

ADOPTION OF DUNDEE DREEM QUESTIONNAIRE TO ASSESS THE EDUCATIONAL ENVIRONMENT OF AN AGRICULTURE DEGREE PROGRAMME

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ABSTRACT

Dundee Ready Education Environment Measure (DREEM) is widely used in medical education institutions to assess students' perception on the educational environment. The present study used a modified version of the DREEM questionnaire to assess the education environment of a BSc (Agriculture) degree programme in Sri Lanka. Students' agreement on each of the 50 statements of five domains; students' perception of learning (SPL) and teachers (SPT), academic self-perception (SAP). Perceptions of atmosphere (SPA) and social self-perception (SSP) were recorded on a five point Likert scale (0= strongly disagree to +4= strongly agree). Scores were added to calculate domain subscales and the overall scale. Over-emphasize of factual learning (1.69/4) and boredom (1.19/4) considered under the domain SPL and SSP, respectively were the only problematic areas (scale<2). Some personal qualities of teacher such as being get angry in classes and their authoritative nature needed improvements (scale>2<3.5). Male students' perception on teaching and their social perception were significantly better than that of female colleagues'. There were no problematic areas under SAP and SPA. Perception on teachers (SPT) (70.1%) was significantly better than SAP (64.9%) and SSP (63.3%). Male (68.4%) students held a significantly better overall perception than female (63.4%) counterparts. Students overall perception decreased until third year and then improved in fourth year upto the level of first year students'. Having a total score of 132/200, educational environment was found to be more positive than negative, though there was a considerable room for further improvements. Particular attention should be paid to address the issues related to female students, second and third year students, with respect to all five domains.

Key words: Agriculture, assessment, DREEM, education environment

INTRODUCTION

Students' academic progress, behavior and well-being are influenced by the educational environment within which they study (Genn, 2001; Pimparyon *et al.* 2000; Audin *et al.* 2003). The educational environment encompasses a range of elements including teachers and teaching process, social, cultural, and psychological elements and the *physical* surroundings. A warm, supportive and challenging educational environment is generally considered an essential pre-requisite for optimal learning. Numerous approaches have been adopted to assess the students' perception on their educational environment (Seabrook, 2004; Audin *et al.* 2003; Roff *et al.* 1997; Sobral, 2004). Of them, the Dundee Ready Education Environment Measure (DREEM) proposed by Roff et

al. (1997) has been widely used as an instrument in medical education to generate institutional profiles, comparing groups and institutions, relating the perception of educational environment and learning styles and predicting academic achievements globally (Roff, 2005). It has been validated and utilized in assessing the educational environments in more than 20 countries, including a Sri Lankan medical school (Miles *et al.*, 2012).

No such tools is available to assess and compare the educational environments of the students following Agriculture and allied fields.

The scope of DREEM questionnaire encompasses students' assessment on five important areas that could be applicable to any degree programme and thus can be used as a basis to evaluate the education environment of the other disciplines. Statements under each of

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the five domains may be modified and/or wordings be rephrased in order to match the context of degree programme in question. For example, Wang *et al.* (2009) have adopted DREEM questionnaire to evaluate an undergraduate course in nursing. Whittle *et al.* (2007) pointed that apart from providing an overall picture about the students perception on their educational environment, analysis of the each statement of the DREEM questionnaire allows the identification of areas that require remediation and could be helpful to design mechanisms for improving the educational environment.

Objective of this study were 1) to assess the students perception of the education environment of the Faculty of Agriculture, University of Ruhuna, using the DREEM questionnaire as a tool, 2) to determine as to how gender and academic year influence the students perception and 3) to identify stronger and weaker areas of each of the five domains.

MATERIALS AND METHOD

One hundred and forty four undergraduates representing all four academic years of the Faculty of Agriculture, University of Ruhuna, Sri Lanka (FAUR) were randomly selected for the study. The DREEM inventory gives a total score of 200 for 50 statements. Students were asked to indicate their perception about the each of the 50 statements on a five point Likert scale 0–4 (4 = strongly agree, 3 = agree, 2 = unsure, 1 = disagree, and 0 = strongly disagree). Wordings of the statements of the original DREEM questionnaire were rearranged and/or rephrased in order to suit the educational environment of the FAUR (Table 1-5). The number of statements considered under SPL, SPT, SAP, SPA and SSP were 12, 11, 8, 12 and 7, respectively. There were 9 negative statements (statement no 8, 12, 15, 16, 21, 23, 35, 39 and 45) scored in a reverse manner; high scores on these items indicate disagreement. The maximum possible total score for domain SPL,

SPT, SAP, SPA and SSP were 48, 44, 32, 48 and 28. The maximum total score was 200. The scheme suggested by McAleer and Roff, (2001) was used for the interpretation of the overall DREEM score. Accordingly, overall scores of 0–50, 51-100, 101-150 and 151-200 were considered very poor, many problems, more positive than negative and excellent, respectively. Items with a mean score of 3.5 or more are true positive points. Items with a mean of 2.0 or less should be examined more closely, as they indicate problem areas. Items with a mean between 2.0 and 3.0 are aspects of the educational environment that could be enhanced.

GLM procedure or t test was used to determine the effects of gender, academic year and the attempt at which student entered the university (A/L attempt) on cumulative scores of each domain. Scores of each domain were divided by the maximum scores of respective domains to determine the percentage level of success. Percentage scores were subjected to GLM procedure to compare the statistical differences among the domains. Significant effects were compared using DMRT procedure. The Cronbach alpha value was used to determine the reliability. Spherman alpha was determined for each subscale to check the reliability of subscale constructs.

RESULTS AND DISCUSSION

Modifications of the Questionnaire

The Cronbach alpha value for the statements related to SPL, SPT, SAP, SPA, and SSP and the whole 50 statements were 0.85, 0.86, 0.83, 0.87, 0.68 and 0.95. respectively. Spherman alpha was determined for each subscale to check the reliability of subscale constructs. Except for SSP (0.68 vs 0.76), observed alpha values were higher than expected values. Dimoliatis *et al.* (2010) have also reported similar results with medical students. Deletion of statement “I am rarely bored on this course” could have increased the reliability up

to 0.73. Possibly a more direct statement might have been used.

Wordings of 10 out of 50 statements of the original DREEM questionnaire were changed taking the special features of the BSc (Agriculture) course offered by the FAUR into consideration. All the statements in domain SPL were used as in the original questionnaire. The statement “teachers are patient with patients” was changed as “the teachers concern about agriculture of the country” (statement 14). Since the FAUR conducts semester based examination system, the statement “I am confident about my passing this year” was changed as “I am confident about my passing this semester examination” (statement 25). In contrast to medical graduates, agriculture graduates are employed in a wide range of professions in Agriculture and allied fields. Therefore, the statement “I feel I am being well prepared for my profession” was rearranged as “I feel I am being well prepared for a profession in Agricul-

ture” (statement 26). Similar changes in wordings were done for statement 28, 29, 30 and 31.

The on-farm field trainings was regarded as the counterpart components in Agriculture degree programme to the “word trainings” of medical courses. Consequently the statement “The atmosphere is relaxed during the ward teaching” was rearranged as “the atmosphere is relaxed during field works” (statement 32). Seminar and tutorials is a minor component in BSc (Agriculture) course offered by the FAUR. Almost all courses has a strong laboratory practical component. Taking the importance of engaging in laboratory practical, instead of the statement “The atmosphere is relaxed during seminars/tutorials” the statement “I have opportunities to perform appropriate practical procedures” (statement 33) was introduced under SPA domain. The statement “cheating is a problem in this school” was changed as “cheating is a problem in assignments (statement 35).

Table 1. Scores (out of four) of the statements under domain Students' Perception of Learning

Statement no	Statement	Mean score	Interpretation
1	I am encouraged to participate in the lectures	3.03	Could be enhanced
2	The teaching is often stimulating	2.86	Could be enhanced
3	The teaching is student-centered	2.58	Could be enhanced
4	The teaching is sufficiently concerned to develop my competence/skills	2.98	Could be enhanced
5	The teaching is well focused	2.79	Could be enhanced
6	The teaching is sufficiently concerned to develop my confidence	2.89	Could be enhanced
7	The teaching time is put in to good use	2.89	Could be enhanced
8*	The teaching over-emphasizes factual learning	1.69	Problematic areas
9	I am clear about the learning objectives of the course	3.01	Could be enhanced
10	The teaching encourages me to be an active learner	2.86	Could be enhanced
11	Long-term learning is emphasized over short-term	2.69	Could be enhanced
12*	The teaching is too teacher-centered	2.27	Could be improved
Mean score		2.71±0.5	Could be improved

*Negative statements

Table 2. Scores (out of four) of the statements under domain Students' Perception of teachers

Statement no	Statement	Mean score	Interpretation
13	The teachers are knowledgeable	3.42	Could be enhanced
14	Teachers concern about the Agriculture in the country	3.31	Could be enhanced
15*	The teachers ridicule the students	2.65	Could be enhanced
16*	The teachers are authoritarian	2.48	Could be enhanced
17	The teachers have good communications skills with students	2.57	Could be enhanced
18	The teachers are good at providing feedback to students	2.62	Could be enhanced
19	The teachers provide constructive criticism about students and their works	2.60	Could be enhanced
20	The teachers give clear examples	2.98	Could be enhanced
21*	The teachers get angry in class	2.45	Could be enhanced
22	The teachers are well prepared for their class	3.10	Could be enhanced
23*	The teachers are irritated by the students	2.73	Could be enhanced
Mean score		2.81±0.6	Could be enhanced

*Negative statements

Students' Perception of Learning

Though, in general, students perception could be viewed as more positive than negative, there were no true positive areas (score >3.5) under this domain (Table 1). Having 32.4 out of 48 (67.5%) score, students perception towards the learning was the second best domain next to SPT (70.1%) (Table 6). Scores on SPL were not significantly affected by the gender, academic year or the A/L attempt on which respondents entered the university (Table 6).

Over emphasis on factual matters was identified as a problematic area. Interestingly, a study with Sri Lankan medical students (Chandratilake and De Silva, 2009) using the same methodology have reported that statement "teachers over emphasized the factual matters" had recorded the least score under domain SPL. All other areas came under this domain "could be enhanced".

Compared to females, male students agreed

significantly more on the statement "The teaching over-emphasizes factual learning". Lie *et al.* (2004) reported that male students have preference for rational evaluation and logic, whereas female students use "elaborative processing. Therefore, female students may enjoy over emphasis of factual learning than males do. However, indicating that the over emphasis on factual matter had no effect on lecture attendance, both male and female students gave similar response to statement "I am encouraged to participate in the lectures" (mean 3.1 vs 2.8). Though not being categorized as a problematic area, teacher-centric teaching was also a concern for students (2.27/4).

Students' perception of teaching

Having 70% success, SPT was the most positive domain that could be classified as more positive than negative. Demirören *et al.* (2008) have also reported SPT as the best domain in a Turkish Medical School. Though

there were no true positive aspect, there were no problematic areas as well regarding the teaching (Table 2). Though students perceived that the teachers are knowledgeable (3.42/4) and concerned about agriculture (3.31/4), some personal qualities such as being get angry in classes and their authoritative nature and teaching attributes such as communication skills and feed-back provision need to be addressed in order to improve the students perception towards the teaching. Interestingly, a Sri Lankan (Chandratilake and De Silva, 2009) and a Turkish study with medical students (Demirören *et al.*, 2008) have also identified authorities nature of the teachers as a problematic area in the teaching.

Male students had a better perception (72.5%) than female students (64.9%). Male (3.4/4) students showed significantly better perception of the statement “Teachers concern about the Agriculture” than female colleagues (3.0/4). Interestingly, compared to females

(median 2), males showed significantly more agreement (median 3) on statement “teachers are irritated by students”. Scores for the statements “teachers ridicule the students” (third year), teachers are authoritarian” (third year), “teachers are good at providing feedback to students” (second and third year) and “teachers get angry in classes” (second and third) of students were significantly lower than first and final year colleagues. Consequently, students perception of teachers declined during first three years and then improved in final year, making third year students perception of teachers significantly lower than other three years.

Students Self Academic Perception

Gender, academic year and A/L attempt at which students entered the university had no significant effect on students’ self academic perception scores. There were no true positive aspects or problematic areas (Table 3).

Table 3. Scores (out of four) of the statements under domain Students’ self academic Perception

Statement No	Statement	Mean score	Interpretation
24	The learning strategies I used before are useful to me still now	3.10	Could be enhanced
25	I am confident about my passing this semester	3.33	Could be enhanced
26	I feel I am being well prepared for a profession in Agriculture	2.88	Could be enhanced
27	Last semester's work has been a good preparation for this semester's work	3.03	Could be enhanced
28	I am able to understand all I need to become a professional in agriculture	2.70	Could be enhanced
29	I have developed a great attraction towards agriculture and/or profession in agriculture	3.07	Could be enhanced
30	I have developed my skills of problem solving at the faculty	3.03	Could be enhanced
31	Much of what I have to learn seems relevant to a career in Agriculture	2.96	Could be enhanced
Mean score		2.60±0.5	Could be enhanced

*Negative statements

There was a great room for further improvements. As in the case with other studies with medical students (Chandratilake and De Silva, 2009; Whittle *et al.*, 2007; Al-Hazimi *et al.*, 2004; Till, 2004; Bassaw *et al.*, 2003; Roff *et al.*, 2001), the poorest perception was towards the statement “I am able to understand all I need to become a professional in agriculture”.

Students Perception of Atmosphere

Though there were no problematic areas, there was a great room for further improvements with respect to all areas concerned (Table 4). Interestingly, students themselves rated cheating in assignment preparation as the weakest aspect in this domain. As continuous evaluation component in which individual or group assignments accounts a minimum of 20% of the total marks of every course, attention has to be made to improve the issue of cheating in assignments.

Male students tend to have ($p=0.06$) better perception than females (Table 6). Students perception of atmosphere declined up to third year and then improved in final year. Both second and third year students has significantly lower perception than first and final year students. Interestingly, students who entered the university at their third attempt showed significantly lower perception on atmosphere than those who entered at their first or second attempt. Those who entered university at their third attempt gave significantly lower scores than those who entered at their first or second attempt for the statements “I feel comfortable socially in the class” and “I feel comfortable to ask questions I want”.

Students Social Perception

This was the weakest domain. There was one problematic area and all other aspects need to be enhanced. Students perceived that they have good friends in the faculty (mean

Table 4. Scores (out of four) of the statements under domain Students' Perception of atmosphere

Statement no	Statement	Mean score	Interpretation
32	The atmosphere is relaxed during field works	2.90	Could be enhanced
33	I have opportunities to perform appropriate practical procedures	2.94	Could be enhanced
34	Academic programs runs according to a well set time table	2.82	Could be enhanced
35*	Cheating is a problem in assignments	2.22	Could be enhanced
36	The atmosphere is relaxed during the lectures	2.68	Could be enhanced
37	There are opportunities for me to develop inter-personal skills	2.84	Could be enhanced
38	I feel comfortable in class socially	2.39	Could be enhanced
39*	I find the experience disappointing	2.73	Could be enhanced
40	I am able to concentrate well	2.65	Could be enhanced
41	The enjoyment outweighs the stress of studying Agriculture	2.49	Could be enhanced
42	The atmosphere motivates me as a learner	2.88	Could be enhanced
43	I feel able to ask the questions I want	2.80	Could be enhanced
Mean score		2.7±0.6	Could be enhanced

*Negative statements

scale=3.17/4), good social life (mean scale=3.1/4) but were bored (mean scale=1.19/4) and tired (mean scale=2.42/4) of the course. Female students appeared to be more vulnerable as they showed significantly lower perception than male students. Both second and third year students showed poorer perception than first and final year students.

Overall comparison

When the guide of McAleer and Roff, (2001) was used to interpret the mean score, the overall perception (66.6%; total score=132), educational environment of the FAUR was found to be more positive than negative. A similar study done in Sri Lanka with medical students (Jiffry *et al.*, 2005) has reported lower perception (108/200). Students had a better perception about learning and teaching environment than about their social perception. Male students held significantly a better perception than female counterparts. Significantly lower perception on teachers and social environment to a large extent and on academic atmosphere to a lesser extent greatly influenced this behavior. Therefore, particular attention should be paid to identify the specific issues related to female students and to improve those aspects.

Students overall perception decreased until third year and then improved in fourth year up to the level of first year students'. The perception towards all domains also behaved in a similar pattern. Contrary, Jiffry *et al.* (2005) and Roff (2005) reported better perception among third than first and the final year student. First semester courses of first three years of the FAUR are mainly of lectures and laboratory practical. The third year second semester is an intensive on-farm practical training programme. The final year programme is a specialization module consisting of a lecture programme followed by a research component. Therefore, it seems that the courses offer after the third year first semester are more flexible and student-centered. Reason/s for lower perception of SSP domain among second and third year students are not clear. However, difficulties those encounter in academic spheres in second and third year may induce negative perceptions in social domain as well. Therefore, behavior of the perception of educational environment of the students across four academic years may largely be related to above course structure.

CONCLUSION

With some minor adjustments, DREEM questionnaire could be used as a tool to assess the

Table 5. Scores (out of four) of the statements under domain Students' social self academic

Statement no	Statement	Mean score	Interpretation
44	There is a good support system for students who get stressed	2.44	Could be enhanced
45*	I am too tired to enjoy this course	2.42	Could be enhanced
46	I am rarely bored on this course	1.19	Problematic area
47	I have good friends in this faculty	3.17	Could be enhanced
48	My social life is good	3.10	Could be enhanced
49	I seldom feel lonely	2.90	Could be enhanced
50	My accommodation is pleasant	2.62	Could be enhanced
Mean score		2.55±0.5	Could be enhanced

*Negative statements

Table 6. Students perception of educational environment of FAUR as affected by gender, the academic year and the attempt at which students entered the university

Variable	Domain					Total
	SPL	SPT	SAP	SPA	SSP	
Male	67.6	72.5	65.5	69.3	64.9	68.4
Female	66.1	64.9	63.2	63.9	59.2	63.4
ANOVA	NS	0.01	NS	0.06	0.03	0.03
Academic year						
1	68.9	75.3 ^a	65.3	72.1 ^a	67.2 ^a	70.4 ^a
2	68.6	71.3 ^a	64.7	62.9 ^b	59.9 ^b	66.0 ^b
3	64.3	61.9 ^b	61.4	57.7 ^b	54.5 ^b	60.4 ^b
4	67.1	70.5 ^a	66.6	72.1 ^a	67.6 ^a	69.1 ^a
ANOVA	NS	0.01	NS	0.00	0.00	0.003
AL Attempt of university entry						
1	70.1	72.6	67.7	69.7 ^a	63.6	69.3
2	66.2	70.8	65.5	70.0 ^a	64.3	67.8
3	67.9	67.9	62.7	62.8 ^b	61.1	64.9
ANOVA	NS	NS	NS	0.04	NS	NS
Scores						
	32.4	30.8	20.7	32.3	17.7	132/200
Percentage						
	67.5 ^{ab}	70.1 ^a	64.9 ^{bc}	67.2 ^{ab}	63.2 ^c	66.6 [±]
ANOVA						
			0.00			14
For % values						

education environment of an undergraduate degree program in Agriculture.

The overall perception of the students about educational environment of the FAUR was more positive than negative though there was a considerable room for further improvements. In order to improve the educational

environment, particular attention needs to be paid to address the issues related to female students, second and third year students, with respect to all five domains.

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