Assessment of the Educational Environment Using the Dundee Ready Education Environment Measure (DREEM) Among Physical Therapy Students at Taif University.

Evaluación del entorno educativo utilizando la Medida del Entorno Educativo de Dundee (DREEM) entre estudiantes de fisioterapia de la Universidad de Taif.

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Abstract

Background: The educational environment significantly influences students' learning experiences, academic performance, and satisfaction. The Dundee Ready Education Environment Measure (DREEM) is widely used to assess students' perceptions of their educational climate. **Objectives**: To evaluate the learning environment of Physical Therapy students at Taif University using the DREEM questionnaire and to examine how gender, academic level, and age predict students' perceptions. **Methods**: A cross-sectional study was conducted among undergraduate Physical Therapy students using the validated Arabic version of the DREEM questionnaire. Descriptive statistics, bivariate analyses (t-test, ANOVA), and multiple linear regression were employed to analyze the data. Results were reported with 95% confidence intervals, and significance was set at $p < 0.05$. **Results**: A total of 234 students completed the survey. The mean overall DREEM score was 125.1 out of 200, indicating a "more positive than negative" perception. Male students had significantly higher DREEM scores than female students (2.65 vs. 2.51; $p = 0.014$). While differences across academic years were not statistically significant ($p = 0.138$), second-year students reported the highest scores. Multiple linear regression showed that female gender ($\beta = -0.14$, $p = 0.012$) and being in the fourth year ($\beta = -0.25$, $p = 0.042$) were associated with lower overall DREEM scores. **Conclusion**: The educational environment for Physical Therapy students at Taif University is generally perceived as positive. However, differences based on gender and academic year highlight the need for targeted interventions, particularly for female and fourth-year students. Enhancing peer support, stress management, and inclusive teaching strategies may improve the overall student experience.

Keywords: DREEM, educational environment, student perception, regression, physical therapy, Saudi Arabia

Resumen

Antecedentes: El entorno educativo influye significativamente en las experiencias de aprendizaje, el rendimiento académico y la satisfacción de los estudiantes. El cuestionario Dundee Ready Education Environment Measure (DREEM) se utiliza ampliamente para evaluar las percepciones de los estudiantes sobre su clima educativo. **Objetivos**: Evaluar el entorno de aprendizaje de los estudiantes de Fisioterapia en la Universidad de Taif mediante el cuestionario DREEM y examinar cómo el género, el nivel académico y la edad predicen las percepciones de los estudiantes. **Métodos**: Se realizó un estudio transversal entre estudiantes de pregrado de Fisioterapia utilizando la versión árabe validada del cuestionario DREEM. Se emplearon estadísticas descriptivas, análisis bivariados (prueba t, ANOVA) y regresión lineal múltiple para analizar los datos. Los resultados se informaron con intervalos de confianza del 95% y la significancia se estableció en p < 0,05. **Resultados**: Un total de 234 estudiantes completaron la encuesta. La puntuación media general de DREEM fue de 125,1 sobre 200, lo que indica una percepción "más positiva que negativa". Los estudiantes varones obtuvieron puntuaciones DREEM significativamente más altas que las estudiantes mujeres (2,65 frente a 2,51; p = 0,014). Si bien las diferencias entre los años académicos no fueron estadísticamente significativas (p = 0,138), los estudiantes de segundo año reportaron las puntuaciones más altas. La regresión lineal múltiple mostró que el género femenino (β = -0,14, p = 0,012) y estar en el cuarto año (β = -0,25, p = 0,042) se asociaron con puntuaciones DREEM generales más bajas. **Conclusión**: El entorno educativo para los estudiantes de fisioterapia en la Universidad de Taif generalmente se percibe como positivo. Sin embargo, las diferencias basadas en el género y el año académico resaltan la necesidad de intervenciones específicas, particularmente para estudiantes mujeres y de cuarto año. Mejorar el apoyo entre pares, el manejo del estrés y las estrategias de enseñanza inclusivas puede mejorar la experiencia general del estudiante.

Palabras clave: DREEM, entorno educativo, percepción estudiantil, regresión, fisioterapia, Arabia Saudita

1. Introduction

In an educational context, the environment in which students are immersed plays a crucial role in shaping their learning experiences (1). The learning environment primarily refers to the physical and social setting where teaching, learning, and interpersonal interactions occur within an educational institution. It encompasses all factors that influence the learning experience and significantly impacts students' academic performance, productivity, and behavior (2–3). Students' academic progress and behavioral outcomes are strongly affected by their perceptions of the educational environment. Moreover, understanding how students perceive their learning spaces can contribute to improved teaching quality—a topic that medical schools are increasingly exploring (4). In recent years, education research has gained substantial attention, leading to the development of several tools, such as questionnaires and interviews, to assess various educational settings. A positive learning environment has been shown to enhance the quality of student learning and may positively affect cognitive outcomes (5).

In 1997, medical educators developed the Dundee Ready Education Environment Measure (DREEM) to evaluate and diagnose issues within educational settings, identify strengths and weaknesses in the learning climate, and facilitate comparisons within and between institutions and medical schools (6–7). The educational environment is critical in influencing students' academic success, motivation, and satisfaction. The DREEM instrument offers a comprehensive assessment of medical and health professions' educational climates on a global scale (7). Since its inception, it has been widely validated and implemented across diverse cultural and institutional contexts. In a systematic review, Soemantri et al. (8) emphasized DREEM's effectiveness in capturing nuanced aspects of educational environments and guiding institutional improvements. They also examined its psychometric properties and adaptability across varying educational settings. Building on this, Miles

et al. (9) reviewed its global application and found it useful for curriculum development and inter-institutional benchmarking, while noting that cultural and contextual differences may affect how results are interpreted. Their findings highlight the importance of using DREEM not merely as an evaluative tool but as a foundation for meaningful educational reform.

Studies further confirm DREEM's relevance in multicultural and multilingual contexts (10-11). These comparative analyses underscore the need for local adaptation while upholding consistent evaluative standards. For example, the Colombian study by Enns et al. (11) and the Spanish multicenter study by Esquerda et al. (12) illustrate how DREEM outcomes can vary according to sociocultural, curricular, and pedagogical influences. In physiotherapy education—where clinical exposure, interprofessional collaboration, and student support are particularly important—understanding the educational climate is especially relevant. Incorporating international findings provides a broader conceptual framework for the present study and facilitates cross-national and interprofessional comparisons.

The DREEM questionnaire comprises 50 statements with closed-ended responses, categorized into five subscales: Students' Perceptions of Learning (12 items), Students' Perceptions of Teachers (11 items), Students' Academic Self-Perceptions (8 items), Students' Perceptions of Atmosphere (12 items), and Students' Social Self-Perceptions (7 items). Responses are scored on a five-point Likert scale: "Strongly Agree" (4), "Agree" (3), "Uncertain" (2), "Disagree" (1), and "Strongly Disagree" (0). The DREEM has been shown to be both valid and reliable for assessing educational settings across different countries and cultures (8, 10). It has been translated into Arabic and eight other languages (9), and it has been employed in numerous medical schools in Saudi Arabia, including those in Jeddah, Makkah, Dammam, Qassim, Jazan, and Riyadh (14–19). Many educational institutions prioritize assessing student satisfaction and perceptions of their learning environments. These assessments should be conducted regularly to enhance student performance, support educational quality, and guide curriculum development (20).

The present study aims to utilize the DREEM instrument to evaluate the educational experiences of undergraduate physiotherapy students at Taif University. The findings will be instrumental in identifying areas for improvement and establishing future benchmarks. While DREEM has seen extensive use worldwide, relatively few studies have focused on Middle Eastern and Latin American settings. For instance, a Brazilian study involving 22 medical schools reported a mean DREEM score of 119.4 ± 27.1, which significantly correlated with students' perceived quality of life (21). Similarly, at ICESI University in Colombia, a mean score of 125/200 was reported, highlighting the need for faculty development and curriculum reform (22). In Europe, a Spanish multicenter study across five medical schools found lower average scores (95.8 ± 22.6), particularly in the domains of social support and learning atmosphere (12). At Taif University, internal data from the 2023 academic advising survey revealed student concerns about peer interaction and faculty accessibility. Evaluating the physiotherapy educational environment using DREEM will thus provide essential institutional insights and allow meaningful comparisons with similar contexts in Latin America and Spain.

2. Methods

Study Design

This study used a cross-sectional design. The Dundee Ready Education Environment Measure (DREEM) questionnaire was integrated into an online form (Google Forms) and disseminated via official university email addresses and social media platforms (WhatsApp, Telegram, Messenger) to undergraduate physical therapy students at Taif University between January 2025 and March 2025.

Ethical Approval

This study was reviewed and approved by the Institutional Review Board (IRB) of Taif University under Resolution No. 46-104. All procedures were carried out in accordance with the

ethical standards of the institutional and national research committees, as well as the 1964 Helsinki Declaration and its subsequent amendments. Informed consent was acquired from all participants prior to data collection. Participation was voluntary, and all responses were anonymized to ensure confidentiality.

Survey Instrument

The survey consisted of two parts. The first part was demographic data, including sex, age, and academic year. The second part comprised the DREEM questionnaire. The Arabic version of the DREEM questionnaire was used in this study, as it has been previously validated in multiple studies across Saudi Arabia and other Arabic-speaking countries (2, 14). The Arabic adaptation has demonstrated acceptable psychometric properties, with internal consistency (Cronbach's alpha) reported between 0.78 and 0.89 in prior research. In the current study, the overall Cronbach's alpha for the 50-item scale was 0.71, indicating good reliability. Subscale Cronbach's alpha values were also acceptable: SPL (0.745), SPT (0.771), SASP (0.764), SPA (0.777), and SSSP (0.877). No separate pilot test was conducted for this study, as the validated tool was implemented directly following prior reliability confirmation in regional contexts. Five domains were assessed in the DREEM questionnaire: Student Perception of Learning (12 items), maximum score of 48; Student Perception of Teachers (11 items), maximum score of 44; Student Academic Self-Perception (8 items), maximum score of 32, Student Perception of Atmosphere (12 items), maximum score of 48, and Student Social Self-Perception (7 items), maximum score of 28. Each item was rated on a five-point Likert scale, as follows: poor (0–50); many problems (51–100); more positive than negative (101–150); and Excellent (151–200). Subscale interpretations were defined according to their respective score ranges, and item-level interpretation classified mean scores ≥ 3.5 as positive, 2–3 as areas for improvement, and ≤ 2 as problematic(20,21).

Sample Characteristics

The source population included all undergraduate physical therapy students enrolled in the second to fifth years at the College of Applied Medical Sciences, Taif University, during the academic year 2024–2025 (N = 484). First-year students were excluded due to limited exposure to the full academic environment, and participation was voluntary. A convenience sampling method was used to recruit students through institutional email and social media platforms. To ensure representativeness and statistical power, a sample size calculation was performed using the online *Good Calculators Sample Size Calculator*, assuming a 95% confidence level, a 5% margin of error, and a population size of 484. This yielded a required minimum sample size of 215 students. Ultimately, 234 students responded and were included in the final analysis, achieving a response rate of 48.3%. Inclusion criteria were active enrollment in the second to fifth years and informed consent. Students were excluded if they declined participation or failed to complete the survey.

Statistical Analysis

Data were analyzed using IBM SPSS Statistics version 25. Descriptive statistics included means, standard deviations, and 95% confidence intervals (CI) for total and subscale DREEM scores. The internal consistency of the DREEM scale was assessed using Cronbach's alpha. Normality was checked using the Shapiro-Wilk test. To explore differences between groups, independent-sample t-tests were used for two-category variables (e.g., sex), and one-way ANOVA with post hoc tests (Tukey) for more than two groups (e.g., year of study). Where normality was violated, the Mann-Whitney U test or Kruskal-Wallis test was used as appropriate. Associations between demographic variables and DREEM total score were further explored using multiple linear regression, with sex, academic year, and age as independent variables. A p-value < 0.05 was considered statistically significant.

3. Results

Demographic Characteristics

The study included 234 participants with a response percentage of 48.3%; the ages were distributed between 19 and 24. 22-year-olds accounted for the largest percentage of the population (34.2%), followed by 21-year-olds (25.6%), 20-year-olds (23.9%), 23-year-olds (12%), 19-year-olds (2.6%), and 24-year-olds (1.7%). Regarding the academic year of students, the highest proportion of participants was in the fourth year (53.8%), followed by third-year (30.8%), fifth-year (12%), and second-year students (3.4%). No first-year students took part in the study. In terms of gender distribution, the majority of participants were male (59%), while females made up 41% of the sample.

The internal consistency analysis yielded a Cronbach's alpha of 0.71 for the overall DREEM inventory, indicating a good level of reliability. Similarly, the five subscales demonstrated high internal consistency, with Cronbach's alpha coefficients as follows: Students' Perceptions of Learning (SPL) – 0.75, Students' Perceptions of Teachers (SPT) – 0.77, Students' Academic Self-Perceptions (SASP) – 0.77, and Students' Social Self-Perceptions (SSSP) – 0.87.

As shown in Table 1, the total DREEM score was 125.1 out of 200 (62.5%), which falls within the range described as "more positive than negative." Among the subscales, Students' Perceptions of Learning (SPL) had a mean score of 31.9 (66.3%), indicating that students generally view their learning experiences favorably. Students' Perceptions of Teachers (SPT) scored slightly higher at 29.7 (67.5%), while Students' Academic Self-Perceptions (SASP) scored 20.2 (63.2%), reflecting a moderate level of academic self-confidence. The Students' Perceptions of Atmosphere (SPA) subscale had a mean score of 28.3 (58.9%), suggesting a somewhat positive, though less favorable, perception of the overall learning environment. The lowest score was recorded in the Students' Social Self-Perceptions (SSSP) subscale, with a mean of 15.0 (53.5%), indicating a perceived need for greater social support.

Table 1. DREEM subscale score and its interpretations

DREEM subscale	Maximum score	Mean	Percent	Interpretation
SPL	48	31.8	66.3%	a more positive approach
SPT	44	29.7	67.5%	moving in the right direction
SASP	32	20.2	63.2%	feeling more on the positive side
SPA	48	28.3	58.9%	a more positive atmosphere
SSSP	28	15	53.5%	not too bad
Total	200	125.1	62.5%	More positive than negative

SPL: Students' perception of learning, SPT: Students' perception of teachers, SASP: Students' academic self-perception, SPA: Students' perception of atmosphere, SSSP: Students' social self-perception

Gender-based comparisons revealed that male students reported higher scores than female students across all subscales except SPL, where female students had a slightly higher mean (32.4) compared to males (31.4). These findings point to both strengths and areas for improvement in the educational environment, particularly in the domains of atmosphere and social engagement (table 2).

Students across all academic levels expressed a generally positive perception of the educational environment (table 3). Notably, 2nd year students reported the highest overall DREEM score (135.0), while 4th year students reported the lowest (127.1), indicating a possible decline in perception as students advance through their academic journey. The SPL subscale was also highest among 2nd year students (70.8%), reflecting a strong positive learning experience; other academic levels reported similarly favorable scores, all above 65%. SPT received the highest ratings from 2nd year students (81.8%), suggesting a particularly favorable view of faculty at this stage. SASP peaked among 2nd year students (70.3%) but showed a slight decrease in subsequent years, which may indicate a reduction in academic confidence over time. SPA were moderately positive across all years, with the highest score

again reported by 2nd year students (66.1%). Interestingly, SSSP were lowest in the 2nd year (56.3%) but increased significantly by the 5th year (78.7%), suggesting that perceptions of social support improve in later stages of the program. These findings indicate that, while overall perceptions of the educational environment are positive, variations across academic levels, particularly in views of teaching and social engagement, highlight key areas for targeted improvement.

Table 2. Mean scores, percentages, and interpretations of DREEM subscales by gender.

DREEM and its subscale	Maximum score		Mean	Percent
SPL	48	M	31.4	65.4%
		F	32.4	67.5%
		All	31.9	66.5%
SPT	44	M	31.2	70.9%
		F	27.7	62.9%
		All	29.45	66.9%
SASP	32	M	20.3	63.4%
		F	20.1	62.8%
		All	20.2	63.1%
SPA	48	M	29.4	61.3%
		F	26.6	55.4%
		All	28	58.3%
SSSP	28	M	20.2	72.1%
		F	18.7	66.8%
		All	19.45	69.5%
Total	200	M	132.5	66.3%
		F	125.5	62.8%
		All	129	64.5%

M, male; F, female. Rest of abbreviations as in the previous table.

In addition to descriptive statistics, inferential analyses were conducted to explore subgroup differences and predictors of overall DREEM scores (Table 4). Sex-based comparisons using independent-sample t-tests revealed that male students reported significantly higher overall DREEM scores (mean = 2.65, 95% CI: 2.58–2.72) than female students (mean = 2.51, 95% CI: 2.42–2.60), with a statistically significant difference (p = 0.014). Academic year comparisons using one-way ANOVA showed no statistically significant differences in DREEM scores across the four academic levels (p = 0.138), though students in the second year had the highest mean score (mean = 2.80, 95% CI: 2.53–3.07). To identify predictors of the DREEM score, a multiple linear regression model was applied with sex, age, and academic level as independent variables. The model showed that female sex was a statistically significant negative predictor (β = -0.14, p = 0.012), indicating that female students had lower overall DREEM scores compared to males. Being in the fourth academic year was also significantly associated with lower scores compared to second-year students (β = -0.25, p = 0.042). Age was not a significant predictor (p = 0.291).

Table 3. Mean scores, percentages, and interpretations of DREEM Subscales by study level.

DREEM and its subscale	Maximum score	Study level (year)	Mean	Percent
SPL	48	2	34	70.8%
		3	31.25	65.1%
		4	31.98	66.6%
		5	31.8	66.2%
SPT	44	2	36	81.8%
		3	30.8	70%
		4	28.4	64.5%

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		5	31.2	70.9%
SAP	32	2	22.5	70.3%
		3	20.5	64.1%
		4	19.8	61.9%
		5	20.64	64.5%
SPSA	48	2	31.75	66.1%
		3	28.6	59.6%
		4	27.7	57.7%
		5	29	60.4%
SSSP	28	2	15.75	56.3%
		3	19.76	70.6%
		4	19.2	68.6%
		5	22.03	78.7%
Total	200	2	135.0	67.5%
		3	130.91	65.5%
		4	127.08	63.5%
		5	134.67	67.3%

Abbreviations as in the previous table.

Table 4. Comparison of DREEM Subscale Scores by Gender and Study Level

DREEM subscale	Sex	N	Mean	SD	P value	Study Level	N	Mean	SD	P value
SPL	Male	138	2.618	.5467	0.286	2	8	3.25	.886	0.699
	Female	96	2.697	.577		3	72	2.0	1.342	
						4	126	1.45	1.389	
						5	28	1.57	1.57	
SPT	Male	138	2.836	.635	0.000	2	234	1.69	1.42	0.007
	Female	96	2.516	.7179		3	8	3.0	.755	
						4	72	2.47	1.1	
						5	126	2.23	1.207	
SASP	Male	138	2.538	.6601	0.798	2	28	2.0	1.44	0.499
	Female	96	2.514	.7462		3	234	2.3	1.2	
						4	8	3.0	.755	
						5	72	3.3	.663	
SPA	Male	138	2.454	.413	0.000	2	126	3.02	.763	0.122
	Female	96	2.219	.434		3	28	3.35	.621	
						4	234	3.14	.728	
						5	8	2.25	.886	
SSSP	Male	138	2.881	.7580	0.025	2	72	2.95	.846	0.003
	Female	96	2.68	.5238		3	126	2.206	1.31	
						4	28	3.1	1.03	
						5	234	2.54	1.204	
Total	Male	138	2.65	.407	0.014	2	8	1.5	.755	0.138
	Female	96	2.51	.444		3	72	2.47	1.233	
						4	126	2.50	1.204	
						5	28	2.64	1.44	

Abbreviations as in the previous table.

4. Discussion

The findings of this study highlight several structural and pedagogical factors influencing students' perceptions of their educational environment. The persistence of traditional teaching models, hierarchical faculty-student dynamics, and limited student autonomy may contribute to reported deficiencies in students' academic self-confidence and social well-being. To address these concerns, incorporating blended learning strategies and reassessing assessment frameworks may foster a more supportive and engaging academic experience.

Targeted Areas for Improvement

- Peer Support and Mentoring: The low score in the Students' Social Self-Perception (SSSP) domain (53.5%) indicates limited peer engagement and emotional support. This calls for the introduction of structured peer mentoring initiatives, student-led support groups, and accessible wellness counseling services to alleviate academic stress and promote social integration.

- Faculty Development: While perceptions of teaching were generally positive (SPT: 67.5%), the variation in scores across gender and academic levels signals a need for professional development in inclusive pedagogy. Workshops focused on student-centered teaching methods, gender-sensitive communication, and inclusive classroom practices may help reduce disparities and enhance teaching effectiveness.

- Curricular Design and Progression: The gradual decline in student satisfaction in higher academic years—especially among fourth-year students—suggests that a clinically intense and didactically rigid curriculum may reduce engagement. Integrating innovative instructional approaches, such as problem-based learning (PBL), flipped classrooms, and interprofessional education, could help re-engage students and increase their satisfaction.

- Institutional Culture and Student Voice: Creating a more participatory academic environment, where students are regularly consulted and involved in curriculum development, may improve perceptions of the institutional climate and foster a stronger sense of belonging.

Notably, the lower scores reported by fourth-year students reflect trends observed in similar contexts. Awawdeh et al. (17) found that senior health students often experience decreased engagement and elevated stress, likely due to heavier clinical responsibilities and reduced faculty accessibility. The gender disparity in perceptions, where male students rated their learning environment more favorably, raises concerns about equity and inclusion. Similar disparities have been documented in studies from Pakistan and Saudi Arabia, suggesting that differences in mentorship availability, communication styles, and cultural expectations may influence how students perceive their academic support systems.

The relatively low SSSP score is consistent with findings from other Saudi-based studies (21), potentially reflecting broader sociocultural dynamics such as gender segregation, limited extracurricular activities, and the psychological burden of clinical demands. Comparable findings in Spain and Syria further suggest that student social well-being is a global concern, particularly in health sciences education (12).

The overall mean DREEM score of 125.1 out of 200 indicates a moderately positive perception of the learning environment, aligning closely with previous studies in Saudi Arabia. For instance, 126.4 in (23) and 129.0 in (15), while being lower than the exceptional score of 170,9 reported by (24). Internationally, the results are comparable to studies from Colombia's ICESI University (12) and Brazil (11), and higher than those from a Spanish multicenter study (95.8/200), suggesting a relatively favorable academic environment at Taif University.

These patterns are not limited to physiotherapy. Similar DREEM outcomes have been reported in other health disciplines such as dentistry and pharmacy. For instance, a score of 120.6 was found among dental students (14), highlighting parallel issues in peer interaction and clinical stress. This consistency across disciplines emphasizes the cross-applicability of interventions like peer support structures and enhanced faculty engagement. Some authors (8-9) stressed that institutional culture, curriculum structure, and teaching methods play significant roles in shaping students' educational perceptions. Our findings corroborate their conclusions, reinforcing the call for more participatory, inclusive, and flexible educational practices.

Beyond descriptive analysis, this study incorporated bivariate and multivariate approaches to uncover patterns in perception. Male students consistently reported higher DREEM scores, indicating a notable gender-based difference that reflects regional patterns. While ANOVA did not reveal statistically significant differences across academic years, second-year students tended to rate their environment more positively. Regression analysis further demonstrated that being female and in the fourth academic year were both associated with lower overall DREEM scores, emphasizing the need for tailored interventions. These findings align with research in Pakistan (25), which reported an overall DREEM score of 55.51% among physical therapy students, with subscale scores reflecting similar concerns in teaching quality, social support, and stress. Within Saudi Arabia, other studies have also documented positive yet varied perceptions of the learning environment, with scores ranging from 112.4 to 170.9, depending on the institution and study focus.

Analysis of subscale scores revealed that male students generally rated teaching (SPT), atmosphere (SPA), and social support (SSSP) higher than female peers, with significant differences noted across these domains. These disparities were also identified in the work of Al-Hazimi et al.(24), whereas other studies found no gender-based differences. This inconsistency highlights the importance of exploring underlying factors such as faculty engagement, classroom dynamics, and cultural influences. Students rated teaching quality highly (SPT: 67.5%), confirming the importance of effective instructional strategies in fostering motivation and academic success. However, the low SSSP score (53.5%) remains a point of concern, underscoring the need for enhanced peer engagement and social inclusion. Introducing student networking events, mentorship programs, and accessible mental health services may address these gaps. The current findings demonstrate that while Taif University's physical therapy program shows strength in teaching and academic support, there is clear room for improvement, particularly in enhancing social connectedness, addressing gender disparities, and rethinking senior-year clinical transitions. These insights, supported by both regional and international evidence, suggest that strategic, evidence-based reforms can help create a more equitable and engaging learning environment.

Practical Implications

The findings point to several concrete actions for educators and administrators:

- Peer Mentoring and Support Programs: The relatively low scores in Students' Social Self-Perception (SSSP) underscore the need to foster a stronger sense of community. Institutions can implement structured peer mentoring systems, student-led support groups, and social integration activities.
- Faculty Development in Inclusive Pedagogy: Given gender disparities in perceptions of teaching (SPT) and learning atmosphere (SPA), faculty development programs should include training in gender-sensitive communication, active engagement strategies, and inclusive classroom practices.
- Curricular and Clinical Redesign for Senior Students: The drop in DREEM scores among fourth-year students indicates rising academic stress. Adjustments such as balanced clinical workload distribution, reflective sessions, and stress management workshops may improve senior-year experiences.

- Student Voice in Curriculum Feedback: Creating formal mechanisms for students to provide ongoing feedback—e.g., anonymous evaluations or student advisory committees—can enhance responsiveness to emerging issues and promote a participatory learning culture.

Limitations and Future Research

The current study has several limitations that should be acknowledged. First, the use of a cross-sectional design restricts the ability to infer causality between demographic factors and students' perceptions. Longitudinal studies would be better suited to track changes over time. Second, the sampling method was non-random and based on voluntary participation through online platforms, which may introduce selection bias. Students who felt more strongly, positively, or negatively may have been more likely to respond. Third, data collection relied on self-reported questionnaires, which can be susceptible to information bias or social desirability bias. Students might have responded in ways they believed were expected or socially acceptable, rather than providing completely accurate reflections. Fourth, although the sample size was sufficient for statistical analysis, it was limited to a single institution, which affects the generalizability of the results to other universities or regions. The specific institutional culture and educational model at Taif University may not represent other settings. Finally, while the study was conducted in 2025, residual effects from earlier pandemic-related disruptions, including shifts to hybrid or remote learning and altered academic routines, may have influenced student perceptions. These contextual factors should be considered when interpreting the results.

Future studies should consider:

- Longitudinal designs to track changes in perceptions over time.
- Examining links between DREEM scores and academic outcomes (e.g., GPA, clinical performance).
- Conducting qualitative research to explore gender differences and social perceptions.
- Cross-institutional and cross-cultural comparisons to assess broader applicability.

Conclusions

- This study assessed the educational environment of undergraduate physical therapy students at Taif University using the DREEM instrument. The overall score (125.1/200) reflects a generally positive perception, with the highest subscale scores observed in students' perception of teachers (67.5%) and learning (66.3%). However, the lowest score in students' social self-perception (53.5%) highlights a need for improved peer support and social engagement strategies.
- Gender-based differences were evident, with male students consistently reporting more favorable Perceptions across most domains, particularly regarding the perceptions of teachers and the atmosphere. The academic level also influenced perceptions, with fourth-year students reporting lower scores, indicating potential stressors or dissatisfaction during this stage of the curriculum.
- These findings suggest that while the overall learning environment is supportive, targeted interventions—such as faculty development, social support programs, and gender-sensitive teaching approaches—could enhance the student experience, especially for female and senior-year students.

analysis, and Statistical analysis. MSA: Validation, software, and visualization. HMH: data acquisition and manuscript review. AAI: Table preparation, references citation software, and manuscript editing.

References.

1. Chakanika WW, Sichula NK, Sumbwa PI. The adult learning environment. *J Adult Educ*. **2019**, 1(1), 14–21. https, //journals.unza.zm/index.php/JAE/article/view/99

2. Al-Ahmari MM, Al Moaleem MM, Khudhayr RA, Sulaily AA, Alhazmi BAM, AlAlili MIS, et al. A systematic review of publications using the Dundee Ready Education Environment Measure (DREEM) to Monitor Education in medical colleges in Saudi Arabia. *Med Sci Monit Int Med J Exp Clin Res*. **2022**, 28, e938987-1. 10.12659/MSM.938987

3. Ozerem A, Akkoyunlu B. Learning environments designed according to learning styles and their effects on mathematics achievement. *Eurasian J Educ Res*. **2015**, (61). https, //eric.ed.gov/?id=EJ1087554

4. Genn JM. AMEE Medical Education Guide No. 23 (Part 1), Curriculum, environment, climate, quality, and change in medical education–a unifying perspective. *Med Teach*. **2001**, 23(4), 337–44. doi.org/10.1080/01421590120063330

5. Fraser BJ. The evolution of the field of learning environments research. *Educ Sci*. **2023,** 13(3), 257. doi.org/10.3390/educsci13030257

6. McAleer S, Roff S. A practical guide to using the Dundee Ready Education Environment Measure (DREEM). *AMEE Med Educ Guid*. **2001**, 23(5), 29–33. https://www.researchgate.net/publication/288791256_A_practical_guide_to_using_the_Dundee_Ready_Education_Environment_Measure_DREEM

7. Roff SUE, 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), 295–9. doi.org/10.3109/01421599709034208

8. Soemantri D, Herrera C, Riquelme A. Measuring the educational environment in health professions studies, a systematic review. *Med Teach*. **2010**, 32(12), 947–52. doi.org/10.3109/01421591003686229

9. Miles S, Swift L, Leinster SJ. The Dundee Ready Education Environment Measure (DREEM): A review of its adoption and use. *Med Teach*. **2012**, 34(9), e620–34. 10.3109/0142159X.2012.668625

10. 10. Hammond SM, O'Rourke M, Kelly M, Bennett D, O'Flynn S. A psychometric appraisal of the DREEM. *BMC Med Educ*. **2012**, 12, 1–5. https://doi.org/10.1186/1472-6920-12-2

11. Enns SC, Perotta B, Paro HB, Gannam S, Peleias M, Mayer FB, et al. Medical students' perception of their educational environment and quality of life, is there a positive association? *Acad Med*. **2016**, 91(3), 409-17. http://doi.org/10.1097/ACM.0000000000000952

12. Esquerda M, Garcia-Estañ J, Ruiz-Rosales A, Garcia-Abajo JM, Millan J. Academic climate and psychopathological symptomatology in Spanish medical students. *BMC Medical Education*. **2023**, 23(1), 843. https://doi.org/10.1186/s12909-023-04811-2

13. Pai PG, Menezes V, Srikanth, Subramanian AM, Shenoy JP. Medical students' perception of their educational environment. *J Clin Diagnostic Res*. **2014**, 8(1), 103. https://doi.org/10.7860/JCDR/2014/5559.3944

14. Sabbagh HJ, Bakhaider HA, Abokhashabah HM, Bader MU. Students' perceptions of the educational environment at King Abdulaziz University Faculty of Dentistry (KAUFD), a cross-sectional study. *BMC Med Educ*. **2020**, 20, 1–7. 10.1186/s12909-020-02165-7

15. Alshareef M, Khouj G, Alqahtani S, Bamoosa E, Fageeh S, Alalyani M, et al. Perception of the learning environment among medical students at Umm Al-Qura University, Makkah, Saudi Arabia. *Majmaah J Heal Sci*. **2022**, 10(3), 88. 10.5455/mjhs.2022.03.009

16. Al-Qahtani MFM. Approaches to study and learning environment in medical schools with special reference to the Gulf countries. Ph. D. Thesis **1999**. https://discovery.dundee.ac.uk/en/studentTheses/approaches-to-study-and-learning-environment-in-medical-schools-w

17. Awawdeh M, Alosail LA, Alqahtani M, Almotairi A, Almikhem RN, Alahmadi RA, et al. Students' perception of the educational environment at King Saud bin Abdulaziz University for health sciences using the DREEM tool. *BMC Med Educ.* **2024**, 24(1), 42. 10.1186/s12909-023-05004-7

18. Irfan F, Al Faris E, Al Maflehi N, Karim SI, Ponnamperuma G, Saad H, et al. The learning environment of four undergraduate health professional schools: Lessons learned. *Pakistan J Med Sci*. **2019**, 35(3), 598. 10.12669/pjms.35.3.712

19. Rawas H, Yasmeen N. Perception of nursing students about their educational environment in the college of nursing at King Saud bin Abdulaziz University for health sciences, Saudi Arabia. *Med Teach*. **2019**, 41(11), 1307–14. 10.1080/0142159X.2019.1638502

20. Patil AA, Chaudhari VL. Students' perception of the educational environment in medical college: a study based on DREEM questionnaire. *Korean J Med Educ*. **2016**, 28(3), 281. 10.3946/kjme.2016.32

21. 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), 115–22. https://doi.org/10.1016/j.jtumed.2013.11.005

22. Abbas M, Salih K, Elhassan K, Ishag M, Alfaifi J, Eledum H. Measurement of the educational environment of an innovative, undergraduate medical program in the Kingdom of Saudi Arabia using DREEM. *Int J Med Dev Ctries*. **2020**, 4 (September), 1734–7. 10.24911/IJMDC.51-1582533753

23. Al-Hazimi A, Zaini R, Al-Hyiani A, Hassan N, Gunaid A, Ponnamperuma G, et al. Educational environment in traditional and innovative medical schools: a study in four undergraduate medical schools. *Educ Heal*. **2004**, 17(2), 192–203. https://doi.org/10.1080/13576280410001711003

24. Mehmood Z, Mashaal AH, George J, Bano A, Elnozhe MM, Ullah A, et al. Evaluating student perceptions of the learning environment using Dream in physical therapy students during e-learning. *Cuest. Fisioter*. **2024**, 53(3), 4047-4058. https://cuestionesdefisioterapia.com/index.php /es/article/view/2962

25. Atwa H, Alkhadragy R, Abdelaziz A. Medical Students' Perception of the Educational Environment in a Gender-Segregated Undergraduate Program. *J Med Educ*. **2020**, 19(3). 10.5812/jme.104934

26. Al-Natour SH. Medical students' perceptions of their educational environment at a Saudi university. Saudi *J Med Med Sci*. **2019**, 7(3), 163–8. 10.4103/sjmms.sjmms_141_17

27. Khan SQ, Al-Shahrani M, Khabeer A, Farooqi FA, Alshamrani A, Alabduljabbar AM, et al. Medical students' perception of their educational environment at Imam Abdulrahman Bin Faisal University, Kingdom of Saudi Arabia. *J Fam Community Med*. **2019**, 26(1), 45–50. 10.4103/jfcm.JFCM_12_18

28. Hasan T, Gupta P. Assessing the learning environment at Jazan Medical School of Saudi Arabia. *Med Teach*. **2013**, 35(suppl 1). 10.3109/0142159X.2013.765546

29. Essa M. Students' perceptions of learning environment in Jazan Medical School in Saudi AlSheikhMH. 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), 115–22. https://dx.doi.org/10.1016/j.jtumed.2013.11.005