

Research article

Medical laboratory science and nursing students' perception of the academic learning environment at a Philippine university using the Dundee Ready Education Environment Measure

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Abstract

Purpose: This study aimed to compare the perception of the academic learning environment between medical laboratory science students and nursing students at Saint Louis University, Baguio City, Philippines. **Methods:** A cross-sectional survey research design was used to measure the perceptions of the participants. A total of 341 students from the Department of Medical Laboratory Science, School of Natural Sciences, and the School of Nursing answered the Dundee Ready Education Environment Measure (DREEM) instrument from April to May 2016. Responses were compared according to course of study, gender, and year level. **Results:** The total mean DREEM scores of the medical laboratory science students and nursing students did not differ significantly when grouped according to course of study, gender, or year level. Medical laboratory science students had significantly lower mean scores in the sub-domains 'perception of learning' and 'perception of teaching'. Male medical laboratory science students had significantly lower mean scores in the sub-domain 'perception of learning' among second year students. Medical laboratory science students had significantly lower mean scores in the sub-domain 'perception of learning'. Nursing students identified 7 problem areas, most of which were related to their instructors. **Conclusion:** Medical laboratory science and nursing students viewed their academic learning environment as 'more positive than negative'. However, the relationship of the nursing instructors to their students needs improvement.

Keywords: Cross-sectional studies; Medical laboratory science; Nursing students; Perception; Philippines

Introduction

The Dundee Ready Educational Environment Measure (DREEM) instrument is commonly used to evaluate the learning environment of medical science and other health science students in various academic settings, and the results can be used to compare different institutions offering health courses [1,2,3,4]. Since having been developed over 10 years ago, this instrument has been used to outline the strengths and weak-

nesses of institutions based on the perceptions of their students [5]. In the Philippines, the DREEM is not commonly utilized to determine the perceptions of students concerning their learning environment. Aside from the lack of records on the strengths or weaknesses of institutions offering health professions courses, the Commission on Higher Education has also reported that tertiary level schools in the Philippines face several problems, such as having unqualified or poorly trained teachers, inadequate facilities, and dilapidated instructional materials (Southeast Asian Ministers of Education Organization, Innovation and Technology [SEAMEO INNOTECH], 2003). In recent years, non-traditional instruction methodologies such as the utilization of technology have been adopted and implemented at some higher education institutions in the

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Philippines, but a gap exists between the level of prioritization of this educational reform and its degree of implementation [6]. Hence, it would be ideal to determine the perceptions of health science students concerning their learning environment, in order to initiate relevant educational reforms.

This study describes the perceptions of medical laboratory science students and nursing students at Saint Louis University, Baguio City, Philippines. Specifically, the study compared the total DREEM scores, sub-domain scores, and DREEM item scores between medical laboratory science and nursing students. The results could provide a reference point for further improvement of the curricula of medical laboratory science and nursing studies in the Philippines.

Methods

Study design

A cross-sectional survey research design was used.

Materials and subjects

The participants in this study were students of Saint Louis University, Baguio City, Philippines. The inclusion criteria in the study are currently enrolled students in their second and third year during the academic year of 2015-2016. First-year students were excluded because their basic professional courses were not yet completed. Fourth-year students were also excluded because they are deployed across various primary, secondary, and tertiary health institutions in different provinces of Luzon, making it difficult to distribute and retrieve questionnaires.

The total number of participants was 1,147 (571 second-year students and 576 third-year students) and the significance level was set at 5%, with the confidence level at 95%. A total of 421 questionnaires were distributed to randomly selected students in the Department of Medical Laboratory Science, School of Natural Sciences, and in the School of Nursing. Only 341 students answered and returned the questionnaire. The questionnaires were distributed and the data were collected from April to May, 2016.

The DREEM instrument was used to determine the students' perception of learning, teaching, academic atmosphere, and their social and academic self-perception. For each item on the questionnaire, students provided a score ranging from 0 to 4 (0 = strongly disagree, 1 = disagree, 2 = unsure, 3 = agree, and 4 = strongly agree). Out of a total of 50 questions, 9 negative items were scored in a reverse manner prior to analysis and interpretation (items 4, 8, 9, 17, 25, 35, 39, 48, and 50) [6]. The demographic profiles of the respondents, including details such as course, year level, and age, were also obtained to compare the mean scores. The DREEM instrument has been

used in several countries, translated into 8 languages, and applied to evaluate the perceptions of medical students and students of other allied health courses [1]. As a generic instrument for providing a profile of a health institution's strengths and weaknesses, the DREEM instrument is generally accepted as valid [6]. The use of DREEM tool from Roff et al. [7] was permitted by Dr. Sue Roff.

Statistical analysis

The scores of students were obtained and reported as mean \pm standard deviation. A perfect score on the DREEM questionnaire is 200. The means of the subscales and individual DREEM items were also obtained to determine problem areas. The software program IBM SPSS ver. 20.0 (IBM Co., Armonk, NY, USA) was used for statistical analysis. To determine significant differences in total mean scores, subscale mean scores, and DREEM item mean scores, independent t-test was utilized. If applicable, one-way analysis of variance with a post hoc Tukey honest significant difference test was also utilized. A finding of

Table 1. Score interpretation of mean subscale and total DREEM scores

Area	Score	Interpretation
Total DREEM score	0-50	Very poor
	51-100	Significant problems
	101-150	More positive than negative
	151-200	Excellent
Perception of learning	0-12	Very poor
	13-25	Negative view of teaching
	25-37	More positive than negative view
	37-40	Teaching highly regarded
Perception of teaching	0-11	Very poor
	12-22	Re-education required
	23-33	Moving in the right direction
	34-44	Model instructors
Academic self-perception	0-8	Feelings of total failure
	9-16	Many negative aspects
	17-24	More positive than negative perception
	25-32	Confident
Perception of atmosphere	0-12	Very poor environment
	13-24	Many issues need changing
	25-36	More positive than negative attitude
	37-48	Good feeling overall
Social self-perception	0-7	Miserable
	8-14	Negative perception
	15-21	More positive than negative
	22-28	Very good perception
Individual items (non-negative)	< 2	Problem area
	2-3	Needs improvement
	3-3.5	Positive aspect
	> 3.5	Excellent

DREEM, Dundee Ready Education Environment Measure.

P < 0.05 was considered significant in this study. The interpretation of the mean scores for total DREEM scores, sub-domains, and individual DREEM items was based on Table 1 [2].

Ethics approval

Prior to data collection, this study was submitted to the Saint Louis University Research Ethics Committee (Protocol No. 2016-014) for approval. Only those who signed the informed consent were given questionnaires.

Table 2. Mean subscale and total DREEM score of medical laboratory science and nursing students at Saint Louis University, Baguio City, Philippines from April to May, 2016

Sub-domain	Medical laboratory science (n = 242)	Nursing (n = 99)	P-value
Perception of learning	27.20 (4.62)	28.80 (6.02)	0.009
Perception of teaching	26.36 (4.32)	27.56 (5.85)	0.037
Academic self-perception	21.13 (4.14)	20.88 (4.74)	0.643
Perception of atmosphere	29.34 (5.17)	29.15 (6.53)	0.779
Social self-perception	16.35 (2.94)	17.03 (3.89)	0.078
Total DREEM score	120.38 (17.95)	123.41 (24.77)	0.270

Values are presented as number (%).
DREEM, Dundee Ready Education Environment Measure.

Results

The total average DREEM score from the students' evaluations was 121.26 ± 20.18 out of a total of 200 points, which can be interpreted as a 'more positive than negative' perception of the learning environment at the academic institution. Mean scores for all students were also calculated for the sub-domains of perception of learning (27.67 ± 5.11/40), perception of teaching (26.70 ± 4.84/44), perception of the academic atmosphere (29.28 ± 5.59/48), academic self-perception (21.06 ± 4.32/32), and social self-perception (16.55 ± 3.25/28). Table 2 shows that, generally, nursing students had higher mean scores in the sub-domains of perception of learning, perception of teaching, and social self-perception. Among them the differences in the mean sub-domain scores for perception of learning and perception of teaching between the two student groups were statistically significant. In contrast, the mean scores of medical laboratory science students in academic self-perception were higher, but the difference was not statistically significant.

Table 3 shows that female nursing students had the highest mean total DREEM scores and highest mean scores in perception of learning, perception of atmosphere, and social self-perception, while female medical laboratory science students

Table 3. Mean subscale and total DREEM score of medical laboratory science and nursing students at Saint Louis University, Baguio City, Philippines from April to May, 2016 by gender

Subscale	Medical laboratory science		Nursing		F-value	P-value
	Male (n = 74)	Female (n = 169)	Male (n = 32)	Female (n = 66)		
Perception of learning	26.18 (4.45)	27.62 (4.64)	28.28 (5.65)	29.15 (6.19)	4.24	0.006
Perception of teaching	25.81 (3.85)	26.57 (4.51)	27.71 (6.04)	26.70 (4.84)	2.08	0.102
Academic self-perception	20.39 (3.96)	21.44 (4.18)	20.34 (5.13)	21.17 (4.59)	1.34	0.260
Perception of atmosphere	28.46 (4.91)	29.69 (5.26)	27.97 (6.48)	29.82 (6.53)	1.63	0.182
Social self-perception	16.07 (2.86)	16.48 (2.96)	16.66 (4.31)	17.20 (3.73)	1.46	0.226
Total DREEM score	116.91 (17.05)	121.80 (18.17)	120.66 (24.40)	125.26 (25.07)	1.99	0.115

Values are presented as number (%).
DREEM, Dundee Ready Education Environment Measure.

Table 4. Mean subscale and total DREEM score of medical laboratory science and nursing students of Saint Louis University, Baguio City, Philippines from April to May, 2016 by year level

Subscale	Medical laboratory sciences		Nursing		F-value	P-value
	2nd Year (n = 135)	3rd Year (n = 107)	2nd Year (n = 46)	3rd Year (n = 53)		
Perception of learning	26.93 (4.67)	27.54 (4.56)	28.11 (5.59)	29.40 (6.35)	3.15	0.025
Perception of teaching	26.11 (4.18)	26.66 (4.50)	27.37 (5.67)	27.72 (6.06)	1.75	0.156
Academic self-perception	20.78 (4.07)	21.58 (4.21)	20.80 (4.31)	20.94 (5.13)	0.77	0.510
Perception of atmosphere	29.17 (5.34)	29.55 (4.96)	29.17 (6.43)	29.13 (6.69)	0.118	0.949
Social self-perception	16.23 (2.71)	16.50 (3.21)	17.00 (3.65)	17.06 (4.13)	1.17	0.321
Total DREEM score	119.22 (17.71)	121.83 (18.23)	122.46 (23.77)	124.25 (25.80)	0.93	0.427

Values are presented as number (%).
DREEM, Dundee Ready Education Environment Measure.

had a higher mean score on academic self-perception, and male nursing students had the highest mean score on perception of teaching. Male medical laboratory science students had the lowest mean total DREEM score and lowest mean scores in perception of learning, perception of teaching, academic self-perception, and social self-perception. Male nursing students had the lowest mean score in perception of atmosphere. However, only the difference in mean score in perception of learning was statistically significant.

Table 4 shows that the mean total DREEM scores were higher among third-year students than second-year students in both courses. The highest average total DREEM score and highest average scores in perception of learning, perception of teaching, academic self-perception, and social self-perception were provided by third-year nursing students. The lowest mean total DREEM score and lowest scores in perception of learning, perception of teaching, and social self-perception were provided by second-year medical laboratory science students, while the lowest mean scores in academic self-perception and perception of atmosphere were provided by second-year nursing students and third-year nursing students, respectively. Only the mean score in the perception of learning among the students was significantly different.

Table 5 shows the mean DREEM scores of medical laboratory science and nursing students per item. The scores ranged from 1.07 ± 1.10 to 2.44 ± 0.98 for negative items (scores were reversed) and 2.25 ± 0.82 to 2.97 ± 0.91 for positive items, indicating that the students perceived these items as either problem areas or aspects that needed improvement. Furthermore, there were 7 negatively stated items rated by nursing students, which had mean scores greater than 2. Since the scores were reversed, a mean score of > 2 is interpreted as a problem area. Hence, a lower score on negatively stated items is desirable [2]. Medical laboratory science students and nursing students had significantly different scores on item 7 ('teaching is often stimulating'), item 25 ('over-emphasis on factual learning'), item 48 ('teaching is too teacher-centered'), item 9 ('instructors are authoritarian'), item 39 ('the instructors get angry in class'), item 50 ('the students irritate the instructors'), item 12 ('the program is well-scheduled'), and item 4 ('being too tired to enjoy the course'). For negatively stated items, nursing students had a mean score greater than 2 (scores are reversed), implying a less desirable response compared to medical laboratory science students.

Discussion

Overall, medical laboratory science students and nursing students did not have significantly different perceptions of their academic learning environments. The mean total DREEM

scores of the students were 'more positive than negative.' This means that the academic learning environment can still be improved to benefit the students. Among the different sub-domains, the mean scores on the perception of learning and perception of teaching significantly differed between medical laboratory science and nursing students. When grouped into gender and year level, only the sub-domain 'perception of learning' was considered to be significantly different (Tables 3, 4).

The differences in DREEM scores may be attributed to several factors related to the curriculum, faculty profile, subjects offered, and types of academic requirements. Since medical laboratory science students and nursing students do not have similar academic requirements, especially in third year, the differences in the mean scores under perception of learning may be attributed to academic requirements 'per se'.

Differences in the total DREEM scores and mean scores for sub-domains between male and female students have been reported in other studies [3,8-10] although the results have not been consistent regarding whether either gender has higher mean scores for the total score, sub-domain scores, or individual DREEM item scores. One possible explanation, though, is the difference in the population of female students in these health professions courses compared to males. Similar to what has been found in other studies at several academic institutions, there were more females enrolled in health science courses compared to males in this study [2-4,9-11]. Having more female students in a course may cause the academic environment to be more suited to women [10], which leads to a 'feminized' assessment design and implementation in the tertiary level [12]. However, male chiropractic students had higher total DREEM scores and higher scores in the five sub-domains, and this population was comprised more of males than females [3]. This inconsistency in the scores may be related to the gender profile of the respondents and may warrant further study.

The differences in the perception of male and female medical laboratory science and nursing students in this study could also be related to differences in their learning styles. Male nursing and midwifery students have been reported to be less reflective observers than females, but more borderline divergers and accommodators in their learning style [13]. However, male physiotherapy students were reported to be more assimilators and convergers, while females were described to be accommodators and divergers [14]. Unfortunately, there is no available data on the learning styles of medical laboratory science students. These data from other studies imply that learning styles may be independent of gender and course.

Several studies have reported different trends in the perception of the academic learning environment based on year level. The perception of nursing students on the academic learning environment, for instance, was less positive among third-

Table 5. Mean scores of medical laboratory science and nursing students from Saint Louis University, Baguio City, Philippines from April to May, 2016 for each Dundee Ready Education Environment Measure item

Category	Medical laboratory sciences	Nursing	P-value
Students' perception of learning			
1. I am encouraged to participate during class.	2.58 (0.84)	2.61 (0.96)	0.832
7. The teaching is often stimulating.	2.43 (0.88)	2.67 (0.76)	0.013
13. The teaching is student focused.	2.64 (0.83)	2.59 (0.87)	0.595
16. The teaching helps to develop my competence	2.77 (0.80)	2.72 (0.69)	0.551
20. The teaching is well focused.	2.71 (0.83)	2.72 (0.81)	0.981
22. The teaching helps to develop my confidence.	2.78 (0.74)	2.63 (0.94)	0.158
24. The teaching time is put to good use.	2.82 (0.79)	2.72 (0.85)	0.868
25. The teaching overemphasizes factual learning. ^{a)}	1.33 (0.85)	2.44 (0.98)	0.000
38. I am clear about the learning objectives of each of the courses.	2.67 (0.78)	2.74 (0.82)	0.454
44. The teaching encourages me to be an active learner.	2.67 (0.75)	2.63 (0.84)	0.688
47. Long-term learning is emphasized over short-term learning.	2.70 (0.84)	2.71 (0.95)	0.937
48. The teaching is too teacher-centered. ^{a)}	1.88 (0.98)	2.24 (1.00)	0.003
Students' perception of teaching			
2. The instructors are knowledgeable.	2.93 (0.92)	2.97 (0.91)	0.714
6. The instructors espouse a patient focused approach to clinical care.	2.52 (0.84)	2.59 (0.77)	0.490
8. The instructors ridicule the students. ^{a)}	1.97 (0.99)	2.14 (1.03)	0.163
9. The instructors are authoritarian. ^{a)}	1.86 (1.02)	2.16 (1.03)	0.022
18. The instructors appear to have good communication skills with students.	2.61 (0.93)	2.64 (0.89)	0.817
29. The instructors are good at providing feedback to registrars.	2.49 (0.78)	2.51 (0.87)	0.895
32. The instructors provide constructive criticism here.	2.71 (0.77)	2.80 (0.69)	0.305
37. The instructors give clear examples.	2.69 (0.81)	2.77 (0.90)	0.483
39. The instructors get angry in class. ^{a)}	1.84 (1.13)	2.33 (0.90)	0.000
40. The instructors are well prepared for their class.	2.92 (0.83)	2.81(0.77)	0.228
50. The students irritate the instructors. ^{a)}	1.78 (1.00)	2.14 (1.08)	0.005
Students' academic self-perception			
5. Learning strategies which worked for me before continue to work for me now.	2.61 (0.78)	2.66 (0.87)	0.627
10. I am confident about my passing this year.	2.62 (0.89)	2.67 (0.86)	0.623
21. I feel I am being well prepared for my profession.	2.66 (0.83)	2.53 (0.98)	0.227
26. Previous course work has been a good preparation for current coursework.	2.82 (0.83)	2.72 (0.85)	0.291
27. I am able to memorize all I need.	2.39 (0.86)	2.47 (0.95)	0.681
31. I have learned a lot about empathy in my profession.	2.68 (0.79)	2.73 (0.74)	0.614
41. My problem solving skills are being well developed here.	2.59 (0.83)	2.55 (0.94)	0.676
45. Much of what I have to learn seems relevant to a career in health sciences.	2.76 (0.87)	2.71 (0.93)	0.599
Students' perception of atmosphere			
11. The atmosphere is relaxed during lectures.	2.24 (0.88)	2.38 (0.83)	0.155
12. The program is well-scheduled.	2.57 (0.83)	2.31 (0.82)	0.009
17. Cheating is a problem in this program. ^{a)}	1.07 (1.10)	1.89 (1.08)	0.162
23. The atmosphere is relaxed during clinical teaching.	2.61 (0.83)	2.58 (0.88)	0.729
30. There are opportunities for me to develop interpersonal skills	2.64 (0.88)	2.73 (0.84)	0.373
33. I feel comfortable in class socially.	2.71 (0.73)	2.72 (0.92)	0.982
34. The atmosphere is relaxed during seminars/tutorials.	2.49 (0.80)	2.49 (0.89)	0.943
35. I find the experience disappointing. ^{a)}	1.92 (0.99)	1.99 (1.12)	0.576
36. I am able to concentrate well.	2.43 (0.76)	2.47 (0.84)	0.644
42. The enjoyment outweighs the stress of the program.	2.49 (0.81)	2.51 (0.77)	0.852
43. The atmosphere motivates me as a learner.	2.72 (0.77)	2.70 (0.80)	0.816
49. I feel able to ask the questions I want.	2.45 (0.87)	2.43 (0.92)	0.852
Students' social self-perception			
3. There is good support system for students who get stressed.	2.46 (0.93)	2.59 (0.97)	0.284
4. I am too tired to enjoy the course. ^{a)}	1.68 (0.95)	2.14 (1.12)	0.000
14. I am rarely bored in this program.	2.25 (0.82)	2.33 (0.83)	0.390
15. I have good friends in this program.	2.42 (1.22)	2.49 (0.94)	0.528
19. My social life is good.	2.56 (0.93)	2.57 (1.05)	0.949
28. I seldom feel lonely.	2.45 (0.88)	2.47 (0.95)	0.798
46. My living situation is pleasant.	2.54 (0.88)	2.49 (0.86)	0.683

Values are presented as number (%). Statistically significant between cohorts P=0.05.

^{a)}Negatively stated items.

year and fourth-year students [15]. The differences in the mean scores of medical laboratory science and nursing students may be attributed to the nature of the course of study itself. The subjects offered to second-year medical laboratory science students and second-year nursing students are almost the same except for introductory professional courses, that is, introductory clinical chemistry for medical laboratory science students and community and public health for nursing students. Similarly, both courses start their clinical duties during their third year. Furthermore, the instructors for non-professional subjects in both courses came from allied departments. It was then expected that second-year medical laboratory science students and nursing students should have similar total scores and sub-domain scores on the DREEM instrument. It was also to be expected that the perceptions of third-year medical laboratory science students and third-year nursing students should be different, but only the mean score under the sub-domain 'perception of learning' was statistically significantly different between the two groups of third-year students (Table 4).

Nursing students identified more problem areas compared to medical laboratory science students. Most of the problem areas identified by nursing students were related to their instructors, although the greatest problem area was identified as 'over-emphasis on factual learning'. Some of the perceived problem areas for their instructors were: 'teaching is too teacher-centered,' 'instructors ridicule the students,' 'instructors are authoritarian,' 'instructors get angry in class,' and 'the students irritate the instructors.'

The role of instructors is crucial in the formation of their students [16]. Nursing instructors are faced with several challenges when educating their students to ensure that their students provide safe patient care in various healthcare settings. These challenges include managing students in the clinical setting to promote safe patient care. However, instructors who lack experience in managing students may display negative behavior. This could be a reason why instructors may display aloof, intimidating, demeaning, arrogant, or unfair attitudes towards their students [17]. Consequently, the behavior of instructors may cause stress for nursing students.

This study has revealed that there is a need to further improve the academic learning environment of students and to address the concerns revealed by the students in this study. Furthermore, this study reports the perceptions of medical laboratory science and nursing students, providing initial data on profiling the educational setting of medical laboratory science and nursing schools in the Philippines. The information could be used as a basis for improving the academic learning environment of health science students in the country.

Conflict of interest

No potential conflict of interest relevant to this article was reported.

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Supplementary materials

Audio recording of the abstract.
Raw data files are available.

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