SC, Bond NW. Approaches to studying and academic performance in a traditional psychology course. **High Educ Res Dev 1997**; 16(3): 309–320.
55. Leiden LI, Crosby RD, Follmer H. Assessing learning styles inventories and how well they predict academic performance. **Acad Med 1990**; 65(6): 395–401.
56. Vahala ME, Winston RB. College classroom environments: disciplinary and institutional-type differences and effects on academic achievement in introductory courses. **Innov High Educ 1994**; 19(2): 99–122.
57. Primparyon P, Roff S, McAleer S, Poonchai B, Pemba S. Educational environment, student approaches to learning and academic achievement in a Thai nursing school. **Med Teach 2000**; 22: 359–365.
58. Mayya S, Roff S. Students' perceptions of educational environment: a comparison of academic achievers and underachievers at Kasturba Medical College, India. **Educ Health 2004**; 17: 280–291.