

# Same syllabus, different country – using DREEM to compare the educational environments at two Pharmacy schools

PEI NEE WONG<sup>\*1</sup>, DAI N. JOHN<sup>2</sup>, RHIAN E. DESLANDES<sup>2</sup>, M. LOUISE HUGHES<sup>2</sup>

<sup>1</sup>*School of Pharmacy, Taylor's University Lakeside Campus, Selangor Darul Ehsan, Malaysia.*

<sup>2</sup>*School of Pharmacy and Pharmaceutical Sciences, Cardiff University, Cardiff, Wales, United Kingdom.*

## Abstract

**Background:** A new pharmacy twinning programme between universities in Malaysia (Taylor's, TU) and the United Kingdom (Cardiff, CU) started in 2011.

**Aims:** To compare the pharmacy students' perceived educational environments in two institutions using the same syllabus.

**Methods:** In October 2012, a modified version of DREEM (Dundee Ready Education Environment Measure) was administered to Year 2 and Year 3 students in both schools, relating views to the previous academic year.

**Results:** For both schools, the total mean scores revealed a positive education environment. CU students perceived the environment to be significantly more positive than TU students (145/200 vs 128/200,  $p < 0.005$ ). Sub-domain scores showed significant difference between TU and CU ( $t$ -test,  $p < 0.05$ ). Highest scores of perceptions of the learning environment in TU were associated with learning and lowest with atmosphere.

**Conclusion:** The study has provided useful information about the strengths and areas of improvement for both schools. Plans are being employed to further enhance the quality of the educational environment.

**Keywords:** *Education environment, DREEM, questionnaire, pharmacy education*

## Introduction

In Malaysia, Transnational Higher Education (TNHE) as a concept began in the mid-1990s (Morshidi, 2005). With the support of the Malaysian government to internationalise higher education, and the ever increasing demands of pharmacy education, TNHE became a common feature of private pharmacy education. The most common form of TNHE in pharmacy education in Malaysia is the "twinning program" (Morshidi, 2005). The first pharmacy twinning program was launched by the International Medical College (currently known as International Medical University), in collaboration with the University of Strathclyde in the United Kingdom (UK) in 1994 (QAA, 2010). At the time of the study there were three private institutions providing UK pharmacy twinning programs in Malaysia (Taylor's University, International Medical University and SEGI University College) and another with a branch campus (University Nottingham Malaysia Campus) offering its own pharmacy programs. The most recent of the pharmacy twinning programs was introduced by the School of Pharmacy, Taylor's University (TU) in 2010 offering a 2+2 twinning programme with Cardiff University School of Pharmacy and Pharmaceutical Sciences (CU).

The first students were enrolled on the collaborative TU-CU pharmacy programme commencing in January 2011. The programme runs in two phases, Phase I and Phase II. Students undergo Phase I training in TU which comprises two years of study in Malaysia and then transfer to Cardiff for Phase II. The Phase II components comprise Year 3 and Year 4 studies. This is known as a "2+2 twinning programme". In this arrangement, TU first and second year students follow the same syllabus as the students enrolled into CU in the same academic year.

Genn defined the learning environment as everything that is happening in the classroom, department, or university and which makes an impact on students' achievement, satisfaction and success (Genn, 2001a; 2001b). A positive learning environment and positive learning outcomes appear to go together (Al-hazimi *et al.*, 2004b). Despite the uniqueness and complexity of the learning environment in the context of a twinning programme (Goh, 2008), students' perceptions of their educational environment are a useful basis for modifying and improving the quality of the educational environment. Students' feedback also allow teaching and learning

\*Correspondence: Ms. Penny Wong, *School of Pharmacy, Taylor's University Lakeside Campus, No. 1 Jalan Taylor's, 47500 Subang Jaya, Selangor Darul Ehsan, Malaysia. Tel: +60123452383. Email: peinee.wong@taylors.edu.my*

activities to be monitored so to ensure that students are provided with the best educational environment possible (Brennan & Williams, 2004). With CU and TU working towards achieving mutually beneficial expectations, students' perceptions of the learning environment are crucial in establishing effective learning (Powell *et al.*, 1996; Goh, 2006, Abraham *et al.*, 2008), thus optimising the overall outcome of the course. TU as a new pharmacy school wishes to obtain students' feedback on the various dimensions of learning environment, so to help in enhancing the strengths and address any weaknesses of the school. The aim of this study was therefore to: (1) assess students' perceptions of learning environments at the two geographically different sites (CU and TU); and (2) compare the perceptions of educational environment between CU and TU students and attempt to identify areas in need of further improvement.

## Methods

### Instrument

A modified version of the Dundee Ready Education Environment Measure (DREEM) questionnaire was the instrument of choice to evaluate the pharmacy education environments (Appendix A). The original DREEM questionnaire was designed to measure the educational environment specifically for medical schools and other health professions (Roff *et al.*, 1997). It was introduced in the late 1990s by a Delphi panel of 30 health professional educators from 20 countries and then tested on students in several countries for validation purposes (Miles *et al.*, 2012). The DREEM was refined into a 50-item self-report questionnaire using a 5-point Likert scale, with scores reflecting overall student perception on five main aspects (domains) of the environment:

1. Students' perceptions of learning (SPL): 12 statements, maximum score is 48
2. Students' perceptions of teachers (SPT): 11 statements, maximum score is 44
3. Students' academic self-perceptions (SAP): 8 statements, maximum score is 32
4. Students' perceptions of atmosphere (SPA): 12 statements, maximum score is 48
5. Students' social self-perceptions (SSP): 7 statements, maximum score is 28

The maximum total score for all domains is 200. Each statement is scored from 0-4 with 4, strongly agree; 3, agree; 2, uncertain; 1 for disagree; 0, strongly disagree. Nine of the 50 items are negative statements and scored in reverse for analysis (item numbers 4, 8, 9, 17, 25, 35, 39, 49 and 50). Table I shows a guide to interpreting the overall score and sub-scale (Roff *et al.*, 1997).

As the DREEM questionnaire was originally developed for medical students who were based in hospitals as part of their educational environment, thus a modified version of DREEM was used for the pharmacy students. The modified DREEM allowed the pharmacy students to complete the questionnaire with their opinions about their experience in the pharmacy school and during their community pharmacy placement (*e.g.* the atmosphere is relaxed during the ward teaching changed to the atmosphere is relaxed during university community pharmacy experiential placements). The content validity of the modified DREEM questionnaire was obtained through a review process with a panel of pharmacy education experts. The modified questionnaire was piloted with four students to ensure face validity. The data from the pilot were excluded from final analysis.

**Table I: Guide for interpretation of DREEM scores (adapted from Roff *et al.*, 1997)**

Total score:	Students' Perception of Teachers (SPT)	Students' Perception of Atmosphere (SPA)
0-50 Very Poor	0 - 11 Abysmal	0-12 A terrible environment
51-100 Plenty of Problems	12-22 In need of some retraining	13-24 There are many issues which need changing
101-150 More Positive than Negative	23-33 Moving in the right direction	25-36 A more positive attitude
151-200 Excellent	34-44 Model course organisers	37-48 A good feeling overall
Students' Perception of Learning (SPL)	Students' Academic Self Perceptions (SAP)	Students' Social Self Perceptions (SSP)
0-12 Very Poor	0-8 Feelings of total failure	0-7 Miserable
13-24 Teaching is viewed negatively	9-16 Many negative aspects	8-14 Not a nice place
25-36 A more positive perception	17-24 Feeling more on the positive side	15-21 Not too bad
37-48 Teaching highly thought of	25-32 Confident	22-28 Very good socially

### Procedures

After obtaining approval from Cardiff School of Pharmacy and Pharmaceutical Sciences Ethics Committee, the modified DREEM was distributed to all Year 2 and Year 3 pharmacy students at each institution during the month of October 2012. Logistically, TU Year 2 students completed the questionnaire at TU whereas TU Year 3 students, CU Year 2 and Year 3 students completed their questionnaire at CU. Before the students completed the questionnaire, they were informed about the purpose of collecting the data as well as the data collection procedure, including anonymity and voluntary participation. Participants consent to take part in the study was inferred by their completion of the questionnaire. When the questionnaire was distributed, the students were specifically reminded verbally as well as through the instructions on the instrument that the questionnaire was related to their previous year's experiences: *i.e.* Year 2 students were asked to reflect on their Year 1 experiences and Year 3 were asked to reflect on their Year 2 experiences. All questionnaires were distributed and returned the same day. Completed questionnaires were kept in a locked cabinet and data were entered into password-protected computers for statistical analyses. Respondent identities were kept anonymous.

The study population comprised all pharmacy students in their second and third year at TU and CU in the academic year 2012/2013. The target population for TU was 64 students: 44 Year 2 and 20 Year 3. The target population for CU was 221 students: 117 Year 2 and 104 Year 3. First year students were not included in the study as they had just joined the course and were not yet in a position to comment on the educational environment.

### Data analysis

Statistical analysis was carried out using SPSS v.20.0 for Windows. The overall mean DREEM scores, sub-scale scores, and individual item scores were expressed as mean  $\pm$  standard deviation (SD). Levene's test was used to test for equality of variances, and comparison of mean values of scores within year groups and institutions was done using the Independent Sample *t*-test for two independent samples. A two-tailed test of statistical significance was used with alpha set at  $<0.05$ .

## Results

### Response rate and demographic data

A total of 281 (98.6%) pharmacy students responded to the modified DREEM questionnaires. The response rates from TU and CU were 100% (64/64) and 98.2% (217/221), respectively. Listwise deletion was performed to remove all data for a case that had one or more missing values. Twenty-five students did not answer all of the questions and they were excluded from the analysis. Therefore, 256 complete questionnaires were analysed (84%). Table II shows the demographic details of the respondents after listwise deletion.

**Table II: Demographic profile of participants\* at TU and CU**

	Gender	Site of study	
		TU	CU
Year 2	Male	8 (18.2%)	33 (33.3%)
	Female	36 (81.8%)	66 (66.7%)
Year 3	Male	3 (16.7%)	35 (36.8%)
	Female	15 (83.3%)	60 (63.2%)
TOTAL		62 (100%)	194 (100%)

\*Data presented as numbers (percentages)

### Total DREEM scores and subscale comparison

The total score and the scores for each of the 5 sub-scales are shown in Table III. The total mean scores were 128 for the TU students and 145 for the CU students out of a maximum of 200 (representing an ideal educational environment). The interpretation of each sub-scale was as suggested by Roff *et al.* (1997).

**Table III: Mean (SD) subscale and total DREEM scores in TU and CU (n=256)\***

DREEM subscale	TU	CU	Verbal description	Significance (two-tailed) <i>p</i> -value
SPL <sup>a</sup> (max = 48)	32.34 (3.9) (67.3%)	35.11 (4.3) (73.1%)	A more positive perception	<0.001
SPT <sup>b</sup> (max = 44)	27.4 (3.6) (62.1%)	32.6 (4.04) (74%)	Moving in the right direction	<0.001
SAP <sup>c</sup> (max = 32)	20.5 (3.5) (64.1%)	22.2 (3.50) (69.5%)	Feeling more on the positive side	0.001
SPA <sup>d</sup> (max = 48)	29.4 (4.9) (61.2%)	35.4 (4.7) (73.8%)	A more positive attitude	<0.001
SSP <sup>e</sup> (max = 28)	18.0 (2.6) (64.3%)	20.02 (2.9) (71.5%)	Not too bad	<0.001
Total score (for different site of study)	127.7 (13.9) (63.9%)	145.4 (15.9) (72.7%)	More positive than negative	<0.001

\*% represents % of the maximum score for that subscale and total score

<sup>a</sup>SPL=Students' Perceptions of Learning

<sup>b</sup>SPT=Students' Perceptions of Teachers

<sup>c</sup>SAP=Student's Academic Self-perceptions

<sup>d</sup>SPA=Students' Perceptions of Atmosphere

<sup>e</sup>SSP=Students' Social Self-perceptions

The mean values in Table III and the interpretations suggest that students' rating of the environment were higher in CU students than TU students. The highest percent score was observed for the "Students' Perceptions of Teachers" (74%) at CU and the "Perception of Learning" (67.3%) at TU. On the other hand, the lowest percent score was observed for the "Academic Self-perception" (69.5%) at CU and the "Students' Perception of Atmosphere" (61.2%) at TU. Overall, each of the sub-scale scores reported by CU students was significantly higher than those of TU students (*p*-value  $< 0.005$ ).

**Individual DREEM items**

In order to identify the specific strengths and areas for improvement within the educational environment, individual items were analysed. The five individual items with both the highest and lowest scores at TU and CU are shown in Table IV. Both groups of students from TU and CU had the highest score for the item Item 2 “The teachers are knowledgeable” showing a high level of agreement. Similarly the lowest scoring item was the same for both TU and CU students: Item 27 “I am unable to memorise all I need”.

**Table IV: Five individual items at TU and CU with the highest and lowest mean scores\***

Item No.	Statement with highest scores	Score
<b>TU</b>		
2	The teachers are knowledgeable	3.29
15	I have good friends in this school	3.24
1	I am encourage to participate during the teaching	3.19
45	Much of what I have to learn seems relevant to a career in pharmacy	3.18
18	During university experiential placement, the community pharmacist teachers are patient with patients	3.15
<b>CU</b>		
2	The teachers are knowledgeable	3.72
15	I have good friends in this school	3.42
19	My social life is good	3.27
35	<i>I find the experience disappointing</i>	3.25
34	The atmosphere is relaxed during workshops	3.22
Item No.	Statement with lowest scores	Score
<b>TU</b>		
27	I am able to memorise all I need	1.50
17	<i>Cheating is a problem in this school</i>	1.55
8	<i>The teachers ridicule the students</i>	1.58
50	<i>The students irritate the teachers</i>	1.60
35	<i>I find the experience disappointing</i>	1.68
<b>CU</b>		
27	I am able to memorise all I need	1.85
25	<i>The teaching over emphasizes factual learning</i>	2.06
9	The teachers are authoritarian	2.07
14	I am rarely bored on this course	2.32
4	<i>I am too tired to enjoy the course</i>	2.49

Negative items are in italics

\* maximum mean score for each item = 4

**Discussion**

The current study is the first DREEM study comparing students' perceptions of the learning environment in the context of a twinning programme. As an established pharmacy school in the UK, Cardiff has received a high total DREEM score of 145.4, while TU, a newly developed pharmacy school also achieved a fairly high total DREEM score of 127.7. The findings of this study suggest both learning environments have achieved a more positive than negative status, which is just one level below the highest category of achievable scores.

Although this is the first study of a pharmacy twinning programme and also the first study conducted in UK and Malaysian higher education institutions using pharmacy students, the DREEM tool has previously been used at individual pharmacy schools and the results from these were in line with the current findings. For example a study which evaluated 116 undergraduate pharmacy students' perceptions of the learning environment at Monash University, Australia recorded a total mean DREEM score of 133.0 (Brown *et al.*, 2011), which also indicated a more positive than negative status. In addition, a recent study conducted in a Saudi Pharmacy School (310 students) reported a total mean DREEM score of 113 (Aljuffali *et al.*, 2013). Students of innovative curricula tend to show more satisfaction and thus a higher total mean DREEM score, compared to students of traditional curricula. Despite the same curriculum being taught in both TU and CU, a higher score at CU tended to indicate a more student-centered approach to teaching (Awdah *et al.*, 2004).

The findings of the TU score also closely correlate with some other Malaysian institutions of higher learning - for example, the International Medical University recorded a total mean DREEM score of 133.1 (Lai *et al.*, 2009), the Dental Training Institute of Malaysia recorded a mean DREEM score of 121.50 (Zamzuri *et al.*, 2004), and the International Islamic University Malaysia cited a total mean DREEM score of 120.12 (Said *et al.*, 2009).

Differences were observed under each sub-scale score. It is interesting to note that there are significant statistical differences between each of the sub-scale scores between TU and CU although all sub-scale scores fell within the same verbal description. Item scores were examined further and there were several areas of concern where students gave poor rating. TU students felt that teachers ridicule the students. Previous studies in other countries have reported a low score on this item (Bassaw *et al.*, 2003; Al-hazimi *et al.*, 2004a; 2004b; Mayya & Roff, 2004), with the lowest score of 1.27 recorded in a faculty of medical sciences in Trinidad (Bassaw *et al.*, 2003). Also, TU students reported a low score of 1.84 (CU score 2.07) on item 9 “the teachers are authoritarian”. They tended to agree that teachers are authoritarian in the school. The assumption is that some senior staff demand obedience and do not encourage verbal interaction. Several studies have demonstrated that this type of control was significantly influenced by training, gender, and context (Martin *et al.*, 2003). One of the main areas

for concern is that the score that was lowest for both TU and CU students was the inability to memorise all the course requirements. It has also been reported that the responses to this item was below 2 in several other studies (Bassaw *et al.*, 2003; Al-hazimi *et al.*, 2004a; Jiffry *et al.*, 2005; Demiroren *et al.*, 2008; Riquelme *et al.*, 2009; Edgren *et al.*, 2010; Zawawi & Elzubeir, 2012). A reduction in the emphasis on knowledge and thus an avoidance of overburdening factual load may ease the burden. However, one has to bear in mind that this is a fairly common observation in medical and other healthcare professional programmes pertaining to the quantity and quality of information that has to be absorbed during undergraduate studies (Till, 2005).

An executive report on the findings of the DREEM inventory has been shared with all CU and TU School of Pharmacy staff and the schools are now considering addressing the issues identified as a result of this research. Although the use of DREEM has been useful to both universities it does have some limitations. Firstly, the number of participants varied between years of study and site. The extent to which these results can be generalised depends on similar studies being carried out at other pharmacy schools in Malaysia and the UK. Secondly, there has been an inadequate focus on establishing and maintaining the psychometric credentials, particular concern relate to the internal consistency of the 5 scales and construct validity (Hammond *et al.*, 2012). However, there is currently insufficient published psychometric analysis across nationalities on the DREEM instrument to suggest which is the most beneficial route to take in this regard. Lastly, qualitative data was not collected in order to understand better specific problems or highlight strengths within the university. However, future research could be carried out to examine students' insights relating to the items that were scored as unsatisfactory (<2) and to explore the underlying causes of items with high scores.

## Conclusions

This paper provides diagnostic information on students' perceptions of their learning environment using the DREEM questionnaire. The findings suggest students enrolled in the 2+2 pharmacy course hold positive perceptions toward their learning environments. Nonetheless, the study has revealed some weaknesses in both schools. Sharing of the executive summary with all members of staff in the pharmacy schools should help these issues to be addressed, while further research can help to explore the underlying causes of the DREEM results. It is hoped that these actions will help to continue to optimise the learning environments for TU and CU pharmacy students.

## Acknowledgements

The authors would like to thank the students who are willing to participate in this study. Gratitude also goes to Prof. P.T. Thomas for his suggestions in editing this article and Associate Prof. Ahmad Shukri bin Yahaya for providing advice and guidance on statistical analysis.

## References

- Abaham, R., Ramnarayan, K., Vinod, P. & Torke, S. (2008). Students' perceptions of learning environment in an Indian medical school. *BMC Medical Education*, **8**, 20.
- Al-hazimi, A., Al-hyiani, A. & Roff, S. (2004a). Perceptions of the educational environment of the medical school in King Abdul Aziz University, Saudi Arabia. *Medical Teacher*, **26**: 6, 570-573.
- Al-hazimi, A., Zaini, R., Al-hyiani, A., Hassan, N., Gunaid, A., Ponnampuruma, G., Karunathilake, I., Roff, S., McAleer, S. & Davis, M. (2004b). Educational environment in traditional and innovative medical schools: a study in four undergraduate medical schools. *Education for Health*, **17**(2), 192-203.
- Aljuffali, I.A., Albogami, Y. & Al-meshal, N.I. (2013). Evaluating Students' Perceptions of the Educational Climate in a Saudi Pharmacy School. *American Journal of Pharmaceutical Education*, **77**.
- Bassaw, B., Roff, S., McAleer, S., Roopnarinesingh, S., Lisle, J.D., Teelucksingh, S. & Gopaul, S. (2003). Students' perspectives on the educational environment, Faculty of Medical Sciences, Trinidad. *Medical Teacher*, **25**(5), 522-526.
- Brennan, J. & Williams, R. (2004). Collecting and using students feedback: A guide to good practice. York: Learning and Teaching Support Network.
- Brown, T., Williams, B. & Lynch, M. (2011). The Australian DREEM: evaluating student perceptions of academic learning environments within eight health science courses. *International Journal of Medical Education*, **2**, 94-101.
- Demiroren, M.M., Palaoglu, O., Kemahli, F., Ozyurda, F. & Ayhan, I. (2008). Perceptions of students in different phases of medical education of educational environment: Ankara University Faculty of Medicine. *Medical Education Online*, **13**(8).
- Edgren, G., Haffling, A., Jakobsson, U., McAleer, S. & Danielsen, N. (2010). Comparing the educational environment (as measured by DREEM) at two different stages of curriculum reform. *Medical Teacher*, **32**, e233-e238.
- Genn, J.M. (2001a). AMEE Medical Education Guide No. 23 (Part 1): Curriculum, environment, climate, quality and change in medical education-a unifying perspective. *Medical Teacher*, **23**, 337-344.
- Genn, J.M. (2001b). AMEE Medical Education Guide No. 23 (Part 2): Curriculum, environment, climate, quality and change in medical education - a unifying perspective. *Medical Teacher*, **23**, 445-54.
- Jiffry, M.T.T., McAleer, S., Fernando, S. & Marasinghe, R.B. (2005). Using the DREEM questionnaire to gather baseline information on an evolving medical school in Sri Lanka. *Medical Teacher*, **27**(4), 348-52.
- Goh, P.S.C. (2006). Obstacles to Learning in Students from Twinning Programs in Malaysia. APERA. Hong Kong.
- Goh, P.S.C. (2008). Teaching Practices that Hinder the Deep Approaches to Learning of Twinning Programme

- Students in Malaysia: a Qualitative perspective. *The Asia-Pacific Education Researcher*, **17**, 63-73.
- Hammond, S.M., O'Rourke, M., Kelly, M., Bennett, D. & O'Flynn, S. (2012). A psychometric appraisal of the DREEM. *BMC Medical Education*, **12**(2).
- Lai, N.M., Nalliah, S., Jutti, R.C., Hla, Y.Y. & Lim, V.K.E. (2009). The education environment and self-perceived clinical competence of senior medical students in a Malaysian medical School. *Education for Health*, **22**(2).
- Martin, N., Shobo, A. & Yin, Z. (2003). Attitudes and beliefs regarding classroom management style: The impact of teacher preparation versus Experience. *Research in the Schools*, **10**, 29-34.
- Mayya, S.S. & Roff, S. (2004). Students' Perceptions of Educational Environment: A Comparison of Academic Achievers and Under-Achievers at Kasturba Medical College, India. *Education for Health*, **17**, 280-291.
- Miles, S., Swift, L. & Leinster, S.J. (2012). The Dundee Ready Education Environment Measure (DREEM): a review of its adoption and use. *Medical Teacher*, **34**, e620-34.
- Morshidi, S. (2005). Transnational higher education in Malaysia: Balancing benefits and concerns through regulation. Universiti Sains Malaysia, Penang. Working Paper for National Higher Education Research Institute (NaHERI).
- Powell, R.A., Single, H.M. & Lloyd, K.R. (1996). Focus groups in mental health research: enhancing the validity of user and provider questionnaires. *International Journal of Social Psychiatry*, **42**, 193-206.
- QAA (Quality Assurance Agency) (2010). UK collaboration in Malaysia: institutional case studies. The University of Strathclyde and the International Medical University, Malaysia. UK: The Quality Assurance Agency for Higher Education (online). Available at: [http://www.qaa.ac.uk/InstitutionReports/Reports/Documents/Malaysia\\_StrathclydeCS10.pdf](http://www.qaa.ac.uk/InstitutionReports/Reports/Documents/Malaysia_StrathclydeCS10.pdf). Accessed 14<sup>th</sup> June, 2014.
- Riquelme, A., Oporto, M., Oporto, J., Mendez, J.I., Viviani, P., Salech, F., Chianale, J., Moreno, R. & Sanchez, I. (2009). Measuring students' perceptions of the educational climate of the new curriculum at the Pontificia Universidad Catolica de Chile: performance of the Spanish translation of the Dundee Ready Education Environment Measure (DREEM). *Educ Health (Abingdon)*, **22**(1), 112.
- Roff, S., McAleers, S., Harden, R.M., Al-Qahtani, M., Ahmed, A.U., Deza, H., Groenen, G. & Primparyon. (1997). Development and validation of the Dundee Ready Education Environment Measure (DREEM). *Medical Teacher*, **19**(4), 295-299.
- Said, N.M., Rogayah, J. & Hafizah, A. (2009). A Study of Learning Environments in the Kuliyyah (Faculty) of Nursing, International Islamic University Malaysia. *Malaysia Journal of Medical Sciences*, **16**(4), 15-24.
- Till, H. (2005). Climate studies: Can students' perceptions of the ideal educational environment be of use for institutional planning and resource utilization? *Medical Teacher*, **27**(4), 332-337.
- Zamzuri, A.T., Azli, N.A., Roff, S. & McAleer, S. (2004). How do students at Dental Training College Malaysia perceived their educational environment. *Dental journal of Malaysia*, **25**, 15-26.
- Zawawi, A. & Elzubeir, M. (2012). Using DREEM to compare graduating students' perceptions of learning environments at medical schools adopting contrasting educational strategies. *Medical Teacher*, **34**, S25-S31.