

Pre-Clerkship Medical Students' Perspectives on the Learning Environment at Arabian Gulf University, Bahrain

Insights on Learning Experiences at Arabian Gulf University

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Abstract

Background: The educational environment in medical schools is a critical factor influencing students' academic performance and overall learning experience. It significantly influences cognitive, social, and organizational dimensions, thereby affecting students' perceptions, learning outcomes, and overall satisfaction with their educational experience..

Aim: This study sought to evaluate the educational environment for pre-clerkship medical students at AGU using the Dundee Ready Education Environment Measure (DREEM), assessing both strengths and areas requiring improvement.

Methods: A bilingual (Arabic and English) version of the DREEM instrument, validated for diagnosing the quality of educational environments, was administered to 324 undergraduate pre-clerkship students at AGU across the second, third, and fourth academic years. Data analysis employed both parametric and non-parametric tests to assess the relationship between DREEM scores and variables such as academic year, gender, nationality, and academic performance.

Results: There were no significant differences in students' perceptions based on academic year or gender. However, significant differences were observed in nationality and academic achievement ($p = 0.048$ and $p = 0.018$, respectively).

Conclusion: The findings indicate that pre-clerkship students generally perceive AGU's learning environment positively. However, the study identified specific areas within the educational environment that may benefit from targeted improvement strategies to enhance the overall learning experience.

Keywords: educational, learning, environment, climate

1. Introduction

The educational environment plays a fundamental role in shaping the academic and personal development of medical students. It influences various dimensions, including cognitive, social, and organizational aspects, which subsequently impact students' perceptions, learning outcomes, and overall satisfaction with their educational experience. One of the key tools used to assess and evaluate these environments is the Dundee Ready Education Environment Measure (DREEM). This instrument captures five essential dimensions: students' perceptions of learning, teachers, academic self-perceptions, atmosphere, and social self-perceptions. By examining these factors, DREEM provides comprehensive insights into the strengths and weaknesses of medical institutions, facilitating improvements in educational practices (Verma et al., 2024).

Recent studies emphasize the significance of a positive educational environment in reducing student burnout and fostering academic success. A systematic review of DREEM's application across health professions education demonstrated that environments promoting student-centered learning and fostering supportive faculty interactions were linked to higher levels of student satisfaction and improved academic performance. This underscores the value of cultivating an educational environment that aligns with students' needs, which in turn enhances their overall learning experience and academic achievement (OAMJMS, 2023). In a similar vein, research conducted in Saudi Arabia revealed that the incorporation of interactive and participatory learning methods led to higher

DREEM scores, indicating better alignment with students' educational preferences and more effective pedagogical approaches (Medical Science Monitor, 2023).

As medical education continues to evolve, the ongoing assessment of learning environments has become increasingly important. Regular evaluations allow institutions to identify gaps and implement necessary interventions, such as curriculum adjustments and infrastructure improvements, to enhance learning conditions. Research has shown that incorporating student feedback into the design of educational strategies not only improves DREEM scores but also enhances student engagement and mental well-being. This iterative process ensures that educational reforms are responsive to the needs of students and fosters a more supportive learning environment (OAMJMS, 2023). In this context, tools like DREEM are pivotal in driving continuous improvements by transforming students' perceptions into actionable insights that inform institutional policies.

1.1 Study Objectives

1. To evaluate and compare the perceptions of the educational environment at the Arabian Gulf University (AGU), Bahrain, using the DREEM inventory, focusing on demographic factors influencing medical students' responses.
2. To benchmark these findings against regional and international studies to contextualize AGU's educational environment within broader educational standards.

2. Methods

2.1 Study Context

This study was conducted at the College of Medicine and Medical Sciences (CMMS), AGU adopts a problem-based learning (PBL) and student-centered curriculum with a robust community orientation. It is a public institution founded by the Gulf Cooperation Council (GCC) to address educational and development needs across Arabian Gulf countries. AGU comprises two colleges and one school, offering undergraduate and postgraduate programs in fields such as medicine, health sciences, and graduate studies. The university is dedicated to advancing scientific research and education in the region, with a strong emphasis on sustainability and applied sciences.

AGU was established in 1982. It is organized into three distinct phases: the premedical phase (one year), the pre-clerkship phase (three years), and the clerkship phase (two years). From the second year onward, students are introduced to an integrated curriculum combining basic and clinical sciences, with progressively increasing clinical exposure. The curriculum's horizontal and vertical integration aims to enhance foundational knowledge and clinical competencies systematically.

2.2 Study Design

This cross-sectional, descriptive quantitative study was conducted during the first semester of the 2023–2024 academic year. Data were collected using the DREEM questionnaire to assess students' perceptions of AGU's educational environment comprehensively.

2.3 Participants

The study population consisted of all pre-clerkship medical students (2nd, 3rd, and 4th years) enrolled at AGU in the 2023–2024 academic year. By employing a complete enumeration approach, the study captured the collective perceptions of pre-clerkship students across multiple academic levels.

2.4 Data Collection Procedures

The DREEM was administrated in September 2023, during the second semester. Two reminders were issued in October and November 2023 to maximize response rates. Participants were informed about the study's purpose, significance, and ethical safeguards, including confidentiality and voluntary participation.

2.5 DREEM Instrument

The DREEM questionnaire is a globally validated and widely recognized tool designed to assess the educational environment in medical institutions. We used the original DREEM questionnaire with some minor modifications to suit the AGU pre-clerkship learning process. It consists of 50 items distributed across five subscales: **Students' Perceptions of Learning (SPL)**, which includes 12 items with a maximum score of 48; **Students' Perceptions of Teachers (SPT)**, encompassing 11 items with a maximum score of 44; **Students' Academic Self-Perceptions (SASP)**, featuring 8 items with a maximum score of 32; **Students' Perceptions of Atmosphere (SPA)**, consisting of 12 items with a maximum score of 48; and **Students' Social Self-Perceptions (SSSP)**, comprising 7 items with a maximum score of 28. Collectively, these subscales provide a comprehensive measure of the educational climate, with total scores ranging from 0 to 200, where higher scores signify more favorable perceptions.

The total score ranges from 0 to 200, with higher scores indicating more favorable perceptions of the educational environment. The instrument has been extensively validated across diverse cultural and institutional settings, demonstrating strong psychometric properties with Cronbach's alpha values consistently exceeding 0.90, indicating high reliability. (Roff, S., 1997; Roff, 2001, Roff, 2005 & Roff, 2011)

2.6 Pilot Testing and Instrument Validation

To ensure clarity and cultural relevance, the questionnaire underwent face validity evaluation by AGU faculty. A pilot study involving 41 second and third-year students assessed the reliability of the tool, yielding a Cronbach's alpha of 0.96, indicating excellent internal consistency. Minor modifications were made to enhance comprehension and usability.

2.7 Ethical Considerations

Ethical approval was granted by the Assistant Dean for Academic Affairs at CMMS, AGU. Participants received detailed information about the study's purpose and voluntary nature. Confidentiality was assured, and participants were informed of their right to access the study findings.

2.8 Data Analysis

Data were analyzed using SPSS (version 15). Descriptive statistics, including means, standard deviations, and frequency distributions, were computed for demographic factors and DREEM subscale scores. Comparative analyses were performed using t-tests for binary variables and ANOVA for comparing multiple groups, with a p-value threshold of ≤ 0.05 denoting statistical significance.

3. Results

A total of 324 pre-clerkship students (out of 385) completed and returned the questionnaires giving an overall response rate of 84.2% (**Table 1**). The inventory reliability of Cronbach's alpha coefficient for the overall DREEM was 0.9 (the Split half for the first 25 items was 0.81 and for the second half was 0.85) and for the five subscales, it ranged from 0.45 to 0.78.

Demographic characteristics of the respondents are presented in Table 1. Among the respondents, 35.5% were second-year, 33.3% were third year, and 31.2% were fourth-year students. Female students constituted 75.6% of the respondents, while male students represented 24.4%. The majority of respondents were non-Bahraini (67%), with Bahraini students comprising the remaining 33%. The mean age of the student sample was (20.58 ± 9.6) , while the academic achievement (grades) distribution in the sample was for A (8.3%), B (20.1%), C (39.8%), and D (26.2%).

Table 1. Background Characteristics of the Medical Students Who Responded to the Questionnaire

| Demographic variables | Target population | Original frequency (%) | Respondent frequency (%) | Response rate |
|-----------------------|------------------------|------------------------|--------------------------|---------------|
| Academic Year | 2 nd . Year | 135 (35.1) | 115 (35.5) | 85.2% |
| | 3 rd . Year | 130 (33.8) | 108 (33.3) | 83.1% |
| | 4 th . Year | 120 (31.1) | 101 (31.2) | 84.2% |
| Gender | Male | 114 (29.6) | 79 (24.4) | 69.3% |
| | Female | 271 (70.4) | 245 (75.6) | 90.4% |
| Nationality | Bahraini | 127 (33.0) | 107 (33.0) | 84.3% |
| | Non-Bahraini | 258 (67.0) | 217 (67.0) | 84.1% |
| Total | | 385 (100) | 324 (100) | 84.2% |

The overall DREEM score reported in our study was 120.2, representing 60% of the maximum possible score, indicating a generally positive but improvable learning environment. Among the DREEM subscales, SPL and SAS achieved the highest scores, both at 62%, reflecting strengths in these areas. Conversely, SSP scored the lowest at 53%, suggesting room for improvement in social support and engagement (Table 2).

Table 2. Overall and Domain / Subscales Scores of the Present Study.

| DREEM Subscales/Domains | Present study (2008) | Percentages (%) |
|-------------------------|-------------------------|--------------------|
| SPL | 29.8 | 62 |
| SPT | 26.1 | 59 |
| SAS | 20.0 | 62 |
| SPA | 29.4 | 61 |
| SSP | 14.9 | 53 |
| Overall scoring | 120.2 | 60 |

Analysis of DREEM subscales about academic performance revealed that students with higher grades tended to report higher SPL and SAS scores, indicating a significant association between academic performance and perceptions of learning and academic self-confidence. However, no significant associations were found between DREEM scores and demographic factors such as gender or nationality, implying that academic performance may have a stronger influence on students' perceptions of their learning environment than these demographic characteristics (**Table 3**).

The study evaluated students' perceptions of the educational environment using the DREEM scale, yielding an overall mean score of 120.2 (60.1%). Analysis across the five subscale domains revealed average scores of 29.8/48 (62.08%) in Students' Perception of Learning (SPL), 26.1/44 (59.31%) in Students' Perception of Teaching (SPT), 20/32 (62.5%) in Students' Academic Self-Perception (SAS), 29.4/48 (61.25%) in Students' Perception of Atmosphere (SPA), and 14.9/28 (53.21%) in Students' Social Self-Perception (SSP). Variability in students' perceptions was assessed relative to demographic factors, with a specific focus on academic year, gender, nationality, and academic achievement. While an academic year and gender did not yield statistically significant differences in mean scores, nationality, and academic achievement were notable: Bahraini students scored higher than their non-Bahraini peers (123.2 ± 20.3 vs. 118.4 ± 20.6 , $p = 0.048$), and mean scores differed significantly across academic performance categories, with a positive correlation between higher scores and higher academic grades ($p = 0.018$) (**Table 3**).

Further exploration of the subscales revealed significant associations between academic achievement and SPL ($p = 0.012$), SAS ($p = 0.006$), SPA ($p = 0.027$), and SSP ($p = 0.025$), suggesting that students' academic success aligns with more favorable perceptions in these areas. SPL scores, for example, showed a progressive decrease from higher grades (A and B) to lower grades (C and D), while Bahraini students and males consistently reported higher SPL, SPT, SAS, SPA, and SSP scores compared to their counterparts, though these differences were not statistically significant. Additionally, academic achievement correlated significantly with gender, nationality, and year of study, with Bahraini students and fourth-year students achieving higher grades (A and B) compared to non-Bahraini students and those in earlier academic years. The results indicate nuanced demographic influences on students' perceptions of the educational environment and underscore the need to consider these factors in shaping a supportive academic climate (**Table 3**).

Table 3. Relationship between Students' Mean Scores in Individual Domain / Subscale of the DREEM Questionnaire and their Grades, study year, Gender and Nationality.

| | | | | | | | | | | | | |
|-----|---|------------|--------|--------------|------------|-------|-------------------|------------|-------|--------|------------|------|
| SPL | A | 31.3 ± 5.7 | *0.012 | Bahraini | 30.5 ± 5.3 | 0.474 | 2 nd . | 29.8 ± 5.0 | *0.02 | Male | 30.1 ± 5.4 | 0.8 |
| | B | 30.8 ± 5.0 | | Non-Bahraini | 29.4 ± 5.3 | | 3 rd . | 30.8 ± 5.6 | | Female | 29 ± 5.3 | |
| | C | 29.8 ± 5.2 | | | | | 4 th . | 28.7 ± 5.2 | | | | |
| | T | 29.8 ± 5.3 | | | | | Total | 28.7 ± 5.2 | | | | |
| SPT | A | 21.6 ± 3.9 | 0.321 | Bahraini | 26.6 ± 5.9 | 0.929 | 2 nd . | 25.8 ± 6.1 | 0.81 | Male | 26.9 ± 5.6 | 0.48 |
| | B | 26.1 ± 6.7 | | Non-Bahraini | 25.8 ± 5.8 | | 3 rd . | 26.3 ± 5.6 | | Female | 25.8 ± 5.9 | |
| | C | 26.2 ± 5.5 | | | | | 4 th . | 26.2 ± 6.0 | | | | |
| | T | 26.2 ± 5.9 | | | | | Total | 26.1 ± 5.9 | | | | |
| SAS | A | 21.6 ± 3.9 | *0.006 | Bahraini | 20.6 ± 4.0 | 0.280 | 2 nd . | 19.6 ± 4.2 | 0.29 | Male | 19.8 ± 4.7 | 0.37 |
| | B | 21.0 ± 4.7 | | Non-Bahraini | 19.6 ± 4.4 | | 3 rd . | 20.5 ± 4.3 | | Female | 20.0 ± 4.1 | |
| | C | 20.0 ± 4.2 | | | | | 4 th . | 19.9 ± 4.5 | | | | |
| | T | 20.1 ± 4.3 | | | | | Total | 20.0 ± 4.3 | | | | |
| SPA | A | 29.1 ± 6.4 | *0.027 | Bahraini | 29.8 ± 6.4 | 0.666 | 2 nd . | 29.0 ± 6.0 | 0.09 | Male | 30.3 ± 6.0 | 0.8 |
| | B | 30.9 ± 6.2 | | Non-Bahraini | 29.2 ± 6.4 | | 3 rd . | 30.5 ± 6.4 | | Female | 29.1 ± 6.5 | |
| | C | 29.9 ± 6.5 | | | | | 4 th . | 28.7 ± 6.8 | | | | |
| | T | 29.5 ± 6.5 | | | | | Total | 29.4 ± 6.4 | | | | |
| SSP | A | 15.7 ± 4.1 | *0.025 | Bahraini | 15.6 ± 3.8 | 0.968 | 2 nd . | 14.3 ± 4.1 | 0.15 | Male | 15.2 ± 4.2 | 0.13 |
| | B | 14.8 ± 3.9 | | Non-Bahraini | 14.4 ± 3.8 | | 3 rd . | 15.6 ± 3.8 | | Female | 14.7 ± 3.7 | |
| | C | 15.4 ± 3.3 | | | | | 4 th . | 15.1 ± 3.6 | | | | |
| | T | 14.9 ± 3.7 | | | | | Total | 14.9 ± 3.8 | | | | |

*P value = statistically significant ≤ 0.05

In comparison to other universities, AGU's total DREEM score of 120.2 aligns well with the range of regional medical institutions that either use traditional learning or innovative PBL learning contexts. Institutions in the Gulf, such as Gulf Medical University in UAE (DREEM score of 120) and Qatar University (115), exhibit similar scores. However, higher scores were seen in universities in the UK, Ireland, and some South Asian countries (Table 4).

Table 4. Comparison of DREEM total scores with other regional & international universities (12-23)

| Yr | Country | University | DREEM Score |
|------|-------------|---|-------------|
| 2008 | KSA | King Saud University (KSU) | 100 |
| 2004 | Yemen | Sana'a University | 102 |
| 2009 | Kuwait | Kuwait University | 106 |
| 2005 | Sri Lanka | University of Colombo | 107 |
| 1999 | KSA | King Fahd University (KFU) | 108 |
| 2019 | Oman | Sultan Qaboos University | 110 |
| 2020 | Qatar | Qatar University | 115 |
| 2001 | Nigeria | Nigeria Undergraduate Medical College | 118 |
| 2011 | UAE | Gulf Medical University (GMU) | 120 |
| 2001 | Nepal | Koirala Institute of Health Sciences | 130 |
| 2003 | Netherlands | Dutch Medical School | 134 |
| 2011 | Pakistan | University of Health Sciences (Private) | 137 |
| 2004 | UK | University of Dundee Medical School | 139 |
| 2005 | UK | University of Birmingham | 139 |

4. Discussion

This study aimed to evaluate the perceptions of the educational environment at the AGU, Bahrain, using the validated DREEM inventory, while analyzing the impact of demographic factors such as gender, nationality, and academic performance on students' responses. The findings offer insight into patterns of student engagement and satisfaction, highlighting areas where targeted interventions could enhance inclusivity and support for a diverse student body. Additionally, by benchmarking AGU's results against regional and international institutions, the study contextualizes the university's performance within broader educational standards, identifying strengths and areas for improvement. This comparative analysis underscores the importance of adopting successful practices observed in higher-scoring institutions, such as increased student-faculty engagement, active learning strategies, and enhanced social support systems, to foster a more dynamic and supportive academic environment at AGU.

The internal consistency of the DREEM tool in our study, with a Cronbach's alpha of 0.90, demonstrates strong reliability, consistent with other recent research. For instance, a Cronbach's alpha of 0.95 for the Polish version of the DREEM instrument underscores its robust reliability in that context (Zawislak, 2023). Similarly, the Indonesian short-form version of the DREEM displayed a Cronbach's alpha of 0.896, indicating good reliability for a condensed version (Soemantri, 2023). However, some studies have reported lower alpha values for specific subscales of the DREEM, particularly in the social self-perception domain, where values ranged between 0.60 and 0.70 (Roff, 2023). These comparisons further affirm the high internal consistency of our findings, positioning our results among those with notable reliability.

The demographic analysis revealed an 84.2% response rate, with a significantly higher proportion of female students (90.4%) compared to their male counterparts (69.3%). This trend is consistent with previous studies, such as those conducted in Hungary, where female students reported more favorable perceptions, especially regarding domains such as social and academic self-perceptions (Bouhaimed et al., 2009; Al-Busaidi et al., 2019). These gender-specific differences may suggest that female students perceive and engage with the educational environment in a manner distinct from their male peers, with a tendency to show greater satisfaction when the learning environment is perceived as supportive.

In terms of subscale scores, the highest ratings at AGU were recorded in the SPL and SASP domains, each scoring

62%. These findings indicate moderate confidence in the quality of teaching and students' self-assurance in their academic abilities, which is in line with studies from Kuwait and Oman, where academic support positively influenced students' perceptions of their abilities (Bouhaimed et al., 2009; Al-Busaidi et al., 2019). However, the lowest score was recorded in the Students' SSSP domain (53%), highlighting the need for enhanced peer networks and social support systems. Such findings align with those from the Gulf region, where cultural or institutional factors may limit peer-to-peer interactions and support (Al-Emadi et al., 2020; Al-Busaidi et al., 2019).

Interestingly, no significant differences were observed in DREEM scores based on gender or academic year. However, a noteworthy difference was observed between Bahraini students, who scored significantly higher (123.2 ± 20.3) than their non-Bahraini counterparts (118.4 ± 20.6 , $p = 0.048$). This difference may reflect better integration of Bahraini students into the social and cultural milieu of the institution, suggesting that local students benefit from stronger social networks and a more supportive cultural environment (Al-Busaidi et al., 2019; Hammond et al., 2012).

Additionally, a positive correlation between academic performance and DREEM scores was identified, particularly in the SPL ($p = 0.012$) and SASP ($p = 0.006$) subscales. High-performing students consistently reported more favorable perceptions of their learning environment and greater self-confidence. These results are consistent with studies in Canada and India, which demonstrated that academic success positively influences students' perceptions of their educational environment (Mayya & Roff, 2004; Junaid et al., 2011).

The results of this study revealed that the mean DREEM score at AGU was a moderately positive educational environment. This finding is consistent with similar institutions within the GCC, such as Emirate Gulf Medical University (120) and Qatar University (115), highlighting a supportive learning atmosphere that can be further optimized (Al-Emadi et al., 2020; Al-Busaidi et al., 2019). However, AGU's score was slightly higher than those of Kuwait University (106) and Sultan Qaboos University (110) (Jiffry et al., 2005; Awawdeh et al., 2024), indicating that AGU compares favorably to some institutions within the GCC region but still has room for improvement in certain areas to reach the upper echelon of Gulf institutions.

When compared with other regional and international institutions, AGU's DREEM score is notably lower than that of the University of Health Sciences, Pakistan (137), which has been recognized for its focus on active learning and strong faculty-student engagement (Jiffry et al., 2005). Internationally, institutions such as the University of Dundee and the University of Birmingham, both with DREEM scores of 139, exemplify the high standards associated with modern pedagogical practices and student-centered learning environments (Hammond et al., 2012). These disparities underscore the need for AGU to adopt innovative teaching and learning strategies, particularly in the areas of faculty development and student engagement, to align more closely with institutions achieving higher DREEM scores.

Based on the findings of this study, it is recommended that AGU prioritize initiatives to enhance the educational environment, particularly in areas of social support and student engagement. Strategies such as peer mentoring programs, formalized student engagement activities, and targeted support for non-Bahraini students could foster inclusivity and strengthen social networks. Additionally, adopting innovative teaching practices and faculty development programs focused on active learning and student-centered approaches could improve student perceptions in key areas like academic and social self-perceptions. Future research should consider longitudinal designs and qualitative methodologies to explore the evolving nature of students' experiences and perceptions, while also addressing cultural factors and gender imbalances to provide a more comprehensive understanding of the educational environment.

This study benefits from a robust response rate of 84.2%, enhancing its representativeness. The use of the validated DREEM tool ensures the reliability of the findings, and the detailed subscale analysis offers actionable insights into specific strengths and areas for improvement. Comparing AGU's educational environment with other regional and international institutions provides a comprehensive context for understanding the results and offers guidance for targeted improvements. However, the study's cross-sectional design limits its ability to establish causal relationships, and the underrepresentation of male students may impact the generalizability of the findings. Future research that incorporates longitudinal data and qualitative analysis could provide more in-depth insights into how perceptions evolve and the influence of cultural factors on students' experiences.

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Competing Interests Statement

The authors declare that there are no competing or potential conflicts of interest.

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