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Investigating perceptions of the academic educational environment across six undergraduate health care courses in the United Kingdom

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**Abstract:**

**Aim:** To compare how health care professional students perceive their academic learning environment in one Higher Education Institution (HEI).

**Method:** The Dundee Ready Education Environment Measure (DREEM), a scale that measures students' perceptions of their academic classroom learning environments, and demographic items were completed by 673 undergraduate students enrolled in health professional courses at the University of Huddersfield, United Kingdom. Respondent scores, partitioned by demographic variables, were obtained on the total DREEM scale and on the individual sub-scales. Analysis of variance techniques were utilized to investigate associations between demographic variables on the total DREEM score and sub-scale scores.

**Results:** All students from all year levels reported total DREEM scores between 101 - 150, indicating a more positive than negative perception of their academic learning environments. Both profession and year of study were found to be significantly associated with total DREEM scores, with occupational therapists, physiotherapists and nurses scoring higher than operating department practice students; and first year students scoring higher than third year students. A significant interaction between these two factors was found to exist, indicating that the impact of the year of study does not apply equally over the different professional groups of students.

**Conclusions:** Students in this study reported positive perceptions about their academic classroom learning environments and teaching delivered. Further interrogation of the DREEM sub-scale dimensions at a programme/cohort level may offer course teams' further information to inform continuous quality improvement.

## **Introduction**

It has been argued that identifying, matching and understanding the range of health professional students' learning styles with classroom delivery of subject matter and learning strategies has the potential to enhance learning experience (Doolan & Honigsfeld 2000). This paper presents and explores results of a study using the Dundee Ready Educational Environment Measure (DREEM). The paper aims to identify factors that are associated with the academic learning environment and the perceptions of undergraduate healthcare students perceptions of the quality of teaching delivered.

## **Background**

The maintenance and continued development of quality in higher education institutions (HEIs) is vital to allow students to transfer knowledge and skills learnt to their chosen profession upon qualification. In the United Kingdom (UK), the National Student Survey provides some information about students' perceptions of their overall higher education experience, and Institutional Review seeks to safeguard quality and standards of HEIs in England and Northern Ireland. Together they endeavour to make transparent students' experiences of higher education, and identify and offer solutions to public concerns about quality and standards in higher education quickly and efficiently (Quality Assurance Agency 2011). Quality assurance is not indigenous to the UK: in the United States, the Department of Education's Accreditation and Quality Assurance ensures that education providers meet, and maintain, minimum standards of quality and integrity regarding academics, administration, and related services. Similarly, in Australia the Australian Higher Education Quality Assurance Framework (2000) maintains standards and quality in HEIs. In the UK, training for nursing, midwifery and allied health professions is funded on a contract basis by Local Training and Education Boards and are delivered by a range of universities. Students are able to evaluate their experience at universities through the national student survey, and university rankings are published annually.

University student demographics continue to change: in the UK, healthcare professional students are often more mature and pursue a career in health as a second career. The Royal College of Nursing (2008) undertook a survey of nursing students (n=4,500) across the UK and identified that 47% were over 30 years of age, including 19% who were over 40 years; and about two-thirds (65%) were in paid employment before starting their nursing course. Therefore these students will enroll on their chosen professional course expecting an academic environment that both supports their knowledge development and individual learning needs.

Student engagement with academic activities has been used as a tool to measure an institutions performance at fostering student learning (Huang and Fisher, 2011). Students' involvement in educational activities both inside and outside of the classroom have been identified as enlarging a student's capacity for continuous learning and development (Kuh, 2003). An effective educational environment should advance knowledge and social and economic progress (Watty, 2006). Brown et al. (2011) analysed DREEM scores from a sample of 548 Australian university undergraduate students enrolled on a range of health professional courses to explore their perceptions of the learning environment. The results in this study uncovered some key differences across student groupings; namely, that neither age nor gender were significantly associated with total DREEM score.

However, the study of Brown et al. did identify significant differences when comparing cohorts from different years of study and gender; finding females to score higher than males. Similarly, Al-Hazimi (2004) identified that female medical students recorded higher total DREEM scores than males; whereas Khan et al (2011) found that male students had higher total DREEM scores than females; a difference apparently explained by institutional bias toward male students.

Individual students learn in significantly different ways, as HEIs need to employ a range of teaching and learning strategies to encompass the various needs of the student including, problem-based learning, lectures, seminars, simulation, on-line learning activities and a range of assessment strategies. Identifying the most appropriate match of teaching and learning methods to the learning style needs of students has received research attention:

Kift (2008) suggested that curricula design is critical for enhancing first year student engagement, success and retention, with student satisfaction being associated with a university's ability to identify and meet students' needs and expectations.

As such it is important that academic staff understand, and are able to adapt their teaching methods to suit numerous learning styles in order to maintain effective academic learning environments in classrooms.

### **Purpose and Research Questions**

The overall aim of the study was to compare how health professional students view the academic learning environments.

The research questions used to inform the study were:

1. To investigate whether students' programme of study (discipline) affected their perception of the academic learning environment
2. To explore if gender affected the students perception of the academic learning environment
3. To explore if the age of the student affected their perception of the academic learning environment
4. To investigate if year of study affected students perception of the academic learning environment

### **Why is this study important?**

It is essential to compare, explore and examine how students perceive the support for learning they receive during their professional courses. This will provide an understanding of how students learn, how they construct knowledge and how this influences future learning and skills acquisition. Examination of the academic learning environment will assist in the generation of data that can provide further insights into students learning needs, particularly in the context of curricula design. In the case of this study, we have interpreted

the educational environment to encompass the students' perception of teaching styles adopted by lecturers; academic support for students and the environment itself, including library and information technology (IT) facilities.

## **Method**

### **Participants**

Using a convenience sampling approach, data was collected through completion of a survey package distributed to health professional students (nurses, midwives, physiotherapists, occupational therapists and operating department practitioners) at the University of Huddersfield, who had completed at least one practice placement during their programme of study. Prior to distribution, students were provided with an explanation of the study and an opportunity to ask questions, and a copy of a written information sheet outlining the research project. Students present when the pack was distributed were asked to sign to indicate informed consent.

### **Instrumentation**

The DREEM questionnaire was developed at the University of Dundee, supported by an international Delphi panel, and designed to specifically measure medical and healthcare-related students' perceptions of their experience of the learning environment in which they undertook their education. The instrument has now been used worldwide to assess students' perceptions of the academic learning environment (i.e. classroom) across a number of undergraduate courses for health professionals (Roff 1997, 2005). DREEM contains 50 statements designed to measure the quality of the educational environment of health professional programmes (university based learning); made up of five sub-scales:

1. Student perception of learning (SPL)(12 items)
2. Student perception of teachers (SPT) (11 items)
3. Student academic perception (SAP) (8 items)
4. Student perception of academic atmosphere (SPA) (12 items)
5. Student social self-perception (SSP) (7 items)

Items are scored as; 4 for Strongly Agree, 3 for Agree, 2 for Uncertain, 1 for Disagree, 0 for Strongly Disagree. Certain items are negative statements and are reversed scored. The overall DREEM score is out of 200. Dunne et al. (2006) suggested the following as a guide to interpreting the scores:

(0 -25%) - Very Poor

(25.5 - 50%) - Plenty of Problems

(50.5 - 75%) - More Positive than Negative

(75.5 - 100%) - Excellent

### **Reliability and Validity of DREEM Instrument**

The DREEM has been validated for assessing undergraduate medical educational environments and reported to have high internal consistency (Cronbach alpha levels of 0.92 - 0.93) within such environments (Roff et al. 1997). It has been used in nursing, chiropractic and dental schools, and Foster et al. (2011) argues that it demonstrates construct validity.

### **Ethical Considerations**

Ethical approval to conduct the study was obtained from the University of Huddersfield School of Human and Health Sciences Research and Ethics Panel. Completion of the DREEM questionnaire was undertaken on a voluntary basis and no identifiable information was collected, so all data was anonymous. The consent forms and questionnaires were kept separately in locked filing cabinets. The questionnaires were entered into a spreadsheet and analysed by a statistician (JS). All data kept electronically was encrypted and accessed only by the research team. All data collected will be kept securely on University servers for a period of five years as stipulated by University guidance and then destroyed.

### **Data Analysis**

Analysis was undertaken using SPSS (version 18.0). Demographic data collected on all participants included profession (categorized as occupational therapy, physiotherapy,

nursing, midwifery, podiatry and operating department practice (ODP)), year of study (categorized as 1st, 2nd or 3rd year), age group (categorized as 15-19, 20-24, 25-29, 30-34, 35-39 and 40+ years) and gender. Means and standard deviations were calculated for each of the sub-scales of the DREEM, plus the grand total for sub-groups of participants partitioned by each of the demographic variables. Missing data was imputed using mean values in cases where more than half of the items associated with a particular sub-scale were present.

An analysis of variance (ANOVA) model was derived to assess the ~~influence~~ association between all the above demographic variables on total DREEM score as the outcome measure. Post-hoc tests were performed where appropriate. An additional ANOVA model considering first order interactions was also constructed. A multivariate analysis of variance (MANOVA) model was also derived, including all the above variables and using each of the total scores of the DREEM sub-scales as outcome measures, following a priori correlation tests to verify the suitability of the MANOVA. Follow-up ANOVAs and post hoc tests were performed where appropriate. In all models statistical significance was inferred by p-values less than 0.05.

## **Results**

The data presented below are separated into sections exploring results relating to each of the four research questions. Initially an overview of demographic data is described for the reader to allow an understanding of the sample size.

### **Demographic Data**

The total size of the cohort was 1128; comprising 116 midwifery students, 616 nursing students, 92 physiotherapy students, 49 occupational therapy students (OT), 143 podiatry students and 112 operating department practice (ODP) students. 738 questionnaires were distributed (65.4% of the total cohort), with 673 returned, (excluding blank returns); giving a response rate of 59.7% of the entire cohort. Response rates were similar across the different professions represented.

Table 1 shows the number of participants in the current study partitioned by profession, gender, age group and year of study (where recorded). Percentages of valid responses are also given. The sample can be seen to be predominantly female, and to comprise individuals mostly under 30 years of age, which is representative of the population of students currently registered on health-related degree programmes at the University of Huddersfield. There were no substantive differences in the age or gender profiles of the professions represented.

<Insert Table 1 here>

### **Student perception of the academic learning environment – Profession**

The first research question had been to investigate whether students' programme of study (discipline) affected their perception of the academic learning environment. Total DREEM score and sub-scale scores were derived for all professions on an individual basis and are summarized in Table 2. From this table it can be seen that total ODP student scores (126.1) were lower than scores associated with occupational therapy (140.3), physiotherapy (138.0), nursing (137.8) and midwifery (135.0) students. ODP students also scored lower than respondents from any other degree discipline on all but one of the sub-scale scores. However, total scores by programme indicate overall students irrespective of discipline were more positive than negative.

The ANOVA conducted on the total DREEM scores found profession to be significantly associated with the outcome measure ( $F(5,627)=7.37, p<0.001$ ). Post hoc testing identified significant differences to occur between occupational therapy and ODP students ( $p=0.002$ ); between nursing and podiatry students ( $p=0.018$ ); between nursing and ODP students ( $p<0.001$ ); and between midwifery and ODP students ( $p=0.009$ ). The MANOVA conducted on the DREEM sub-scale scores found profession to be significantly associated with all five of the sub-scales comprising the DREEM score using Wilk's lambda statistic ( $\tilde{\epsilon}=0.848, F(25,2316)=4.21, p<0.001$ ). Follow-up ANOVAs indicated significant association between profession and all five of the DREEM sub-scales.

<Insert Table 2 here>

### **Student perception of the academic learning environment – overall**

Total DREEM score and sub-scale scores were derived for all students in the sample and are summarized in Table 3. Hence the overall scores of the students would be classified as More Positive than Negative according to Dunne et al.'s (2006) criteria.

<Insert Table3 here>

### **Student perception of the academic learning environment – Gender**

The second research question was to explore if gender affected the students perception of the academic learning environment. Total DREEM score and sub-scale scores were derived for males and females separately; females consistently reported higher scores than male students across all disciplines. However, gender was not significantly associated with the total DREEM score ( $F(1,627)=0.78$ ,  $p=0.780$ ). The MANOVA found that while scores on each of the sub-scales were not significantly different, the sub-scales jointly did differentiate between genders ( $F(5,623)=2.34$ ,  $p=0.040$ ). This effect arises due to the combination of small differences on several variables.

### **Student perception of the academic learning environment – Students' age**

The third research question was to explore if age of the student affected their perception of the academic learning environment. Total DREEM score and sub-scale scores were derived for students in different age groups. In most sub-scales, and in the total scale, scores appear to peak in the 25-29 age group before falling by age 40+ to levels approximating those recorded by participants in the youngest age group. However, age group was not significantly associated with the total DREEM score ( $F(5,627)=1.69$ ,  $p=0.136$ ). The MANOVA also found that age group was not significantly associated with scores on the individual sub-scales jointly ( $\eta^2=0.943$ ,  $F(25,2316)=1.48$ ,  $p=0.059$ ), although two individual sub-scales (SPL and SAP) were found to significantly differentiate the age groups ( $F(5,627)=2.39$ ,  $p=0.037$  for SPL;  $F(5,627)=3.53$ ,  $p=0.004$  for SAP).

### **Student perception of the academic learning environment – Year of study**

The final research question had been to investigate if year of study affected students' perception of the academic learning environment. Total DREEM score and sub-scale scores were derived for students in different years of study, and are summarized in Table 4. In general there appeared to be a slight reduction in scores with progression through the course of study, and the ANOVA conducted on the total DREEM scores found Year of Study to be significantly associated with the outcome measure ( $F(2,627)=5.50$ ,  $p=0.004$ ). Post hoc testing identified significant differences to occur between 1st year students and 3rd year students ( $p=0.010$ ). The MANOVA conducted on the DREEM sub-scale scores did not find a significance of association between Year of Study and the sub-scales comprising the DREEM score jointly ( $\eta^2=0.973$ ,  $F(10,1246)=1.72$ ,  $p=0.073$ ); although three individual sub-scales (SPL, SPT and SPA) were found to significantly differentiate the age groups ( $F(2,627)=4.36$ ,  $p=0.013$  for SPL;  $F(2,627)=5.40$ ,  $p=0.005$  for SPT;  $F(2,627)=4.23$ ,  $p=0.015$  for SPA).

<Insert Table 4 here>

### **Student perception of the academic learning environment-interaction between factors**

An additional ANOVA including 1st-order interactions was derived to assess the effect of interactions between predictor variables. In this model, the interaction between profession and year of study was found to be statistically significant ( $F(6,577)=3.66$ ,  $p=0.001$ ). Hence the effect of year of study does not apply equally in all professions. This is illustrated in the interaction graph in Figure 1.

It may be seen that for most disciplines, including OT, nursing and podiatry, DREEM scores peak in the 2nd year of study before falling to levels at or below baseline in the 3rd year. However, in the case of midwifery and ODP, the direction of association is reversed between years 1 and 2; the only years from which respondents in these disciplines were drawn. No determination of the interaction effect was possible for students of physiotherapy, who were drawn from the 2nd year of study only.

<Insert Figure 1 here>

## **Discussion**

In general, the findings of the current analysis are comparable with those found by Brown et al. in a study of Australian students (2011). It is worth noting all statistical significant comparisons across professions found in the analysis of Brown et al involved professions not represented in the current study (emergency health, dietetics & nutrition, pharmacy, social work, radiography and medical imaging). The mean total and sub-scale scores recorded in the two studies can be compared. The overall mean score in the current analysis of 135.2 is slightly lower than the Australian students score of 137.3, and the difference between the two studies is statistically significant ( $p=0.045$ ). However, the statistical significance is obtained from two samples in excess of 500 students, and the corresponding effect size of 11.5% (using Cohen's  $d$  statistic), is small in magnitude.

The Australian students overall had a higher mean score than British students, but this effect was produced by the score on one sub-scale, student perceptions of learning. On this sub-scale, Australian students, with a mean score of 32.8, scored considerably higher than British students, with a mean score of 27.3, by 5.1 points. This difference is statistically significant, allowing for a suitable correction for multiple comparisons ( $p=0.003$ ). Again, the corresponding Cohen's  $d$  statistic of 17.0% represents an effect which is unlikely to be significant in practice. On all other sub-scales, British students score marginally higher than Australian students by scores of up to 1.1, but none of these differences represent anything greater than small effects.

The findings of no significant differences in DREEM score between genders concur with findings from the study of Brown et al (2011). The difference in scores between the genders was less marked in the study of Brown et al, although this study identified no statistical significance between the genders. The difference between genders noted in the student perception of teachers sub-scale may be attributed to differing learning styles between the genders. Differences in learning styles on the basis of gender is contested: Breckler and Joun (2009) suggest that learning style preferences may change over time and with different

levels of education. Fleming (2001) reported significant differences between genders, with men having more kinaesthetic responses and women more read/write responses; signifying that gender does impact on learning styles of students. In contrast, studies carried out by James et al (2011) and Alkhasawneh et al (2008) found no significant differences; however, there was a trend for differing proportions of unimodal (having one mode of learning style) and multimodal (having more than one mode of learning style) learners among males and females. James et al (2011) in their study of undergraduate first year nursing and midwifery students' learning styles concluded that the high score of kinaesthetic mode among their students suggested a need for teaching strategies to include extensive laboratory work, demonstrations, interactive simulations and role-playing.

Age-related diversity in learning styles has been described by Johnson and Romanello (2005), who categorized learning styles of all university students by generation. The highest proportion of participants in our study can be considered as Generation Xers (1961– 1981), who learn quickly and want to focus on what will benefit them; and Millennials (1982– 2002), who favor teamwork, experiential activities, structure and the use of technology.

Vaughan et al (2009), in their study of 246 female college students, stated that students over the age of 25 years were more independent than younger students. However D'Amore et al (2011), in their study of learning styles of undergraduate nursing and midwifery students, found no relationship between learning styles and age, but found relationships between learning styles and student demographics, suggesting that it was important that educators and students were made aware of existing student learning styles to encourage a balanced learning approach to education.

Overall Vaughan et al.'s work does suggest differences in learning styles associated with age, and as such curricula development must represent these various learning styles. As the demographics of students entering university education changes, educators must offer teaching methods that incorporate traditional lectures, on-line learning and one-to-one or small group seminars, to ensure the needs of all groups are met. Some healthcare courses, for example undergraduate nursing courses, have large numbers of students: often in excess of 100 students per cohort. The ability for educators to learn and recognize students

individual learning styles may prove impossible, but educators may be able to offer advice to students of the importance of understanding their own leaning styles and being able to adapt to those styles that the students find less suitable.

All students of all years recorded a total DREEM score between 101 – 150, indicating a more positive than negative perception of the academic learning environment (Dunne et al 2006). All student sub-groups also recorded scores within this range. This finding is in line with that of Brown et al (2011) and Roff (2005), where total DREEM scores were also high. Although overall DREEM scores fell in the final year of study, this may be attributable to the pressure students feel on completing all academic assignments prior to completion of the degree course. However this needs to be investigated in more depth. The analysis of the effect of professional discipline on DREEM scores suggests some dichotomy. The three highest DREEM scoring disciplines were occupational therapy, physiotherapy and nursing. The responses of these students appear to be distinct from responses of students from other professions; and definitely distinct from responses of students from ODP. This may be attributed ODP being only a 2-year course (thus only 2 years of data were available for this course), while other courses are 3 years in duration. The responses of students from the remaining disciplines of podiatry and midwifery lie between these 2 professional groupings and could reasonably be grouped with either.

The results of this DREEM survey indicate that the majority of students scored their experience of the learning environment as positive. This is particularly important, in the context of the controversial changes to tuition fees in England brought in by the current Government. The importance of ensuring the student experience is positive during their education period is vital if students are expected to finance their time of learning at university. It is envisaged this will alter the relationship between student and HEI to a more commercial basis and quality indicators such as performance in student satisfaction or other indicators of what constitutes a quality learning environment may become more significant.

### **Study Limitations**

This study has investigated a range of health care professions programmes, but is limited to

one HEI in the UK, and therefore it would be beneficial to undertake a comparative study across a range of HEIs providing healthcare education. The number of participants varied between courses and year of study, with no third (final) year midwifery respondents as they were unavailable when the survey was administered. Also, the sample consisted of just over 50% of nursing students. The ODP course is two years in duration as opposed to the three year programmes for the other disciplines questioned. Qualitative data which may have allowed for an exploration of specific concerns or strengths within the university or particular courses was not collected.

### **Conclusion**

Overall the students in this study were positive towards the academic learning environment and teaching delivered, suggesting that the academic environment and curricula across the courses surveyed met the educational needs of students. This was a positive finding and suggests that the range of teaching strategies used, lectures, seminars, problem based scenarios on line learning and simulation met the learning needs of the majority of students. However the positive scores should not allow for complacency: as the demographics of students continue to change academic staff must be constantly reviewing the appropriateness and success of learning and teaching methods. Further interrogation of the sub scale dimensions of DREEM at a programme/cohort level may offer course teams' further intelligence to inform continuous quality improvement.

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Figure 1 Interaction between degree discipline and year of study (outcome measure: DREEM total score)

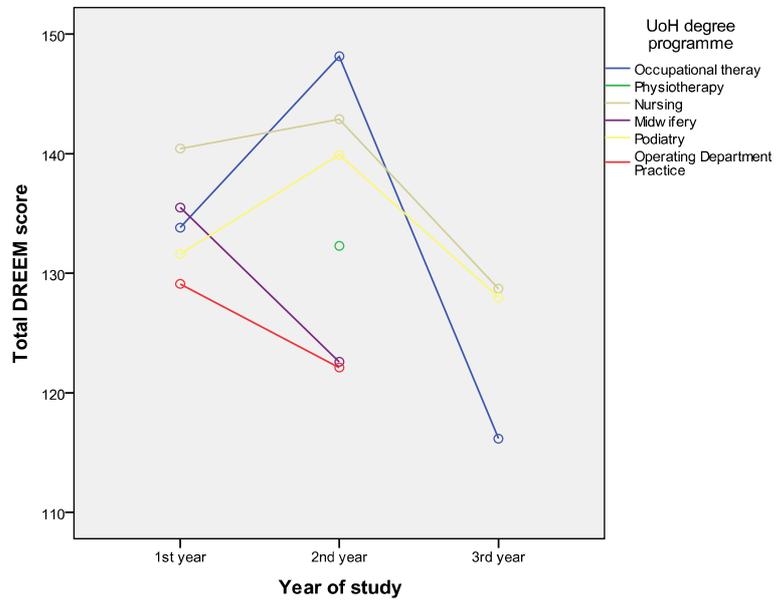


Table 1 Summary of demographic variables

<b>Variable</b>	<b>Number (valid percentage)</b>
<b>Profession</b>	
Occupational Therapy	32 (4.9%)
Physiotherapy	22 (3.4%)
Nursing	332 (50.8%)
Midwifery	100 (15.3%)
Podiatry	92 (14.1%)
Operating Department Practice (ODP)	75 (11.5%)
<b>Gender</b>	
Male	86 (12.9%)
Female	583 (87.1%)
<b>Age group</b>	
15-19	101 (15.5%)
20-24	226 (34.6%)
25-29	102 (15.6%)
30-34	74 (11.3%)
35-39	74 (11.3%)
40+	76 (11.6%)
<b>Year of study</b>	
1 <sup>st</sup> year	259 (39.8%)
2 <sup>nd</sup> year	285 (43.7%)
3 <sup>rd</sup> year	107 (16.4%)

Table 2 Summary of DREEM total and sub-scale scores by profession (mean (SD))

Profession	n	Mean DREEM score (SD)					
		SPL	SPT	SAP	SPA	SSP	TOTAL
Occupational Therapy	32 (4.9%)	27.9(3.77)	34.1(4.97)	22.1(3.59)	35.9(5.15)	20.3(3.00)	140.3(15.1)
Physiotherapy	22 (3.4%)	28.5(3.21)	33.0(5.00)	22.6(2.55)	34.0(3.38)	19.1(4.15)	138.0(13.4)
Nursing	332(50.8%)	28.1(4.54)	33.9(5.04)	22.6(4.01)	34.4(5.77)	19.8(3.57)	137.8(18.4)
Midwifery	100 (15.3%)	27.0(4.33)	33.9(4.26)	22.2(3.21)	33.5(5.82)	18.5(3.35)	135.0(15.9)
Podiatry	92 (14.1%)	26.7(3.80)	31.5(5.36)	20.8(3.25)	33.1(6.14)	18.7(3.64)	130.9(17.0)
ODP	75 (11.5%)	24.6(4.97)	29.6(5.33)	21.2(3.48)	32.7(6.32)	18.1(3.09)	126.1(18.9)

Table 3 Summary of DREEM total and sub-scale scores (mean (SD))

SPL	SPT	SAP	SPA	SSP	TOTAL
27.3(4.56)	32.6(5.19)	22.1(3.77)	33.9(5.81)	19.3(3.58)	135.2(18.1)

Table 4 Summary of DREEM total and sub-scale scores by year group

Year	n	Mean DREEM score (SD)					
		SPL	SPT	SAP	SPA	SSP	TOTAL
1 <sup>st</sup> year	259 (39.8%)	27.7(4.35)	32.9(5.39)	22.4(3.59)	34.4(5.90)	19.5(3.23)	136.9(17.5)
2 <sup>nd</sup> year	285 (43.7%)	27.2(4.73)	32.9(4.98)	22.2(3.63)	34.0(5.99)	19.0(3.75)	135.4(18.4)
3 <sup>rd</sup> year	107 (16.4%)	26.6(4.24)	31.4(4.87)	21.2(4.20)	32.7(5.17)	19.2(3.69)	131.1(17.8)