

UC San Diego

UC San Diego Previously Published Works

Title

Distress and attitudes toward the learning environment: effects of a curriculum innovation.

Permalink

<https://escholarship.org/uc/item/0x69n9x9>

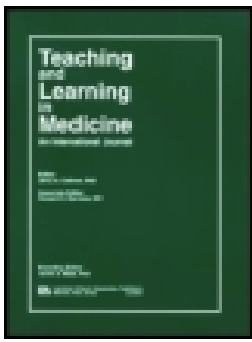
Authors

Moore-West, M
Harrington, DL
Mennin, SP
[et al.](#)

Publication Date

1986

Peer reviewed



Teaching and Learning in Medicine: An International Journal

ISSN: 1040-1334 (Print) 1532-8015 (Online) Journal homepage: <https://www.tandfonline.com/loi/htlm20>

Distress and attitudes toward the learning environment: Effects of a curriculum innovation

Maggi Moore-West , Deborah L. Harrington , Stewart P. Mennin , Arthur Kaufman & Betty J. Skipper

To cite this article: Maggi Moore-West , Deborah L. Harrington , Stewart P. Mennin , Arthur Kaufman & Betty J. Skipper (1989) Distress and attitudes toward the learning environment: Effects of a curriculum innovation, *Teaching and Learning in Medicine: An International Journal*, 1:3, 151-157, DOI: [10.1080/10401338909539400](https://doi.org/10.1080/10401338909539400)

To link to this article: <https://doi.org/10.1080/10401338909539400>



Published online: 03 Nov 2009.



[Submit your article to this journal](#)



Article views: 62



[View related articles](#)



Citing articles: 1 [View citing articles](#)

Distress and Attitudes Toward the Learning Environment: Effects of a Curriculum Innovation

Maggi Moore-West

*Department of Community and Family Medicine
Dartmouth Medical School
Hanover, New Hampshire, USA*

Deborah L. Harrington

*Veterans Administration Medical Center
Albuquerque, New Mexico, USA*

Stewart P. Mennin

*Department of Anatomy
University of New Mexico School of Medicine
Albuquerque, New Mexico, USA*

Arthur Kaufman and Betty J. Skipper

*Department of Family, Community, and Emergency Medicine
University of New Mexico School of Medicine
Albuquerque, New Mexico, USA*

The emergence of innovative curricula provides unique opportunities to examine how a modification in the learning environment might influence stress and attitudes among students in medicine. In 1979, the University of New Mexico School of Medicine implemented a problem-based, community-oriented, student-centered curriculum that runs concurrently with the larger traditional track. This longitudinal investigation compares the perceptions of distress and attitudes toward the learning environment of students in these two tracks. The Symptom Questionnaire and the Learning Environment Questionnaire were used to measure distress levels and attitudes toward the learning environment. Students completed these instruments at orientation (first semester) and during the second, third, and fourth semesters of the first 2 years of medical school. The innovative-track students' perceptions of distress were significantly lower during the first 2 years of medical school than those of the traditional-track students. Their expectations and perceptions of the learning environment were more positive, and they found their curriculum more meaningful and flexible than did traditional-track students. These findings suggest that a student-centered, problem-based approach may more effectively help students handle the stress associated with mastering a large body of information and coping with distressing situations such as those encountered by the practicing physician.

Stress and accompanying dissatisfaction have been widely documented in medical education.¹⁻⁴ Many investigators have attempted to identify the sources of stress and dissatisfaction. The most

commonly cited explanations include perception of an overwhelming amount of information to be mastered in too little time,¹ dissonance between present curriculum and future roles,^{5, 6} perceived

This study was funded by Kellogg Foundation Grant UHZ M02R.

We thank Lucinio Santos-Gomez for expert assistance in data management and Sharon Leonard and Judy Bohn for typing and word processing.

Requests for reprints should be sent to Dr. Mennin at the Department of Anatomy, Basic Medical Sciences Building, North Campus, University of New Mexico School of Medicine, Albuquerque, NM 87131, USA.

"hurdle jumping,"⁷ and disappointment with the realities of medical school, which often fails to meet high expectations.⁶ These factors may lead to increased separation between faculty and students, resulting in anxiety and frustration.⁵ Still other studies point to the issue of coping with the mortality of patients, which takes its toll on the emotional health of the student, perhaps because of the lack of opportunity for the student and physician to discuss and appropriately handle their own vulnerabilities and limitations.⁸

The emergence of innovative curricula provide a unique opportunity to examine the crucial issue of how a modification in the learning environment might influence stress and attitudes among students in medicine. The question is timely because the General Professional Education of the Physician report stated that the mission of innovative curricula is to develop a more meaningful method of learning, one that encourages the development of more appropriate strategies for coping with stresses of the profession.⁹ A team of investigators at the University of New Mexico School of Medicine was able to study longitudinally the effects of an educational innovation on distress and attitudes.¹⁰ In 1979, the school implemented a parallel, problem-based, student-centered track running concurrently with the larger traditional track.¹¹ Our study compares students in these two tracks on their perceived distress and attitudes toward the learning environment.

All 73 students admitted to the University of New Mexico School of Medicine are given the choice of applying to either track. Thirty percent to 50% apply to, and 20 students are selected into, the innovative track, the Primary Care Curriculum (PCC).

The admission procedures and study design have been described previously.¹² For the first two years of medical school, students learn the sciences basic to medicine in small tutorial groups of five students and one faculty member. There are no formal lectures. Students are presented with clinical problems from which they develop basic science issues. Emphasis is placed on peer- and self-teaching/evaluation methods as well as interactive skills. Students are given substantial control over their learning environment. At the end of the first year, students enter a 4-month primary-care clerkship in the rural areas of New Mexico. There, real patient problems serve as the stimulus for the continued study of the sciences basic to medicine. In addition, students must conduct a community health project that may involve research and/or services. After completion of their rural clerkship, they return to the medical school, finish another year of tutorial-oriented learning and sit for the

National Boards, Part I. On successfully completing the National Boards, PCC students, together with their traditional-track colleagues, enter the clerkship years. With the exception of shelf boards, PCC students have no objective, content examinations. Instead, their evaluations emphasize clinical and biomedical problem-solving skills. The PCC runs concurrently with a traditional curriculum that is primarily lecture oriented, with a focus on assessment through content exams.

We hypothesized that PCC students would be better able to cope with the stresses of medical school by evidencing lower distress levels than traditional-track students because the PCC structure provides an opportunity for more open encounters among students and faculty. Second, PCC also should more favorably influence students' attitudes toward the learning environment: their perceptions of the program's emotional climate, the nurturance by its faculty, and relationships between its students. Third, because the educational approach in PCC encourages students to integrate clinical and basic sciences as well as to define their own learning issues, perceptions of the flexibility and relevance of the curriculum should be more positive among PCC than among traditional-track students. Finally, we wanted to determine if, within each track, there was a relationship between distress and attitudes. If present, would such a relationship differ in magnitude between the two tracks?

Method

Instruments

The Symptom Questionnaire (SQ) and the Learning Environment Questionnaire (LEQ) were used to measure levels of distress and attitudes toward the learning environment, respectively. The SQ was designed to measure dimensions of perceived distress (i.e., depression, somatic complaints, hostility, and anxiety).^{13, 14} For each item, students indicate by responding *yes* or *no* to whether they have experienced a particular feeling during the past week. In our study, we examined the total distress score combining the subscales. Higher scores on the total scale reflect more distress. The SQ was selected because it has been found to be both reliable and valid as a measure of perceived distress.^{15, 16}

The LEQ evolved from Marshall's Medical School Environment Inventory^{15, 16} and consists of five subscales measuring an individual's perception of the learning environment:

1. The emotional climate subscale reflects students' affective responses to their medical education.
2. The nurturance subscale assesses students' perception of the supportiveness of the faculty.
3. The student-student interaction subscale measures the perception of closeness among students.
4. The meaningful learning experience subscale measures the extent to which students perceive the curriculum relevant to problems encountered as a physician.
5. The flexibility subscale differentiates between perceptions of an open, flexible versus a closed, rigid environment.

For each LEQ item, students respond on a 4-point Likert scale with points labeled *this happens rarely* (1), *this happens once in a while* (2), *this happens fairly regularly* (3), and *this happens very frequently* (4). Higher scores reflect more favorable perceptions of the learning environment. Students are asked at the beginning of the first semester to indicate their expectations of the learning environment, and during subsequent semesters, they respond in terms of their actual perceptions. Although it has been shown that the LEQ has good content validity and reliability,^{15, 16} for the purpose of our study, the LEQ was shortened from 65 to 30 items, which resulted in 4 to 9 items per subscale. Analyses of the internal consistency of these shortened subscales showed that the coefficients of reliability ranged between .70 and .86, indicating that the items selected for the shortened subscales had moderate to high reliability.

Subjects and Procedure

Students completed the SQ and the LEQ at orientation, during January of the second semester, in November of the second year (third semester), and again in March (fourth semester). In PCC, students attend small tutorial groups during all four semesters. In the traditional curriculum, the second-semester administration occurs during a Basics of Human Behavior block; the third-semester administration is subsequent to the Pathology, Immunology, Microbiology, and Pharmacology block; and the fourth-semester administration is during the Human Sexuality block.

Complete data were not available on all students because many did not return the questionnaires from all four administrations (Table 1). As a consequence, data reported for the SQ and LEQ

Table 1. Frequency of PCC and Traditional-Track Students Completing the Four Administrations of the SQ and LEQ

Class	SQ		LEQ	
	PCC n (%)	Traditional n (%)	PCC n (%)	Traditional n (%)
1984	8 (80)	8 (13)		
1985	13 (93)	13 (22)		
1986	15 (75)	10 (19)		
1987			15 (79)	13 (25)
1988	17 (85)	21 (40)	14 (70)	20 (28)
1989	13 (68)	29 (55)	14 (70)	20 (28)
Total	66 (68)	81 (24)	29 (25)	33 (31)

were based on different numbers of students. For the SQ, data are reported on 147 students from the graduating classes of 1984, 1985, 1986, 1988, and 1989. The traditional and PCC samples contained 81 and 66 students, respectively. There were no significant differences between curricula in the distribution of sex, ethnicity, or prior achievement (i.e., Medical College Admission Test scores, science grade point average, and nonscience grade point average). For the LEQ, data are reported on 62 students from the graduating classes of 1987 and 1988. There were 29 students from PCC and 33 from the traditional curriculum. Again, there were no differences between curricula in background characteristics and prior achievement.

Relationship Between SQ and LEQ

To examine the relationship between distress and attitudes, correlations between total distress and each LEQ subscale were performed separately for PCC and traditional-track students. The number of students with complete data on both instruments varied across semesters (for PCC, $n = 56$, $n = 84$, $n = 55$, and $n = 56$; for traditional track, $n = 112$, $n = 127$, $n = 79$, and $n = 81$; in both cases for the first, second, third, and fourth semesters, respectively). The sample sizes were larger than in the individual analyses of variance (ANOVAs) of the SQ and LEQ because it was not necessary to have data in all four semesters for each student.

Analysis of SQ Data

The total distress scores were analyzed using the repeated-measure analysis in the SPSS MANOVA (i.e., multivariate analysis of variance) computer package.¹⁷ The between-subjects factor was curriculum, and the repeated (within-subject) factor

was semester. A preliminary analysis showed no statistically significant differences among classes for either the PCC or the traditional curriculum. All main effects and first-order interactions were tested. Main effects subsumed under interactions are not reported. When the interaction between curriculum and semester was statistically significant, one-way ANOVA was used to compare means for the two curricula for each semester separately and to compare means of two adjacent semesters separately for each curriculum.

Analysis of LEQ Data

The repeated-measures analysis in the SPSS MANOVA was used to analyze the LEQ data. The between-subjects factors were curriculum and graduating class; the repeated (within-subject) factor was semester. The scores for each LEQ subscale were analyzed separately. All main effects, first-order interactions, and second-order interactions were tested. No second-order interactions were statistically significant. Main effects subsumed under interactions are not reported. When the interaction between curriculum and semester was statistically significant, one-way ANOVA was used to compare means across time separately for each curriculum and to compare means for the two curricula separately for each semester. Classes varied somewhat in the trend of their perceptions across semesters, but these variations were small and inconsistent and did not affect the comparison of curricula across semesters.

Results

Relationship Between Distress and Attitudes

For PCC students, all LEQ subscales except flexibility were significantly correlated with distress during the second semester (r s ranged from $-.24$ to $-.30$) indicating that, as distress increased, perceptions were less positive. During the third semester, the correlation for the student-student interaction subscale was $-.18$ ($p = .09$), the correlation for the emotional climate subscale was $-.22$ ($p = .05$), and the correlation for the meaningful learning experience subscale was $-.23$ ($p < .05$). During the fourth semester, only perceptions of student-student interactions were significantly correlated with distress ($r = -.22$, $p = .05$). There was no statistically significant relationship between total distress and expectancies of the learning environment at orientation (first semester) for PCC.

For traditional-track students, all LEQ

subscales were significantly correlated with distress during the second, third, and fourth semesters (r s ranged from $-.20$ to $-.56$). Higher distress levels were particularly related to less positive attitudes about the emotional climate (r s ranged from $-.52$ to $-.56$) and the meaningfulness of the curriculum (r s ranged from $-.40$ to $-.41$). There was no statistically significant relationship between total distress and expectancies of the learning environment at orientation (first semester) for the traditional track.

The relationships between distress and expectancies of the learning environment at orientation were significantly stronger for the traditional (T) track than for the PCC on the emotional climate subscale during the second ($r_{PCC} = -.29$, $r_T = -.56$, $p < .05$), third ($r_{PCC} = -.22$, $r_T = -.53$, $p < .05$), and fourth ($r_{PCC} = -.04$, $r_T = -.52$, $p < .01$) semesters; on the nurturance subscale during the third ($r_{PCC} = .05$, $r_T = -.37$, $p < .05$) and fourth ($r_{PCC} = .09$, $r_T = -.30$, $p < .05$) semesters; and on the meaningful learning experience subscale for the fourth semester ($r_{PCC} = -.01$, $r_T = -.40$, $p < .05$).

Perceived Distress

Students in the traditional curriculum experienced a large increase in perceived distress between the first and second semester that began to level off thereafter (Figure 1). For PCC students, only a small increase in total distress was found between the second and third semesters. The supporting statistical analysis showed a Curriculum \times Semester interaction, $F(3, 435) = 5.54$, $p < .001$. Although there was no difference between

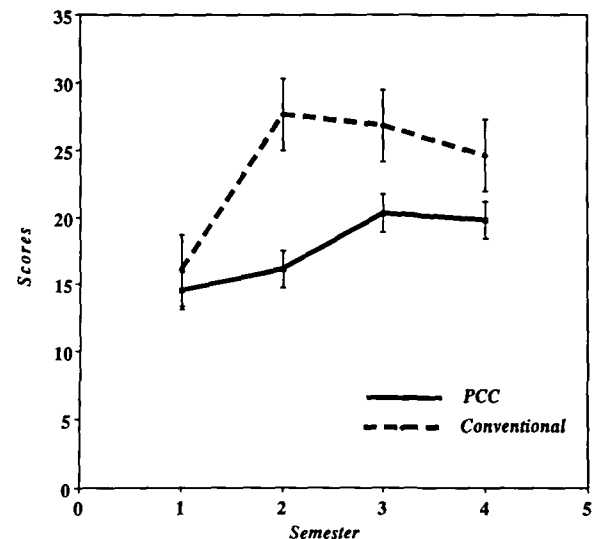


Figure 1. $M \pm SEM$ total distress scores on Kellner's Symptom Questionnaire for PCC and traditional-track (conventional) students.

curricula in perceived distress during the first semester, PCC students reported significantly lower distress levels during all other semesters in comparison to traditional-curriculum students: $F(1, 145) = 24.70, p < .001$, for the second semester; $F(1, 145) = 5.90, p < .05$, for the third semester; and $F(1, 145) = 3.06, p > .05$, for the fourth semester. The only significant increase in perceived distress levels for PCC students was between the second and third semesters, $F(1, 65) = 6.30, p < .05$, and the only significant increase for traditional-curriculum students was between the first and second semesters, $F(1, 80) = 46.38, p < .001$. Perceptions of distress did not decline significantly after the third semester for PCC students and after the second semester for traditional-track students. Distress levels in both curricula, however, were within normal limits (in a statistical sense).

Attitudes Toward the Learning Environment

Figure 2 shows that perceptions of the extent to which the learning environment was meaningful changed differently across semesters for PCC and traditional-track students, $F(3, 174) = 4.77, p < .01$. Specifically, although traditional-track students initially expected their curriculum to be relevant to problems encountered as a physician fairly regularly, over time they perceived this to be the case less than regularly, $F(3, 96) = 14.36, p < .001$. In contrast, PCC students' initial expectations of the meaningfulness of the learning environment were exceeded during the second and third semesters but then dropped to their initial expectations by the fourth semesters, $F(3, 84) = 7.63, p < .001$. PCC students also perceived the learning environment as more meaningful than did traditional-track students across all semesters:

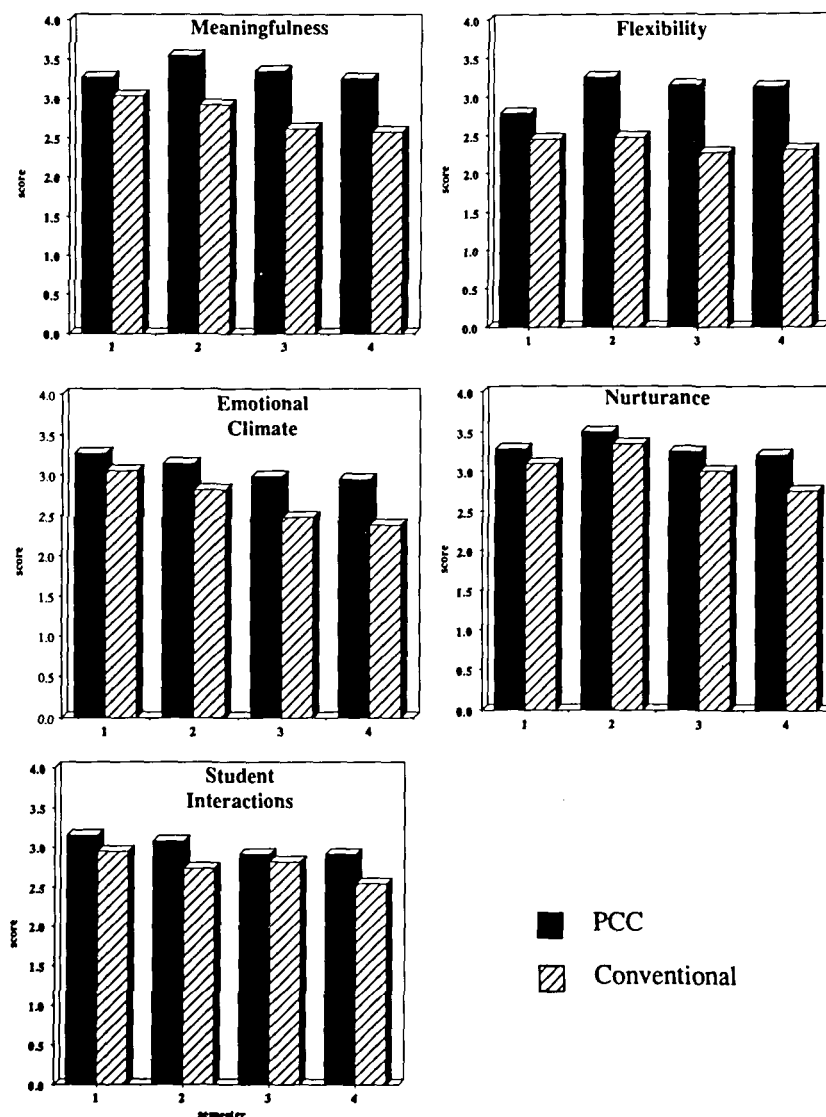


Figure 2. Mean ratings on the five LEQ subscales for PCC and traditional-track (conventional) students. The standard error of the mean was 0.1 for all data points.

$F(1, 60) = 4.37, p < .05$; $F(1, 60) = 46.79, p < .001$; $F(1, 60) = 43.03, p < .001$; and $F(1, 60) = 46.64, p < .001$, for the first, second, third, and fourth semesters, respectively.

Students' perceptions of the flexibility of the learning environment also changed differentially across semesters for PCC and traditional students as evidenced by a Curriculum \times Semester interaction, $F(3, 174) = 3.85, p < .01$, but there was a slightly different pattern of results. PCC students' perceptions of the flexibility of the learning environment during all semesters were higher than their initial expectations, $F(3, 84) = 11.10, p < .001$, indicating that they felt the learning environment was flexible fairly regularly, whereas traditional-track students' perceptions did not change significantly from their initial expectation that the learning environment would be flexible less than regularly. PCC students also perceived the learning environment to be more flexible than did traditional-track students during all semesters: $F(1, 60) = 5.90, p < .05$; $F(1, 60) = 41.47, p < .001$; $F(1, 60) = 41.08, p < .001$; and $F(1, 60) = 42.64, p < .001$, for the first, second, third, and fourth semesters, respectively.

As for perceptions of the emotional climate, affective responses were progressively less favorable across time for students in both tracks: $F(3, 96) = 18.97, p < .001$, for traditional students, and $F(3, 96) = 9.44, p < .001$, for PCC students. The decline was greater for traditional than for PCC students, as shown by the Curriculum \times semester interaction, $F(3, 174) = 3.06, p < .05$. In addition, PCC students perceived the emotional climate as significantly more favorable than did traditional-track students during all semesters: $F(1, 60) = 4.04, p < .05$; $F(1, 60) = 7.84, p < .01$; $F(1, 60) = 16.16, p < .001$; and $F(1, 60) = 17.72, p < .001$, for the first, second, third, and fourth semesters, respectively.

There was no differential pattern of results across semesters between PCC and traditional students in their perceptions of the extent to which the learning environment was nurturant. Averaging across the last three semesters, students from both curricula indicated that the learning environment was nurturant more than fairly regularly ($M = 3.2$).

Finally, for both tracks, there was a progressive decline across semesters in perceptions of the degree of closeness among students, $F(3, 96) = 5.87, p < .001$, for traditional students, and $F(3, 84) = 4.22, p < .01$, for PCC students. The decline for traditional students was greater than the decline for PCC students: Curriculum \times Semester interaction, $F(3, 174) = 2.64, p < .05$. Although there was no significant difference in

perceptions for the two tracks during the first and third semesters, during the second, $F(1, 60) = 8.24, p < .01$, and fourth, $F(1, 60) = 11.42, p < .001$, semesters, PCC students indicated that closeness among students was regular, whereas traditional-track students perceived closeness to be less than regular.

Discussion

The PCC students' perceptions of distress were significantly lower over the first 2 years of medical school in comparison to the traditional-track students' perceptions. The increase in stress observed for PCC students between the second and third semesters occurred when they returned to the Medical School after having completed their 16-week community-based, primary-care preceptorship. During the preceptorship, students became more aware of their strengths and weaknesses, particularly in the basic sciences. Their anxiety about the National Boards, Part I was highest at the start of their second year (the third semester).

One implication of the finding that PCC students perceive less distress than traditional students is that the small-group, problem-based approach may be more supportive in that it helps students to handle more effectively the stress associated with mastering a large body of information and coping with distressing situations such as those encountered by the practicing physician. Specifically, in PCC, student-faculty contact is close, and support is promoted in the peer teaching and evaluation process. In contrast, the traditional track's large-lecture format minimizes faculty contact, resulting in comparatively less opportunity for students to discuss problems and sensitive issues that may contribute to higher perceptions of distress. This explanation is supported by the finding that there appeared to be a stronger relationship in the traditional track compared to PCC between distress and emotional climate, nurturance, and meaningfulness of the curriculum.

Generally, PCC students had higher expectations of their curriculum at orientation, but their perceptions of the learning environment changed differentially across time in comparison to their traditional-track colleagues. Students from both curricula indicated that the emotional climate and interpersonal relationships among students were progressively less positive over time, particularly for traditional students. However, PCC students still perceived the emotional climate and interactions among students to be better across all semesters than did traditional students. This finding was

partially unexpected and suggested that, although expectations of the emotional climate and interpersonal relationships among students were not sustained during the first 2 years of medical school, a student-centered curriculum may mitigate the reduction in students' positive affect and feelings of closeness. We did not expect that students from both tracks would find the learning environment equally nurturant because PCC should provide an atmosphere where students perceive more support from faculty and concern about their welfare in comparison to the traditional track. Our results, however, showed that students from both tracks perceived the learning environment as regularly nurturant.

Finally, PCC students' expectations about the meaningfulness and flexibility of the learning environment were met and, generally, exceeded over time. By contrast, traditional students perceived the content of the curriculum as progressively less relevant over time but not less flexible than initially expected. The expectations and perceptions found for PCC students are consistent with the PCC program philosophy, which incorporates both basic and clinical sciences into the curriculum and allows students to take the lead in defining learning issues. The focus of studying primarily basic sciences in the traditional curriculum may be related to students' perceptions that the content, by the end of the second year, is not consistently relevant to real doctor-patient problems.^{6, 18} As for the flexibility of the traditional curriculum, based on interviews, most students recognize this as a component of the curriculum and often select this track because of the highly structured curriculum.

Turning to methodological issues, the results from this study must be interpreted with caution and require replication because any comparative analysis may be limited by confounding factors including self-selection effects, other intervening variables, and measurement error. This study does demonstrate, however, that the general pattern of findings is maintained across graduating classes, helping to cross-validate the findings. Future studies need to investigate whether coping strategies and attitudes presumably acquired in PCC are sustained during subsequent undergraduate years and into postgraduate training and practice as a physician.

References

1. Coombs RH, Boyle BP. The transition to medical school: Expectations versus realities. In RH Coombs, CE Vincent (Eds.), *Psychosocial aspects of medical training* (pp. 91-109). Springfield, IL: Thomas, 1971.
2. Funkenstein DH. The learning and personal development of medical students and the recent changes in universities and medical schools. *Journal of Medical Education* 1968;43:883-97.
3. Lloyd C, Gartrell NK. A further assessment of medical school stress. *Journal of Medical Education* 1983;58:964-7.
4. Martin W. Preferences for types of patients. In RK Merton, GG Reader, PL Kendall (Eds.), *The student-physician* (pp. 189-205). Cambridge, MA: Harvard University Press, 1957.
5. Becker H, Geer B, Hughes EC, Strauss AL. *Boys in white: Student culture in medical school*. Chicago: University of Chicago Press, 1961.
6. Rosenberg PP. Students' perceptions and concerns during their first year in medical school. *Journal of Medical Education* 1971;46:211-8.
7. Bloom S. Socialization for the physician's role: A review of some contributions of research to theory. In E Shapiro, L Lowenstein (Eds.), *Becoming a physician: Development of values and attitudes in medicine* (pp. 3-52). Cambridge, MA: Ballinger, 1979.
8. Werner ER, Korsch BM. The vulnerability of the medical student: Posthumous presentation of L.L. Stephens' ideas. *Pediatrics* 1976;57:321-8.
9. Association of American Medical Colleges. *Physicians for the twenty-first century: The GPEP report*. Washington, DC: AAMC, 1984.
10. Moore-West M, O'Donnell M. Program evaluation. In A Kaufman (Ed.), *Implementing problem-based medical education: Lessons from successful innovations* (pp. 180-206). New York: Springer, 1985.
11. Kaufman A, Obenshain SS. Origins. In A Kaufman (Ed.), *Implementing problem-based medical education: Lessons from successful innovations* (pp. 1-16). New York: Springer, 1985.
12. Martinez-Burrola N, Klepper DJ, Kaufman A. Admission into a problem-based curriculum. In A Kaufman (Ed.), *Implementing problem-based medical education: Lessons from successful innovations* (pp. 164-79). New York: Springer, 1985.
13. Kellner R, Sheffield B. A self-rating scale of distress. *Psychological Medicine* 1973;3:88-100.
14. Kellner R. A symptom questionnaire. *Journal of Clinical Psychology* 1987;48:268-74.
15. Feletti GI, Clarke RM. Construct validity of a learning environment survey for medical schools. *Educational and Psychological Measurement* 1981;41:875-82.
16. Marshall RE. Measuring the medical school learning environment. *Journal of Medical Education* 1978;53:98-104.
17. Available from SPSS, Inc., Suite 3000, 444 North Michigan Avenue, Chicago, IL 60611.
18. Alexander DA, Haldane JD. Medical education: The discontinuers' view point. *Medical Education* 1980;14:16-22.

Received 21 April 1988