

Student Perceptions of the Educational Environment at the University of Nebraska Medical Center Department of Pediatrics

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Abstract

Background: During clinic training in medical school, the learning environment plays a pivotal role in molding medical student's behavior. A systematic assessment of patient care learning environments needs to be conducted. With two medical schools utilizing limited pediatric patient base, student evaluations indicated dissatisfaction with inpatient and general clinic experiences.

Objectives: The objective of this study was to generate a profile of clinic and inpatient strengths and weaknesses. This study received exempt approval.

Patients and Methods: The Dundee Ready Education Environment Measure (DREEM) questionnaire was administered to students over the course of 3 academic years after inpatient and clinic assignments (2-week deployments each) in the 8-week clerkship. DREEM identifies student academic self-perceptions, perceptions of teachers, and perceptions of the educational atmosphere. Fifty questions are rated from 4 = strongly agree to 0 = strongly disagree for a total of 200. Anonymous responses were grouped by assignment and analyzed using Kruskal-Wallis test. Participants were asked for up to 3 suggestions to improve the rotation. An immersion/crystallization framework was used to identify themes. Two authors independently coded suggestions, and then discussed the themes to reach a consensus.

Results: Overall results from DREEM indicated students' perceptions were positive for different learning environments. No statistical differences were noted between subscales. Thematic analysis identified concerns with scheduling, lack of teaching, and non-specific feedback.

Conclusions: DREEM did not identify measurable deficiencies in the learning environment. However, thematic analysis uncovered specific issues that are currently being addressed.

Keywords: Learning Environment, Pediatrics, Qualitative Analysis, DREEM

1. Background

The patient care learning environment plays a pivotal role in molding medical students' knowledge, skills, and attitudes (1). A systematic assessment of patient care learning environments needs to be regularly conducted (2). This is a heightened concern when learning is distributed to different sites. For example, students may complete inpatient rotations at both a university-based hospital and a private hospital where preceptors are affiliated with the university.

In addition to assuring learning environments are appropriate for students' learning, the Liaison Committee on Medical Education (LCME) standard 3.5 requires medical schools to periodically assess learning environments (2). Additionally, learning environment assessments provide information about comparability of training sites and potential issues related to student mistreatment. Being able to document these standards is crucial for the medi-

cal school's continued accreditation.

Because Omaha has a private children's hospital that is staffed by faculty from the University of Nebraska College of Medicine (UNMC), students spend time working at that hospital as well as the pediatric ward at UNMC's hospital. For the sake of having quality clinical experiences for our students, we have identified private clinics in Omaha and throughout the state of Nebraska to assist in the training of our students. At the end of each 8-week pediatric rotation, students complete an extensive evaluation of their experience.

2. Objectives

Upon reviewing these evaluations more systematically, we felt it was imperative that we evaluate the students' perception of learning to help improve our students' experiences (3). With our distinct learning environments, assessing students' perceptions of the learning environments on

the clerkship can offer recommendations for improving the learning experiences for future students.

3. Patients and Methods

3.1. Sample

The population involved junior medical students completing their required pediatric clerkship at UNMC. The sample was taken over three academic years (AY 2011 - 2014). Over the course of three academic years, the numbers of students participating was: AY 2011 - 2012: 111; AY 2012 - 2013: 111; and AY 2013 - 2014: 103. [Table 1](#) provides a breakdown by gender and race of our medical student population, but is not specific to the sample because questionnaires were completely anonymous. This study was reviewed by the institutional ethics committee and received exempt approval by the institutional review board.

Table 1. Class Demographics

Value	11/12	12/13	13/14
Gender			
Male	64	64	71
Female	47	57	44
White, not Hispanic	105	117	115
African American	3	1	1
Asian	3	2	7
Hispanic/Latino	0	1	0

3.2. Assessment Instrument

The Dundee Ready Education Environment Measure (DREEM) questionnaire was developed using grounded theory and Delphi techniques (4-6). This instrument was designed to identify student perceptions of learning, perceptions of course organizers, academic self-perceptions, perceptions of atmosphere, and social self-perceptions. Fifty questions were rated from 0 = strongly disagree to 4 = strongly agree. Based on Cronbach alpha scores, the instrument has been shown to have good internal consistency (5, 7). It has also demonstrated sensitivity to individual perceptions and the environment being evaluated (1). Further studies have indicated this questionnaire, in conjunction with open-ended responses, generated data that could be used to develop interventions to improve teaching sites with identified weaknesses (8).

3.3. Study Design

Phase 1 of our study was a pilot of the DREEM. Data was collected over the course of the first academic year (2011 - 2012) on the students' inpatient experience (2 weeks) and their general pediatric clinic experience (2 - 4 weeks). For the inpatient rotation, students rotated at either a private children's hospital or a public university hospital. For the outpatient clinic, students who completed the clerkship in Omaha spent two weeks at a private pediatrics clinic or the university clinic while other students rotated for four weeks in a clinic throughout the state of Nebraska. [Table 2](#) provides an example of how the clerkship schedule is structured. This pilot study was designed to compare experiences between the two hospitals for inpatient and across three different experiences for general clinic university, Omaha private, or Nebraska private.

Phase 2 of the study (AY 2012 - 2013) was designed to evaluate inpatient learning environments at two hospitals. Slight modifications were made to the inpatient experience based on recommendations from the pilot data collected. Rather than spending two weeks in a single hospital (university vs. private), we modified the experience so they spent one week at each location. The DREEM questionnaires from the 2012 - 2013 cohort were compared to responses from the pilot data.

Phase 3 of our study (AY 2013 - 2014) was the evaluation of the university clinic learning environment. During the pilot year of data collection (AY 2011 - 2012), students evaluated their general clinic experiences. During year two of the study, the university clinic changed management, and the new medical director set goals to improve the educational opportunities. During year 3 of the study we focused on obtaining DREEM responses for the clinic setting to determine if the changes had a significant impact.

3.4. Statistical Analysis

DREEM responses generate subscales by summing responses. The subscales include student perception of learning (maximum score of 48), student perception of course organizers (maximum score of 44), students' academic self-perception (maximum score of 32), students' perceptions of atmosphere (maximum score of 48), and students' social self-perceptions (maximum score of 28). DREEM responses were analyzed using descriptive statistics as well as Kruskal-Wallis test and subsequent post hoc tests.

3.5. Qualitative Analysis

Thematic analysis was used to analyze the open-ended question about how to improve the learning environment.

Table 2. Pediatric Clerkship Rotation Example^a

Student	Wk1	Wk2	Wk3	Wk4	Wk5	Wk6	Wk7	Wk8
A	Children's hospital	Children's hospital	Specialty clinic - 1 week in different specialty	Specialty clinic - 1 week in different specialty	Specialty clinic - 1 week in different specialty	Specialty clinic - 1 week in different specialty	Omaha clinic	Omaha clinic
B	Specialty	Specialty	University hospital	University hospital	University clinic	University clinic	Specialty	Specialty
C	Kearney clinic	Kearney clinic	Kearney clinic	Kearney clinic	Children's hospital	Children's hospital	Specialty	Specialty

^aKearney clinic is located 150 miles from the university.

An immersion/crystallization framework was used to identify themes. Two authors independently identified themes and discussed to reach consensus on the coding structure. The authors independently coded the open-ended narrative responses and met to discuss the themes to reach consensus and meaning of the comments.

4. Results

4.1. Sample

For the initial study in 2011 - 2012, 246 questionnaires were completed for both inpatient and outpatient; however, some were not completed leaving 120 inpatient DREEMs and 109 outpatient DREEMs. In 2012 - 2013, 111 questionnaires were completed for the inpatient experience, but one was incomplete leaving 110 for analysis. In 2013 - 2014, 102 questionnaires were completed for the outpatient experience.

4.2. Phase1 Results

During the 2011 - 2012 year, students completing the inpatient rotation spent two weeks assigned to a floor at the children's hospital or at the university hospital inpatient unit. DREEM subscales were reviewed and were not statistically different between the rotation sites (children's floor 4, children's floor 5, and children's floor 6, University tower). Similar results occurred in an analysis of the various outpatient clinic rotations (university clinic, Omaha private clinic, greater Nebraska private clinic). Although we hypothesized times of the year when children are sicker may impact perceptions of the learning environment, there were no significant differences based on the time of year students completed the clerkship.

Pilot data themes focused on clarifying expectations for the rotations. "Clearer objectives on what students are to do and what patients we are to see", outpatient clinic student comment. This theme extended to the inpatient wards at children's hospital, particularly with respect to

rounding on Saturdays. "Regarding the Saturday assignment for children's inpatient, each of the students on the 4th, 5th, and 6th floors was given different instructions from residents, showed up at different times and the supervising resident that day didn't know what to do with us!". Perhaps establish what students should expect to do on Saturday (we saw patients but none got to present or even see faculty) ideas include seeing a particular patient to present, staying to take an intake anything".

4.3. Phase 2 Results

Based on annual college of medicine course evaluations, changes were made to the inpatient rotation in 2012 - 2013. Students still spent two weeks on inpatient wards, but they moved to a different children's hospital floor or to the university hospital ward for a week at a time. With these changes it was anticipated that DREEM results may change. Table 3 shows the mean subscale result differences from the first to the second year. The results remained positive in each DREEM subscale, although the means dropped somewhat after the changes were made. Upon analysis, DREEM subscales were not significantly different across sites. Pairwise comparisons with adjusted p-values showed there were no significant differences on all measured subscales (data not shown).

Five themes emerged from the analysis of the narrative comments about how to improve the inpatient rotation. Two themes were complementary, relating to expectations and scheduling. When students came on the service, there were not clear directions about what they should do in the morning or after rounds. The following was indicative of this theme: "We were never told on the first day what we should do on the floor and then were publicly called out for not doing enough on the first day of the rotation." Although students eventually learn what is expected in the mornings, the structure of the remainder of the day remained unclear. "Daytime shifts could be more structured after the lunch hour. I always knew what was expected of me from 6 am to noon, after lunch was a toss-up."

Table 3. Inpatient DREEM Results^a

Value	11/12				12/13 ^b			
	CH	UH	K-W	P	CH	UH	K-W	P
1. Student perception of learning	34.29	35.02	1.42	0.234	33.55	34.44	1.28	0.258
2. Student perception of course organizers	29.59	30.00	1.69	0.193	28.26	29.28	0.72	0.396
3. Students' academic self-perception	22.75	22.09	0.47	0.495	22.43	22.94	0.79	0.375
4. Students' perceptions of atmosphere	31.96	32.43	1.46	0.227	28.86	28.67	0.01	0.922
5. Students' social self-perceptions	17.96	18.29	0.38	0.540	17.71	18.22	0.47	0.495

^aSubscale interpretations: 1, 0 - 12: very poor; 13-24: teaching is viewed negatively; 25-36: positive perception of teaching; 37 - 48: teaching highly thought of, 2, 0 - 11: abysmal; 12 - 22: in need of some retraining; 23 - 33: doing okay; 34 - 44: model course organizers, 3, 0 - 8: feelings of total failure; 9 - 16: many negative aspects; 17 - 24: more positive feelings; 25 - 32: confident, 4, 0 - 12: terrible environment; 13 - 24: many issues need changed; 25 - 36: More positive perception; 37-48: overall good feeling of environment, 5, 0 - 7: miserable; 8 - 14: dissatisfied; 15 - 21: not too bad; 22 - 28: very good socially.

^b12/13 students spent 1 week at UH and 1 week at CH. In 11/12 they were assigned to UH for 2 weeks.

The other themes related to the educational experience, specifically logistics, teaching, and feedback. These themes also relate to the expectations and scheduling themes in that students were expected to prepare mini-topics but never had an opportunity to present them (logistics). The students suggested "more structured afternoon teaching sessions/learning on topics that are directly relevant to patients." The students also sought specific feedback from the attending physicians about their performance on the wards.

4.4. Phase 3 Results

In January, 2013, the university outpatient clinic came under new management by a private physician group. The new clinic director had a goal to improve the patient care experience and education of the medical students in the clinic. We hypothesized the new management and emphasis on student education would result in higher DREEM ratings by the students.

Table 4 shows the results of the DREEM from 2011 - 2012 versus the 2013 - 2014 groups. The table summarizes the DREEM subscales for the sites. The results from the pilot year were more positive in all of the subscales across sites. "Social self-perception", which relates to student wellness, indicated students were dissatisfied in both Omaha private clinics and the University clinic in 2013 - 2014. DREEM subscales were not significantly different across sites. Pairwise comparisons with adjusted P values showed there were no significant differences on all measured subscales (data not shown).

Recommendations to improve the outpatient experience ultimately resulted in four themes: orientation, environment, structured teaching, and inclusion. Orientation to the clinic was a theme identified prior to the change in management and did not change under the new manage-

ment. Students commented that they needed a "better introduction to expectations on the first day."

The overall learning environment was of concern for both study periods. This theme focused on the lack of patient care accessibility, either because the clinic had too many learners for the patient population, or the students were allowed to do a portion of the encounter then excluded from the rest. For example, "I would see a patient, present to the attending, and then not continue the encounter."

New themes that arose after the change in management were structured teaching and inclusion. With the change in management, the clinic was busier, and the faculty had less time to teach or provide feedback. Students would like to "have better scheduled teaching sessions with faculty. They easily got pushed aside with faculty schedules." Because of their schedules, students did not feel they were included in decisions about patient care. "It would be nice to be more involved by being asked how we think we should handle a patient's plan and treatment."

5. Discussion

The Dundee Ready Education Environment Measure was used to generate data to evaluate aspects of the learning environment (3). This instrument is a good method for assessing aspects of the learning environment (9). However, in comparing different learning environments before and after changes were made, the subscales for DREEM did not specify areas of concern.

Following Whittle et al., we found the comments from DREEM are a useful evaluation for learning environments (8). During our study results of thematic analysis provided detailed suggestions to improve our learning environment settings. This gave us tools to begin putting sug-

Table 4. Outpatient DREEM Results for University Clinic^a

Value	11/12	13/14	K-W	P
1. Student perception of learning	33.06	33.39	0.34	0.561
2. Student perception of course organizers	32.88	33.16	0.02	0.890
3. Students' academic self-perception	21.88	21.71	0.02	0.883
4. Students' perceptions of atmosphere	34.13	34.90	0.51	0.477
5. Students' social self-perceptions	20.06	19.45	0.31	0.579

^aSubscale interpretations: 1, 0 - 12: very poor; 13 - 24: teaching is viewed negatively; 25 - 36: positive perception of teaching; 37 - 48: teaching highly thought of, 2, 0 - 11: abysmal; 12 - 22: in need of some retraining; 23 - 33: doing okay; 34 - 44: model course organizers, 3, 0 - 8: feelings of total failure; 9 - 16: many negative aspects; 17 - 24: more positive feelings; 25 - 32: confident, 4, 0 - 12: terrible environment; 13 - 24: Many issues need changed; 25 - 36: More positive perception; 37 - 48: overall good feeling of environment, 5, 0 - 7: miserable; 8 - 14: dissatisfied; 15 - 21: not too bad; 22 - 28: very good socially.

gestions into place that would improve the learning environment for the student.

Logistical concerns that were raised in the thematic analysis resulted in changes to the inpatient rotations for our clerkship. Students perceived that Saturday rounding was not organized and was not as educational as rounds during the week. Consequently, students were no longer required to be present on the weekends for the inpatient rotation.

Students also indicated they wanted better defined learning activities in the afternoons and evenings especially at children's hospital. We addressed this in AY 2014 - 2015 by starting several afternoon activities during the week instructing students how to round on patients in the inpatient setting and practice presenting patient topics to faculty members and other students. This was implemented after the last DREEM assessment and needs to be evaluated to determine if this has improved the overall experience at children's hospital.

Another concern was that students wanted more specific feedback from the faculty on their performance. We addressed this issue in AY 2014 - 2015 by giving each junior medical student evaluation cards to be presented to their faculty preceptor before the end of the clerkship. It was specified that the student was to have the faculty member evaluate the student and give them feedback prior to the end of the rotation. This has had a very positive effect on this issue giving the student more face-to-face feedback with the faculty and has also made it possible to get all evaluations back in a timely manner.

Although this study has been conducted at a single institution, we conducted an analysis of different learning environments across three academic years. The results from each assessment of the learning environment based on the DREEM questionnaire indicated that students have a positive perception of the inpatient units and clinics. Since the responses across sites were not statistically

significant, we feel that using the entire questionnaire to evaluate the learning environment is unnecessary. Asking students to respond to the open-ended question provided greater information concerns students have with a specific location, which allows clerkship administration to implement changes that may improve that site.

5.1. Conclusion

The DREEM questionnaire results indicated that learning environments at the sites students spend most of their time rotating are perceived to be good. However, based on our findings it is unnecessary to use this instrument for repeated evaluations of the sites because there were minimal changes to the responses by students across different academic years. Instead, using the question to obtain up to three suggestions for how to improve the learning environment provided greater specificity to develop appropriate, actionable interventions.

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