

Perception of tomorrow's Health-Care connoisseur and front-runners of their educational environment utilizing DREEM inventory in Bahasa Melayu version, the native language of Malaysia

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RESEARCH

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ABSTRACT

Background

There have been a lot of reports throughout the world that medical students were abused during their undergraduate education and clerkship training. Thereafter, calls for intensifying the evaluation of medical and health schools' curricula based on students' perceptions of their educational environment. Several studies, methods, and instruments were developed including the Dundee Ready

Education Environment Measure (DREEM) inventory, to evaluate the medical educational environment in last five decades. The DREEM inventory has been translated into minimum eight different native tongues namely Arabic, Chinese, Japanese, Persian, Portuguese, Spanish, Swedish, and Turkish.

Aims

The objective of this study was to assess the educational environment of the UniSZA undergraduate medical program from the students' perspective utilizing the DREEM inventory translated in Bahasa Melayu.

Methods

This was a descriptive cross-sectional survey conducted among the medical students of session 2015-2016 to assess educational environment of the Faculty of Medicine, UniSZA. The study was conducted from December 2015 to January 2016. Universal sampling technique was adopted.

Results

A total of 277 (95.5 per cent) out of 290 students responded to the questionnaire; among them 27.4 per cent were male and 72.6 per cent were female respondents. The overall mean DREEM scores for both preclinical and clinical students were 67.41 ± 24.06 . The scores for pre-clinical and clinical were 64.02 ± 25.10 and 69.65 ± 23.15 respectively; however, no statistically significant ($p=0.57$) differences was observed between two phases. A significant difference was observed between gender of the respondents in students' perceptions of teachers ($p=0.005$) and students' social self-perceptions ($p=0.046$).

Conclusion

The study respondents demanded teachers training program targeting active learning methods.

Key Words

Perceptions, Universiti Sultan Zainal Abidin, educational environment, DREEM, Bahasa Melayu

What this study adds:

1. What is known about this subject?

The DREEM inventory and educational environment has been assessed throughout the universe including different Malaysia medical schools.

2. What new information is offered in this study?

This is the first time the DREEM inventory is translated in local language Bahasa Melayu and utilised to assess education environment.

3. What are the implications for research, policy, or practice?

The study findings hopefully provide some baseline data to reconsider and redesign the curriculum, teacher training, and meet other issues.

Background

A brief history of the Dundee Ready Educational Environment Measure (DREEM)

There have been a lot of reports throughout the world that medical students were abused during their undergraduate education and clerkship training. Thereafter, calls for intensifying the evaluation of the medical and health schools' curricula based on students' perceptions of their educational environment.¹⁻⁷ Several studies, methods, and instruments were developed to evaluate medical educational environment in last five decades.⁸⁻¹² A high standard medical school move forward through continuous scholastic review of its' educational structure and curriculum to gather evidenced-based information to improve the academic experience of students.^{13,14} Professor Ronald Harden, the Editor of Medical Teacher has supported the views of Professor JM Genn of the University of Queensland in his editorial regarding the necessity of continuous action research for educational environment and curriculum.¹⁵ These two stalwart and visionary medical educationists have considered medical teachers as action researchers, using their "own classes, departments or medical schools, largely as a diagnostic tool for educational purposes they deem to be important, as they seek to discover more about the nature of the education they

provide for their students and seek to improve that education".¹⁶ A group medical educationists was much inspired with recommendation and proposition of JM Genn and Ronald Harden for action research.^{16,17} Dr Sue Roff, a faculty member of the Centre for Medical Education of University of Dundee, Scotland, UK, was the principal scientist of a team and who developed the 50-item DREEM instrument utilizing a "Delphi panel of nearly 100 health professions educators from around the world and validation by over 1,000 students in countries as diverse as Scotland, Argentina, Bangladesh and Ethiopia to measure and 'diagnose' undergraduate educational climates in the health professions".¹⁸

Utilization of DREEM inventory and translation

The landmark DREEM papers published by Roff et al.,^{17,18} were well-cited by the researchers gained enormous importance and utilized few hundred times throughout the world from developing to developed countries.¹⁹⁻³⁷ The DREEM inventory has been translated into minimum eight different native tongue namely Arabic, Chinese, Japanese, Persian, Portuguese, Spanish, Swedish, Turkish for appraisal grounds and utilized in 20 countries, including: Australia, Brazil, Canada, Chile, China, India, Iran, Ireland, Japan, Kuwait, Malaysia, Nepal, Nigeria, Saudi Arabia, Singapore, Sri Lanka, Sweden, Turkey, the UK and the West Indies.²⁸ Another review article much before has claimed similarly that the instrument has been deciphered into Spanish, Portuguese, Arabic, Chinese, Dutch, Swedish, Norwegian, Malay, Thai, Nepali, and Nigerian.¹⁷ To best of researchers' knowledge, there is no published document regarding the DREEM inventory has ever translated in Malay. Through personal queries and investigation found that there was a thesis work for Masters' program in Universiti Sains Malaysia, Kota Bharu, Malaysia a few years back and presented in one conference.³⁸ This thesis work particularly Malay Version of the DREEM inventory was yet not published in the online or print journal or in websites.

Importance of native language in questionnaire based research

Study has shown that children's mother tongue is the ideal language of instruction and learning during primary school. Children whose principal language of instruction is not their mother tongue are more expected to drop out or fail.³⁹ A research in the UK has developed socially proficient transformations of questionnaires measuring diabetes self-care in languages of two marginal ethnics groups whose main languages are Sylheti (Bangladesh) and Mirpuri (Pakistani). It was reported that said instrument was much better to communicate with patients, and helped to

generate a better outcome of the study.⁴⁰ Another study reported that the multilingual health educational resources have significant potential to reduce health inequalities in the marginal ethnic societies. The multilingual tactic is essential to improving “participation and representativeness of samples from ethnic populations”.⁴¹ Moreover, translation is defined as the communication of the meaning of a source-language text by means of an equivalent target-language text.⁴² Therefore, translation to native language promotes effective communication, understanding, academic performance and positive social and educational outcomes.^{43,44} We have conducted and published a research paper³⁷ using the DREEM inventory at UniSZA and the Editor advised this research group to translate the inventory in Malay and to conduct another study.³⁷ This was the primary reason to translate the DREEM inventory in the Malay language.

An ephemeral description about DREEM inventory

The DREEM was planned and designed to precisely quantify the educational environment for medical schools and health-related institutes.^{18,45} The inventory is now considered a valid and reliable tool, which is globally accepted for measuring the educational environment.^{18,27,45} Therefore, the questionnaire has been used worldwide, and many studies’ findings have been published in highly reputed journals.^{18,45–54} A numbers of studies have also been conducted in Malaysian medical schools.^{33–35,55–57} There are other related tools, including the precursor to DREEM, the ME Environment Measure, and several subsequent tools that have been designed to measure the educational environment in specific post-graduate medical settings: The Post-Graduate Hospital Educational Environment Measure, the Surgical Theatre Educational Environment Measure, and the Anesthetic Theatre Educational Environment Measure.²⁸ The DREEM original version was then refined into a 50-item self-report questionnaire using a 5-point Likert scale,⁵⁸ with scores reflecting a student’s overall perception of the environment and their perceptions of five main aspects of this environment, namely: 1) their learning, 2) the teachers, 3) academic self-perception, 4) atmosphere and 5) social self-perception.^{59,60} The DREEM has been translated into eight languages and has been used in at least 20 countries. In fact, the DREEM questionnaire is an ideal instrument for examining students’ opinions. It is valuable in highlighting areas of concern voiced by medical students, including educational climate, academic achievement, and social support. A systematic review of 79 original articles concluded that DREEM is “likely to be the most suitable instrument for undergraduate medicine, postgraduate

medicine, nursing and dental education” to examine educational environment.⁶¹

The faculty of Medicine, Universiti Sultan Zainal Abidin

The Faculty of Medicine, UniSZA, is scheduled to conduct a major revision in the next few years of the undergraduate medical curriculum.^{62,63} The medical faculty of the UniSZA has evolved with time. The Ministry of Higher Education of the Government of Malaysia granted approval of the University’s medical program in Kuala Terengganu, Terengganu, Malaysia to and improve health care in the country. The first group of 30 MBBS students, admitted in 2009, graduated in August 2014. Therefore, UniSZA medical graduates started working as house officers and serving Malaysia from early 2015. UniSZA has successfully graduated another two batches in 2015 and 2016. Therefore, around 140 medical graduates are serving in Malaysian health system as house officers. Malaysian medical education is usually of a 5-year program and 2-year houseman-ship in hospitals owned by the Ministry of Health, Government of Malaysia.^{37,64–66}

The objectives of the study

The objective of this study was to assess the educational environment of the UniSZA undergraduate medical program from the students’ perspective. The researchers expected to explore UniSZA medical students’ overall perception, and perceptions of learning, teachers, atmosphere, academic self-perception, and social self-perception, using the DREEM questionnaire. The current study also had the intention to detect any differences has been in these one and half year passed about the educational environment of UniSZA. The current work will also determine the association between UniSZA medical students’ socio-demographic and educational characteristics based on five subscales of the DREEM questionnaire. Top of all these educational environmental issues authors and researchers also analysed the reliability and validity of the data set utilizing the DREEM inventory translated in the Malay language.

Method

This was a descriptive cross-sectional survey, conducted to measure the perception of the medical students toward their educational environment of the Faculty of Medicine utilizing the 50-item DREEM inventory. The DREEM inventory was translated in Malay, the native language of Malaysia, officially known as Bahasa Malaysia. The DREEM consists of five subscales (Table 1). i) students’ perceptions of learning (SPL)–12 items, maximum score of 48; ii) students’ perceptions of teachers (SPT)–eleven items, maximum score of 44; iii) students’ academic self-

perceptions (SASP)—eight items, maximum score of 32; iv) students’ perceptions of atmosphere (SPA) –12 items, maximum score of 48; and v) students’ social self-perceptions (SSSP)—seven items, maximum score of 28. The total score for all subscales is 200. However, negative items were scored in reverse for analysis so that the higher the score, the more negative the feedback, or the more incorrect perception.

All medical students of UniSZA from Years I–V of the MBBS program of session 2015–2016 were the target population. The total number of medical students at UniSZA was 300 (60×5=300). The universal sampling technique was used as the total sample size was small. As earlier mentioned, the DREEM inventory was universally validated instrument^{17,18} and was demonstrated as a reliable instrument among Malaysian medical students.³³ The DREEM inventory was initially translated from English to Bahasa Melayu by one of the author and back-translated into English by another author to confirm the accuracy of the translation. A pilot study was conducted among 10 undergraduate medical students (2×5=10, 2 students from each year) for the Malay version of DREEM inventory and it was found that the survey instructions and items were easily comprehensible and suitable for the study. The students who participated in the pilot study were excluded from the final study. The pretested Malay version of the DREEM inventory was found reliable and valid as most of the sections of this questionnaire demonstrated acceptable values of Cronbach’s alpha, with a range between 0.672 and 0.882, which indicated that both instruments possessed good internal consistency and reliability. Evidence of convergent validity was shown by the significant correlations between the items of each section and the overall mean in each section ($r_s=0.332-0.718$; $p<0.05$).^{67,68} The reliability and validity were again tested in the whole data set. The DREEM questionnaires were distributed among the rest 290 (300-10=290) medical students, who were given one day to complete them. The data were collected in December 2015 to January 2016. The principal and corresponding author Professor (Dr) Mainul Haque was an academic staff of the Faculty of Medicine when data was collected. The questionnaires were then retrieved. The completed questionnaires were collated for further analysis. The data were analysed by SPSS version 21 software using descriptive statistics; the numerical variables were described using means and standard deviations (SD), and categorical variables were presented in frequencies and percentages. The Independent t-test was applied for comparison between two means variables, which included sex, phase of study, and type of secondary school. Analysis of variance

(ANOVA) was used for comparison of more than two means, which included race, marital status, cumulative grade point average, type of foundation study, and year of study. There are four methods available to students to pursue a degree program in Malaysia.³⁷

This study obtained ethical approval from the UniSZA Research Ethics Committee, recorded as Memo Number UniSZA. C/1/UHREC/628-1 (44), Dated: 3 November 2015. The UniSZA Research Ethics Committee had examined the Malay version of the DREEM inventory before the study was conducted and was satisfied that there were no sensitive questions appeared after translation. Research ethics were strictly maintained, especially regarding confidentiality. The current research was totally anonymous and voluntary. Adequate explanation concerning the purpose of the study was provided to the participants and informed written consent was obtained to utilize their data for research purposes.

Table 1: Guide of DREEM score categories and interpretation per domain^{69,70}

Domain	Score	Interpretation
SPL	0–12	Very poor
	13–24	Teaching is viewed negatively
	25–36	A more positive approach
	37–48	Teaching highly thought of
SPT	0–11	Abysmal
	12–22	in need of some retraining
	23–33	Moving in the right direction
	34–44	Model teachers
SASP	0–8	Feeling of total failure
	9–16	Many negative aspects
	17–24	Feeling more on the positive side
	25–32	Confident
SPA	0–12	A terrible environment
	13–24	There are many issues that need changing
	25–36	A more positive atmosphere
	37–48	A good feeling overall
SSSP	0–7	Miserable
	8–14	not a nice place
	15–21	not too bad
	22–28	Very good socially

Abbreviations: SPL, students’ perceptions of learning; SPT, students’ perceptions of teaching; SASP, students’ academic self-perceptions; SPA, students’ perceptions of atmosphere; SSSP, students’ social self-perceptions; DREEM, the Dundee ready Education Environment Measure.

Results

Sociodemographic status of the study participants

The detailed sociodemographic data of the respondents are depicted in Table 2. A total of 277 (95.5 per cent) out of 290 students responded to the questionnaire; among them 27.4 per cent were male and 72.6 per cent were female respondents. Specifically, the response rate per year consisted of: Year I 19.5 per cent, Year II 20.2 per cent, Year III 19.5 per cent, Year IV 19.1 per cent, and Year V 21.7 per cent (Table 2). Most the medical students were Malays (62.8 per cent), followed by Indians (19.1 per cent), Chinese (17 per cent), and other races (1.1 per cent). The highest respondents were from Year-V (21.7 per cent), and the least represented from Year-IV (19.1 per cent). Most students (67.9 per cent) were from non-boarding schools, and the remaining 32.1 per cent students came to the university from boarding schools (Table 2).

Table 2: Sociodemographic Profiles of respondents (n=277)

Variable	n	%
Sociodemographic characteristics		
Gender		
Male	76	27.4
Female	201	72.6
Race		
Malay	174	62.8
Chinese	47	17
Indian	53	19.1
Others	3	1.1
Religion		
Islam	179	64.6
Buddha	35	12.6
Hindu	46	16.6
Christian	15	5.4
Atheist	2	0.7
Educational characteristics		
Phases of study		
Phase I (Basic Sciences)	110	39.7
Phase II (Clinical)	167	60.3
Year of study		
Year 1	54	19.5
Year 2	56	20.2
Year 3	54	19.5
Year 4	53	19.1
Year 5	60	21.7
Type of foundation study		
One Year Matriculation	210	75.8
Two Year Matriculation	4	1.4
Foundation University	63	22.7

Cumulative Grade Point Average (CGPA)		
4	137	49.5
Below 4.0	140	50.5
Type of Secondary school		
Boarding School	89	32.1
Non- Boarding School	188	67.9

Overall DREEM scores

The items (both English and Bahasa Melayu) in different DREEM domains with their mean scores are depicted in Table 3. Only eight items scored between 2 and 3, and 5 of them were negative items. All items in SPA domain scored less than 2. Ten items scored less than 1. The three items from the DREEM questionnaire with lowest mean score were: 'The teachers are knowledgeable' (Item 2; SPT; 0.71±0.91); 'I have learned a lot about empathy in my profession' (Item 31; SASP; 0.75±0.77); 'The teachers are well prepared for their classes' (Item 40; SPT; 0.91±0.78); and 'Much of what I have to learn seem relevant to career in healthcare' (Item 45; SASP; 0.88±0.79). When individual domains were considered, the average score for the SPL was higher (15.09±6.28) than other domains. Most rated interpretation (Table 5) in the individual domain were: 'teaching is viewed negatively' (61 per cent; SPL); 'need of some retraining' (50.9 per cent; SPT); 'many negative aspects' (59.2 per cent; SASP); 'there are many issues that need changing' (50.9 per cent; SPA); and 'not a nice place' (76.2 per cent; SSSP).

The overall mean DREEM scores for both preclinical and clinical students were 67.41±24.06. The scores for pre-clinical and clinical were 64.02±25.10 and 69.65±23.15 respectively (Table 4); however, no statistically significant (p=0.57) differences was observed between two phases. Clinical students scored slightly higher than pre-clinical students. There were no statistically significant differences found in all domains except SASP domain (p=0.042) (Table 6).

The scores for all five subscales (Table 5) illustrate respondents' perceptions, and the interpretation of responses suggested by the DREEM scoring system (Table 6).^{69,70} In general, most students (61 per cent) perceived in SPL domain that their 'teaching is viewed negatively'. Similarly, in SPT domain 50.9 per cent think that 'need of some retraining' and again in domain SASP the majority (59.2 per cent) opined for 'many negative aspect'. Correspondingly, in domain SPA much of students (50.9 per cent) thought 'there are many issues that need changing'. Finally, regarding SSSP domain 76.2 per cent thought that it is 'not a nice place'.

Scores in socio-economic variables

- **Gender:** A significant difference was observed between gender of the respondents in SPT ($p=0.005$) and SSSP ($p=0.046$) (Table 6).
- **Race:** There were statistically significant difference observed in total DREEM scores ($p=0.018$) and in SPL domain ($p=0.041$) between Chinese and Indian student groups (Table 6). Again, in SPT domain there was also statistically significant ($p=0.003$) differences observed between Malay and Chinese students and between Chinese and Indian groups. In SPA domain, there was statistically significant ($p=0.016$) differences observed between Chinese and Indian groups.
- **Phase of Study:** In SASP domain there was statistically significant ($p=0.042$) difference between pre-clinical and clinical groups (Table 6).
- **Year of Study:** In SPT domain, there was statistically significant ($p=0.008$) difference observed between Year IV and V groups. In SASP, there was statistically significant ($p=0.015$) differences observed between Year III and IV groups. In SSSP domain there was statistically significant ($p=0.009$) difference observed between Year III and IV groups (Table 6).

Post hoc analysis of the socio-economic variables

ANOVA with Post hoc test was used to examine the differences in mean scores of 5 subscales related to year of study, the phase of study, gender, race, religion, foundation study, CGPA and type of Secondary school. Differences were considered statistically significant with a p -value <0.05 . ANOVA showed that there was a significant difference between mean scores of SPL ($p=0.00$), SPT ($p=0.02$), SAP ($p=0.00$) and SPA ($p=0.00$) from various academic years. Post hoc analysis showed a significant difference between Year I and Year III ($p=0.01$), Year I and Year IV ($p=0.00$), Year II and Year IV ($p=0.01$), Year V and Year III ($p=0.03$), Year IV and Year V ($p=0.02$) in SPL; Year V and Year I ($p=0.00$), Year II ($p=0.01$), Year V ($p=0.00$) in SPT; Year I and Year III ($p=0.00$), Year I and Year IV ($p=0.00$), Year II and Year III ($p=0.01$), Year V and Year III ($p=0.00$), Year IV and Year V ($p=0.05$) in SAP; Year I and Year II ($p=0.02$), Year I and Year III ($p=0.00$), Year I and Year IV ($p=0.00$), Year V and Year III ($p=0.01$), Year IV and Year V ($p=0.01$) in SPA. In relation to phase of study, SPL ($p=0.00$), SPT ($p=0.05$) and SAP ($p=0.01$) was statistically significant. Regarding sex, SPL ($p=0.04$) and SPT ($p=0.00$) was statistically significant. In relation to race, SPL ($p=0.05$), SPT ($p=0.01$) and SPA ($p=0.04$) was statistically significant. Post hoc analysis showed a significant difference between Malay and Chinese ($p=0.03$), Chinese and Indian ($p=0.00$) in SPL; Malay and Chinese ($p=0.00$), Chinese and Indian ($p=0.00$) in SPT; Malay and Chinese ($p=0.02$), Chinese

and Indian ($p=0.00$) in SPA. ANOVA showed statistically significant differences between mean scores of SPT ($p=0.04$) and foundation of study. In addition, Post-hoc analysis showed a significant difference between Matriculation One Year and Foundation Course ($p=0.01$). ANOVA showed statistically significant differences between mean scores of SPA ($p=0.05$) and CGPA. A statistically non-significant difference of mean scores of 5 subscales related to religion and type of secondary school was observed.

Reliability and validity of the questionnaire

Reliability

Cronbach's alpha coefficient was calculated to assess the reliability of DREEM questionnaire. A reliability of 0.70 and higher was considered satisfactory. 'Corrected item-total correlation' and 'Cronbach's alpha if item deleted' was calculated. Cronbach's alpha coefficient for 50 items was 0.943, suggesting that the items had relatively high internal consistency. 'Corrected item-total correlation' values ranged between 0.110 and 0.747 (Table 7). 'Corrected item-total correlation' of item 17, 25, 39, 48 and 50 was less than 0.30, indicates that these items did not correlate very well with the scale overall.

Validity

Principal component factor analysis with varimax rotation was used to search for the underlying factor. Eigenvalues greater than 1 were required to retain factors and factor loadings of 0.30 or greater were required for the interpretation of the factor structure. The Kaiser-Meyer-Olkin (KMO) analysis was performed, yielding an index of 0.943. The result for Bartlett's test of sphericity was 8127.602 and was highly significant ($p=0.00$). This information indicates the appropriateness of principal components analysis. Five factors with the eigenvalue greater than 1 emerged and accounted for a total of 52.55 per cent of the variance. Factor 1 loaded thirty-two items, Factor 2 loaded seventeen items, Factor 3 loaded eighteen items, Factor 4 loaded nineteen items and Factor 5 loaded five items having a factor coefficient of greater than 0.30. Maximum items loaded in more than one factor (Table 8).

The reliability and validity issue of Malay version differs in validity section in the pretesting and actual study. This may be due to very small sample size cannot able to detect the troubles. Moreover, in the main study with large sample medical students did not understand the explanation and instructions. Nonetheless, opposite scenario can also happen medical students who participated in pretesting did not understand the inventory purpose and wrongly marked.

Table 7: Mean, SD, Corrected item-total correlation and Cronbach's Alpha if item deleted of the 50 items of DREEM

	Mean	Std. Deviation	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Q1	1.1083	0.97198	0.587	0.941
Q2	0.7076	0.91151	0.583	0.941
Q3	1.8267	1.06608	0.481	0.942
Q4	2.4296	1.03538	0.453	0.948
Q5	1.6643	1.04565	0.419	0.942
Q6	1.1047	0.88047	0.562	0.941
Q7	1.1119	0.87958	0.747	0.94
Q8	1.0325	1.05416	0.556	0.941
Q9	1.13	1.02385	0.566	0.941
Q10	1.343	0.97136	0.543	0.941
Q11	1.8736	1.00466	0.456	0.942
Q12	1.5993	1.00815	0.595	0.941
Q13	1.3755	0.88251	0.583	0.941
Q14	2.5162	0.95776	-0.608	0.948
Q15	1.0144	1.05628	0.524	0.941
Q16	0.9928	0.82089	0.745	0.94
Q17	1.1841	1.32917	0.207	0.944
Q18	1.0469	0.90568	0.596	0.941
Q19	1.1769	0.95616	0.636	0.941
Q20	1.1336	0.8724	0.716	0.94
Q21	1.7292	0.95305	0.499	0.941
Q22	1.2708	0.85273	0.718	0.94
Q23	1.0939	0.91596	0.626	0.941
Q24	1.1336	0.85138	0.72	0.94
Q25	2.4043	0.8983	-0.118	0.945
Q26	1.213	0.89773	0.554	0.941
Q27	2.0794	0.97849	0.415	0.942
Q28	1.5993	1.0675	0.507	0.941
Q29	1.1949	0.94691	0.7	0.94
Q30	1.213	0.88962	0.746	0.94
Q31	0.7509	0.76569	0.61	0.941
Q32	0.9928	0.81201	0.612	0.941
Q33	0.9964	0.76375	0.689	0.941
Q34	1.0181	0.83603	0.606	0.941
Q35	0.9531	1.03628	0.622	0.941
Q36	1.2491	0.81163	0.646	0.941
Q37	0.9495	0.76446	0.702	0.941
Q38	0.9458	0.78985	0.669	0.941
Q39	2.0578	1.07183	0.14	0.944
Q40	0.9134	0.78001	0.648	0.941
Q41	1.0722	0.76271	0.728	0.94

Q42	1.4007	1.04	0.538	0.941
Q43	1.1805	0.92661	0.671	0.94
Q44	1.2347	0.90839	0.722	0.94
Q45	0.8845	0.79012	0.622	0.941
Q46	2.1516	1.17589	0.355	0.943
Q47	1.0866	0.88038	0.554	0.941
Q48	2.0722	0.89393	-0.112	0.945
Q49	0.9242	0.87933	0.621	0.941
Q50	2.2744	1.0306	0.11	0.944

Table 8: Principal component factor analysis with varimax rotation of DREEM questionnaire

	Component				
	1	2	3	4	5
Q1	0.496		0.304		
Q2	0.563		0.44		
Q3			0.526	0.377	
Q4			-0.363	-0.516	
Q5		0.585			
Q6	0.567				
Q7	0.584		0.43		
Q8			0.611		
Q9			0.657		
Q10		0.542			
Q11		0.473	0.432		
Q12		0.321	0.485		
Q13	0.381	0.32	0.388		
Q14			-0.435	-0.411	
Q15	0.326		0.509	0.355	
Q16	0.582		0.414		
Q17	0.376				0.302
Q18	0.446		0.509		
Q19	0.371		0.341	0.41	
Q20	0.44	0.417	0.426		
Q21		0.664		0.309	
Q22	0.466	0.564			
Q23	0.565	0.365			
Q24	0.591	0.316	0.372		
Q25		-0.446			0.333
Q26	0.401	0.551			
Q27		0.72		0.321	
Q28				0.591	
Q29	0.512		0.305	0.4	
Q30	0.581			0.38	
Q31	0.753				

Q32	0.681				
Q33	0.644				
Q34	0.622				
Q35	0.595				
Q36	0.414	0.374		0.488	
Q37	0.67			0.335	
Q38	0.603			0.41	
Q39					0.715
Q40	0.66				
Q41	0.67			0.362	
Q42				0.664	
Q43	0.416			0.655	
Q44	0.501	0.361		0.52	
Q45	0.671			0.346	
Q46				0.318	
Q47	0.664				
Q48		-0.369			0.443
Q49	0.671				
Q50					0.767
% of variance	21.022	9.292	9.243	9.198	3.795

Discussion

The response rate in the current study was found quite high and can be considered as representative.⁷¹ Most of the study respondents were female medical students which are trends observed in Malaysia and many other countries.^{20,30–37} The current study finding regarding overall score (66.84/200) was even less than earlier studies. The global DREEM scores reported for different countries around the world of medical and allied health sciences schools were from 107/200 to 139/200.^{30–32,34–37,54,72–76} Therefore, the students felt and rated the overall environment in this institution as more positive than negative as the total scores were 101/200.²² A few studies reported the overall scores below 100/200—one Saudi Arabian study conducted in Arabic Version of DREEM found overall score 89.9/200.⁷⁷ Another study from Hormozgan University of Medical Sciences in Bandar Abbas, south Iran, in 2009 also identified the overall scores was 99.6/200.²³ Multiple studies revealed that even total DREEM score was in the more positive than negative category but the medical school has failed to provide a congenial environment.^{19,53,78} Poor congenial environment lead to stress of medical students. Stress is universally accepted as a most important causative factor which was accountable for the unhappiness and poor academic achievement of medical students.^{5,37,38,79–81} Stress can arise because of limited leisure time, academic overload and exam anxiety, financial, being too tired to enjoy the

course, teachers being authoritarian, and emphasis on factual and teacher-centred learning.^{79,82–84} The DREEM inventory has been used till today for several different intention and determinations which include sketching medical or related educational strengths and weaknesses, predominantly during the curricular review,⁸⁵ equating student perceptions between different schools and cohorts, and forecasting academic accomplishment.¹⁷ This generic inventory of the DREEM generates only a still picture not a video of student perception of their educational environment, nevertheless cannot deliver evidence about poor scores; which were much concerns of institutional authority.⁴⁶ Medical educational experts felt that the answer should be sought through qualitative analysis that would allow documentation of the areas that need careful consideration to improve the educational environment.⁴⁶

The study inventories the Malay version of DREEM inventory Cronbach's alpha value was more than 0.7. Multiple earlier studies reported that regarding reliability Cronbach's alpha more than 0.7 were considered as acceptable,^{67,68,86} which is in line with previous studies.^{18,87–89} Almost similar observation found while doing KMO analysis, variance, and Bartlett's test in one Pakistani study published in 2011.⁸⁸ Another Malaysian study aiming to appraise the construct validity of DREEM by means of confirmatory factor analysis, as well as its internal consistency concluded that findings did support the reliability, but not the construct validity, of the DREEM inventory.³³ Subsequently, regarding five factor DREEM questionnaire the current study findings were in the same line of earlier study.³³ The major strength of the study was high response rate but although there were several findings in the area to improve but with the current inventory, it was real difficult to achieve more in-depth conceptualization of the research results as because DREEM findings are principally numerical data.¹⁹ Multiple researches revealed that the addition of qualitative determinants would yield more comprehensive outcome regarding students' perception of their educational environment.^{46,90}

Conclusion

This study found overall students' feeling towards the more negative side. The students' opined teaching quality negatively and demanded teachers need more training. Most them claimed is not a nice place and suggested need the change on many issues. The translated Malay version of the DREEM inventory is a good generic instrument to assess students' perception regarding educational environment for medical school but need some local and sociocultural modification to be applicable for the Malaysian context.

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PEER REVIEW

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CONFLICTS OF INTEREST

The authors declare that they have no competing interests.

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ETHICS COMMITTEE APPROVAL

This study obtained ethical approval from UniSZA Research Ethics Committee, recorded as Memo Number UniSZA. C/1/UHREC/628-1 (44), Dated: 3 November 2015.

Table 3: The mean item score of DREEM by medical students of UniSA (n=277)

Domain		Item	Mean (SD)
SPL	1	I am encouraged to participate Saya terdorong untuk mengambil bahagian	1.11(0.97)
	7	The teaching is often stimulating Setiap pengajaran selalu meransangkan	1.11(0.88)
	13	The teaching is student-centred Pengajaran menekankan pendekatan berpusat pada pelajar	1.38(0.88)
	16	The teaching is helpful to develop my skills /competency Kaedah pengajaran membantu untuk meningkatkan kemahiran/kecekapan saya	0.99(0.82)
	20	The teaching is well focused Kaedah pengajaran memberikan focus yang menyeluruh	1.13(0.87)
	22	The teaching is sufficiently to develop my confidence Kaedah pengajaran cukup untuk meningkatkan keyakinan saya	1.27(0.85)
	24	The teaching time is put to good use Masa pengajaran digunakan dengan baik sekali	1.13(0.87)
	25	<i>The teaching over emphasizes factual learning</i> Pengajaran terlalu menitikberatkan pembelajaran berasaskan fakta	2.40(0.90)
	38	I am clear about the learning objectives of the course Saya jelas tentang objektif pembelajaran dalam kursus ini	0.95(0.79)
	44	The teaching encourage me to be an active learner Kaedah pengajaran memberikan semangat kepada saya untuk menjadi pelajar yang aktif	1.23(0.91)
	47	Long term learning is emphasized over short term Pembelajaran jangka panjang lebih ditekankan berbanding jangka pendek	1.09(0.88)
	48	<i>The teaching is too teacher-centered</i> Kaedah pengajaran terlalu menekankan pendekatan berpusat pada pengajar	2.07(0.89)
SPT	2	The teachers are knowledgeable Pensyarah berpengetahuan luas	0.71(0.91)
	6	The teachers are emphasizes on patient-centred during their interaction with patients Pensyarah menekankan pendekatan berpusat kepada pesakit semasa berinteraksi bersama pesakit	1.10(0.88)
	8	<i>The teachers is ridicule the students</i> Penyarah menyindir para pelajar	1.03(1.05)
	9	<i>The teachers are authoritarian</i> Pensyarah terlalu memerintah	1.13(1.02)
	18	The teachers have good communication skills with the patients Pensyarah mempunyai kemahiran komunikasi yang baik dengan para pesakit	1.05(0.91)
	29	The teachers are good at providing feedback to students Pensyarah bagus dalam menyediakan maklum balas kepada pelajar	1.19(0.95)
	32	The teachers provide constructive criticism here Pensyarah memberikan kritikan yang membina di sini	0.99(0.81)
	37	The teachers give clear examples Pensyarah memberikan contoh-contoh yang jelas	0.95(0.76)
	39	<i>The teachers get angry is class</i> Pensyarah adakala marah di dalam kelas	2.06(1.07)
	40	The teachers are well prepared for their classes Pensyarah bersedia dengan baik untuk kelas-kelas yang akan diajar	0.91(0.78)

	50	<i>The students irritate the teachers</i> Para pelajar ada menyebabkan kemarahan kepada pensyarah	2.27(1.03)
SASP	5	Learning strategies which work for me before continue to work for me now Strategi pembelajaran yang digunapakai oleh saya sebelum ini masih berkesan untuk saya sekarang	1.67(1.05)
	10	I am confident about my passing this year Saya yakin dengan keputusan peperiksaan saya untuk lulus pada tahun ini	1.34(0.97)
	21	I am feel I am well prepared for my profession Saya merasakan saya telah bersedia secukupnya untuk kerjaya saya	1.73(0.97)
	26	Last year work has been a good preparation for this year's work Usaha pada tahun lepas telah menjadikan persediaan yang baik kepada usaha tahun ini	1.21(0.90)
	27	I am able to memorize all I need Saya berkebolehan untuk mengingati semua yang perlu saya ingati	2.08(0.98)
	31	I have learn a lot about empathy in my profession Saya telah belajar banyak tentang rasa empati dalam kerjaya saya	0.75(0.77)
	41	My problem skills are well developed here Kemahiran penyelesaian masalah saya ditingkatkan dengan baik di sini.	1.07(0.76)
	45	Much of what I have to learn seem relevant to career in healthcare Kebanyakan perkara yang saya perlu belajar dilihat berkaitan dengan kerjaya saya dalam bidang kesihatan	0.88(0.79)
SPA	11	The atmosphere were relax during ward teaching Suasana sangat menenangkan semasa pengajaran di dalam wad	1.87(1.00)
	12	The school is well timetabled Universiti ini mempunyai jadual yang bagus	1.60(1.01)
	17	<i>Cheating is a problem in this school</i> Meniru adalah satu masalah di dalam universiti ini	1.18(1.33)
	23	The atmosphere is relaxed during lectures Suasana tenang semasa mendengar kuliah	1.09(0.92)
	30	There are opportunities for me to develop interpersonal skills Di sini terdapat banyak peluang untuk saya meningkatkan kemahiran interpersonal	1.21(0.89)
	33	I feel comfortable in class socially Saya berasa selesa di dalam kelas ketika bersosial	1.00(0.76)
	34	The atmosphere is relaxed during seminars/tutorial Suasana tenang semasa seminar/tutorial	1.02(0.84)
	35	<i>I found the experience disappointing</i> Saya merasakan pengalaman disini adalah mengecewakan	0.95(1.04)
	36	I am able to concentrate well Saya mampu menumpukan perhatian dengan baik	1.25(0.81)
	42	The enjoyment outweighs the stress of studying medicine Keseronokan telah mengatasi tekanan belajar ilmu perubatan	1.40(1.04)
	43	The atmosphere motivates me as a learner Suasana memotivasikan saya sebagai pelajar	1.18(0.93)
	49	I feel able to ask the questions I want Saya boleh bertanya soalan yang saya mahu	0.92(0.88)
SSSP	3	There is good support system for students who get stressed Terdapat sistem sokongan yang baik untuk para pelajar yang tertekan/stress	1.83(1.07)
	4	I am too tired to enjoy this course	2.43(1.04)

		Saya terlalu letih untuk menikmati kursus ini	
14	<i>I am rarely bored on this course</i>	Saya jarang berasa bosan di dalam kursus ini	2.52(0.96)
15	I have good friends in this school	Saya mempunyai ramai kawan-kawan yang baik di dalam universiti ini	1.01(1.06)
19	My social life is good	Kehidupan sosial saya adalah baik	1.18(0.96)
28	I seldom feel lonely	Saya jarang berasa keseorangan	1.60(1.07)
46	My accommodation is pleasant	Tempat penginapan saya adalah selesa	2.15(1.18)

Items in bold are Malay Language, Notes: Items in italics are the negative statements. SPL-Students' perceptions of learning; SPT-Students' perceptions of teaching; SASP-Students' academic self-perceptions; SPA-Students' perceptions of atmosphere; SSSP-Students' social self-perception

Table 4: Domain mean score of DREEM by medical students of UniSZA per academic phase (n=277)

Domain	Mean (SD)		
	Pre-Clinical	Clinical	Overall
Students' perceptions of learning (SPL) ^a	15.09(6.32)	16.38(6.22)	15.87(6.28)
Students' perceptions of teaching (SPT) ^b	12.67(5.97)	13.89(6.30)	13.40(6.19)
Students' academic self-perceptions (SASP) ^c	10.02(5.06)	11.21(4.54)	10.74(4.78)
Students' perceptions of atmosphere (SPA) ^a	13.77(7.62)	15.29(6.94)	14.69(7.25)
Students' social self-perceptions (SSSP) ^d	12.46(2.91)	12.88(2.76)	12.71(2.82)
Total DREEM scores ^e	64.02(25.10)	69.65(23.15)	67.41(24.06)

a Minimum score=0, Maximum score=48

b Minimum score=0, Maximum score=44

c Minimum score=0, Maximum score=32

d Minimum score=0, Maximum score=28

e Minimum score=0, Maximum score=200

Table 5: Domain interpretation score of DREEM by medical students of UniSZA per academic phase (n=277)

Level of Score Based on Domain	Number of Respondent, n (%)		
	Pre-clinical ^a	Clinical ^a	Overall ^a
Students' perceptions of learning			
Very poor	43(39.1)	38(22.8)	81(29.2)
Teaching is viewed negatively	59(53.6)	110(65.9)	169(61.0)
A more positive approach	8(7.3)	19(11.4)	27(9.7)
Teaching highly thought of	0(0)	0(0)	0(0)
Students' perceptions of teaching			
Abysmal	54(49.1)	60(35.9)	114(41.2)
In need of some retraining	48(43.6)	93(55.7)	141(50.9)
Moving in the right direction	8(7.3)	13(7.8)	21(7.6)
Model teachers	0(0)	1(0.6)	1(0.4)
Students' academic self-perceptions			
Feeling of total failure	43(39.1)	42(25.1)	85(30.7)

Many negative aspects	60(54.5)	104(62.3)	164(59.2)
Feeling more on the positive side	6(5.5)	21(12.6)	27(9.7)
Confident	1(0.9)	0(0)	1(0.4)
Students' perceptions of atmosphere			
A terrible environment	51(46.4)	62(37.1)	113(40.8)
There are many issues that need changing	51(46.4)	90(53.9)	141(50.9)
A more positive atmosphere	7(6.4)	15(9.0)	22(7.9)
A good feeling overall	1(0.9)	0(0)	1(0.4)
Students' social self-perceptions			
Miserable	3(2.7)	3(1.8)	6(2.2)
Not a nice place	81(73.6)	130(77.8)	211(76.2)
Not too bad	25(22.7)	34(20.4)	59(21.3)
Very good socially	1(0.9)	0(0)	1(0.4)

^acolumn per cent

Table 6: The association between social demographic and educational characteristics with mean score of DREEM

Variable	N	Mean(SD)					
		Overall	SPL	SPT	SASP	SPA	SSSP
Sociodemographic Characteristics							
Gender^d							
Male	76	71.68(24.69)	16.57(6.40)	15.09(5.89)^b	11.04(5.25)	15.73(7.48)	13.26(3.11)^a
Female	201	65.80(23.68)	15.61(6.23)	12.76(6.19)^b	10.62(4.60)	14.29(7.14)	12.51(2.68)^a
Race^e							
Malay	174	67.34(24.00)	15.71(6.35)	13.21(6.19)^b	11.11(4.65)	14.63(7.05)	12.68(2.87)
Chinese	47	75.32(22.57)^a	17.89(6.00)^a	15.94(5.93)^b	11.11(4.65)	17.15(7.36)^a	13.23(2.36)
Indian	53	60.96(24.51)^a	14.62(6.06)^a	11.98(6.00)^b	9.23(5.09)	12.70(7.41)^a	12.43(3.04)
Others	3	61.67(10.41)	15.33(5.51)	10.00(1.73)	10.00(1.73)	14.67(5.69)	11.67(2.31)
Religion^f							
Islam	179	67.50(23.81)	15.77(6.30)	13.27(6.21)	11.09(4.63)	14.68(6.99)	12.69(2.87)
Buddha	35	72.23(21.37)	16.91(5.91)	15.40(5.65)	10.69(4.31)	16.14(6.89)	13.09(2.37)
Hindu	46	60.50(24.99)	14.63(6.30)	11.91(5.92)	9.13(5.26)	12.61(7.59)	12.22(3.03)
Christian	15	72.47(26.10)	17.73(6.27)	13.80(6.69)	10.93(5.32)	16.47(8.56)	13.53(2.59)
Atheist	2	76.50(23.33)	21.50(4.95)	21.50(4.95)	15.50(4.95)	24.50(6.36)	13.50(0.71)
Educational Characteristics							
Phases of Study^d							
Phase I (Pre-Clinical)	110	64.02(25.10)	15.09(6.32)	12.67(5.97)	10.02(5.06)^a	13.77(7.62)	12.46(2.91)
Phase II (Clinical)	167	69.65(23.15)	16.38(6.22)	13.89(6.30)	11.21(4.54)^a	15.29(6.94)	12.88(2.76)
Year of Study^f							
Year I	54	60.28(22.32)	14.61(5.55)	12.04(5.95)	9.37(4.49)^a	12.57(6.39)	11.69(2.73)^b
Year II	56	67.63(27.24)	15.55(7.010)	13.29(5.98)	10.64(5.53)	14.93(8.53)	13.21(2.90)
Year III	54	74.06(20.42)	17.78(5.41)	14.28(5.78)	12.39(4.06)^a	16.26(6.65)	13.35(2.78)^b
Year IV	53	73.49(23.84)	17.36(6.41)	15.62(6.29)^b	11.17(4.75)	16.34(7.16)	13.00(2.64)
Year V	60	62.28(23.37)	14.27(6.26)	12.00(6.34)^b	10.18(5.57)	13.48(6.75)	12.35(2.79)
Type of Foundation Study^e							
One Year Matriculation	210	67.81(25.38)	16.07(6.45)	13.69(6.53)	10.59(4.96)	14.80(7.62)	12.67(2.86)
Two Year Matriculation	4	56.75(15.97)	13.25(2.87)	11.50(4.20)	10.25(4.11)	11.00(5.89)	10.75(2.36)

University Foundation	63	66.75(19.60)	15.30(5.84)	12.57(4.97)	11.27(4.20)	14.52(5.94)	13.00(2.69)
Cumulative Grade Point Average (CGPA) ^d							
4	137	69.37(25.89)	16.36(6.57)	14.10(6.41)	10.60(5.13)	15.44(7.99)	12.88(2.94)
Below 4.0	140	65.49(22.04)	15.39(5.97)	12.72(5.90)	10.87(4.42)	13.95(6.38)	12.56(2.70)
Type of Secondary school ^d							
Boarding School	89	66.39(23.64)	15.66(6.23)	13.29(6.66)	10.89(4.69)	14.09(6.73)	12.46(2.45)
Non- Boarding School	188	67.89(24.30)	15.97(6.32)	13.46(5.97)	10.66(4.83)	14.97(7.48)	12.84(2.98)
Total Mean Score	277	67.41(24.06)	15.87(6.28)	13.40(6.19)	10.74(4.78)	14.69(7.25)	12.71(2.82)

Notes: a significant $p < 0.05$ b significant $p < 0.01$ c highly significant $p < 0.001$ d Independent T-test e Kruskal Wallis test f One-way ANOVA. Mean total score of SPL was 15.87, Maximum=48. Mean total score of SPT was 13.40, Maximum=44. Mean total score of SASP was 10.74, Maximum=32. Mean total score of SPA was 14.69, Maximum=48. Mean total score of SSSP was 12.71, Maximum=28.

For Gender, In SPT, there is statistically significant ($p=0.005$) difference of mean scores between Male and Female groups. In SSSP, there is statistically significant ($p=0.046$) difference of mean scores between Male and Female groups.

For Races, In Total DREEM, there is statistically significant ($p=0.018$) difference of mean scores between Chinese and Indian groups.

In SPL, there is statistically significant ($p=0.041$) difference of mean scores between Chinese and Indian groups.

In SPT, there is statistically significant ($p=0.003$) difference of mean scores between Malay and Chinese groups, between Chinese and Indian groups.

In SPA, there is statistically significant ($p=0.016$) difference of mean scores between Chinese and Indian groups.

Others possess no statistically significant differences.

For Phase of Study, In SASP, there is statistically significant ($p=0.042$) difference of mean scores between Pre-Clinical and Clinical groups.

For Year of Study, In SPT, there is statistically significant ($p=0.008$) difference of mean scores between Year IV and Year V groups.

In SASP, there is statistically significant ($p=0.015$) difference of mean scores between Year III and Year IV groups.

In SSSP, there is statistically significant ($p=0.009$) difference of mean scores between Year III and Year IV groups.

Others possess no statistically significant differences.