

**Selected Learning Environment References**  
**Assessing Learning Environments: Context Matters**  
**IAMSE Webcast, April 21, 2005**

(1995). "Active learning in large class settings." *Am J Physiol* 269(6 Pt 3): S73-9.

Science education is in the process of shifting from the mastery of a large body of factual information to an emphasis on the development of reasoning skills and the solving of practical problems. Such skills are best developed by instructors and students working together in an active learning environment as opposed to instructors and students being, respectively, sources and sinks of factual knowledge. Most models of active learning are geared toward small group (< 15 students) settings in which interactions between students and instructor are optimized. However, basic courses in physiology are often forced to meet in large classes in which it is more difficult to utilize active learning methods. The panelists in this workshop demonstrated techniques that they use in large class settings to promote an active learning experience. We hope that this summary of the workshop will encourage you to experiment with educational approaches to improve the efficacy of teaching in the large class setting.

Al-Hazimi, A., A. Al-Hyiani, et al. (2004). "Perceptions of the educational environment of the medical school in King Abdul Aziz University, Saudi Arabia." *Med Teach* 26(6): 570-3.

The present paper reports data from the undergraduate medical school at King Abdul Aziz University in Saudi Arabia using the 50-item Dundee Ready Education Environment Measure (DREEM), which has been validated and found to be reliable in a range of cultural contexts. The mean total score was 102/200. The mean total score for Perception of Learning was 22/48; for Perceptions of Teaching 24/44; for Academic Self-perceptions 17/32; for Perceptions of Atmosphere 23/48 and for Social Self Perceptions 15/28. The mean score of 0.9 for Item 3--There is a good support system for students who get stressed--was the lowest and is indicative of the pressures felt by the students. These scores give a clear indication of the priorities for reform of the curriculum. These data can also serve as a baseline for a longitudinal quality assessment of students' perceptions of the changes planned for the medical school at King Abdul Aziz University, Saudi Arabia. Further studies are needed to analyse educational environment down to the year levels and to detect any gender differences.

Arnold, L. and T. B. Jensen (1984). "Students' perception of stress in a baccalaureate-MD degree program." *Percept Mot Skills* 58(2): 651-62.

The quality of student life in combined baccalaureate-M.D. degree programs has rarely been investigated although these programs address widely recognized problems in medical education. Through the use of an environmental stress inventory, 183 students' perceptions of the learning environment of a combined-degree program were examined. Students in that program rated few situations in their environment as stressful. Yet, they were significantly concerned about information overload and attendant time problems, just as their peers in 4-yr. schools were. Unlike their 4-yr. counterparts, however, they did not see relations with other students and faculty as problematic. Their scores on the inventory were best predicted at each year level by a combination of personal characteristics, notably living arrangements, sex, and to a lesser extent, introversion.

Atkinson, P. (1973). "Worlds apart. Learning environments in medicine and surgery." *Br J Med Educ* 7(4): 218-24.

Atkinson, P. (1974). "'Centre' and 'periphery': further analysis of learning environments in the Edinburgh Medical School." *Br J Med Educ* 8(4): 234-40.

Baldwin, D. C., Jr., S. R. Daugherty, et al. (1991). "Student perceptions of mistreatment and harassment during medical school. A survey of ten United States schools." *West J Med* 155(2): 140-5.

Senior students at 10 medical schools in the United States responded to a questionnaire that asked how often, if ever, they perceived themselves being mistreated or harassed during the course of their medical education. Results show that perceived mistreatment most often took the form of public humiliation (86.7%), although someone else taking credit for one's work (53.5%), being threatened with unfair grades (34.8%), and threatened with physical harm (26.4%) were also reported. Students also reported high rates of sexual harassment (55%) and pervasive negative comments about entering a career in medicine (91%).

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Residents and attending physicians were cited most frequently as sources of this mistreatment. With the exception of more reports of sexual harassment from women students, perceived mistreatment did not differ significantly across variables such as age, sex, religion, marital status, or having a physician parent. Scores from the 10 schools also did not vary significantly, although the presence of a larger percentage of women in the class appeared to increase overall reports of mistreatment from both sexes.

Bassaw, B., S. Roff, et al. (2003). "Students' perspectives on the educational environment, Faculty of Medical Sciences, Trinidad." *Med Teach* 25(5): 522-6.

The Dundee Ready Education Environment Measure (DREEM) was administered to 70 final-year medical students and 36 first-year medical interns (pre-registration house officers). The overall total mean DREEM scores for the five subscales—namely, students' perceptions of the atmosphere, students' perceptions of learning, students' social self-perceptions, students' perceptions of teachers and students' academic self-perceptions—was 109.9 and the total mean scores for the subgroups—male students, male interns, female students and female interns—were 103.39, 111.82, 111.33 and 113.15, respectively. The lowest scores were assigned to students' social self-perceptions and students' perceptions of the atmosphere. All of the participants except the male interns recorded the highest scores for the subscale academic self-perceptions.

Beaudoin, C., B. Maheux, et al. (1998). "Clinical teachers as humanistic caregivers and educators: perceptions of senior clerks and second-year residents." *Cmaj* 159(7): 765-9.

**BACKGROUND:** The acquisition and nurturing of humanistic skills and attitudes constitute an important aim of medical education. In order to assess how conducive the physician-learning environment is to the acquisition of these skills, the authors determined the extent to which clinical teachers are perceived by their trainees as humanistic with patients and students, and they explored whether undergraduate and graduate students share the same perceptions. **METHODS:** A mail survey was conducted in 1994/95 of all senior clerks and second-year residents at Laval University, University of Montreal and University of Sherbrooke medical schools. Of 774 trainees, 259 senior clerks and 238 second-year residents returned the questionnaire, for an overall response rate of 64%. Students' perceptions of their teachers were measured on a 6-point Likert scale applied to statements about teachers' attitudes toward the patient (5 items) and toward the student (5 items). **RESULTS:** On average, only 46% of the senior clerks agreed that their teachers displayed the humanistic characteristics of interest. They were especially critical of their teachers' apparent lack of sensitivity, with as many as 3 out of 4 declaring that their teachers seemed to be unconcerned about how patients adapt psychologically to their illnesses (75% of clerks) and that their teachers did not try to understand students' difficulties (78%) or to support students who have difficulties (77%). Compared with the clerks, the second-year residents were significantly less critical, those with negative perceptions varying from 27% to 58%, 40% on average. Except for this difference, their pattern of responses from one item to another was similar. **INTERPRETATION:** This study suggests the existence of a substantial gap between what medical trainees are expected to learn and what they actually experience over the course of their training. Because such a gap could represent a significant barrier to the acquisition of important skills, more and urgent research is needed to understand better the factors influencing students' perceptions.

Biddle, W. B., D. U. Smith, et al. (1985). "Congruence between curriculum goals and students' perceptions of learning environment." *J Med Educ* 60(8): 627-34.

The authors' main objectives in the study reported here were to assess medical students' perceptions of the learning environments provided by fourth-year clinical electives taken at three different training sites and to determine whether differences in learning environment among the sites could be attributed to differences in curricular goals. The investigators used a survey containing 32 items subdivided into six subscales: structure, interpersonal relationships, educational climate, practicality, enthusiasm, and humanism. Perceptions of the elective learning environment were obtained from 67 students. Overall differences among training sites as perceived by the students were found by means of a multivariate analysis of variance to be statistically significant. Further analysis revealed site differences on four subscales: structure, interpersonal relations, educational climate, and practicality. Implications of these findings and suggestions for future research are discussed.

Calkins, E. V., L. Arnold, et al. (1994). "Medical students' perceptions of stress: gender and ethnic considerations." *Acad Med* 69(10 Suppl): S22-4.

Carmel, S. and J. Bernstein (1987). "Perceptions of medical school stressors: their relationship to age, year of study and trait anxiety." *J Human Stress* 13(1): 39-44.

It has been noted that medical school is a stressful social environment. This study proposes to determine domains of medical school stressors and to investigate to what extent the perceived stressfulness of these domains is explained by age, year of study, marital status, sex, and trait anxiety. Data were obtained by self-administered questionnaires filled out by 131 students in four classes of a six-year medical school. Four clusters of stressors were revealed by factor analysis: "off-time death," "incurable condition," "patient contact," and "medical practice demands." Marital status, sex, and year of study did not correlate with any of these stressor domains. Age was positively correlated with the perception of off-time death as stressful and negatively correlated with patient contact. Trait anxiety was directly correlated with the perceived stressfulness of patient contact and medical practice demands. No independent variable explained differences in perception of all four domains. It is suggested that there are some experiences, such as facing off-time death, that are so painful that repeated exposure to them augments, rather than decreases, the perception of their stressfulness.

Christian, M. J. (1974). "Perceptions affecting student learning and development in the clinical environment." *Med Arts Sci* 28(4): 41-6.

Clarke, R. M., G. I. Feletti, et al. (1984). "Student perceptions of the learning environment in a new medical school." *Med Educ* 18(5): 321-5.

Students' perceptions of their learning environment in the Faculty of Medicine of the University of Newcastle were tested in 1979, in the second year of the school's existence, when the first two cohorts of students were surveyed. It was thought important to re-test those same cohorts in 1982, when they were in the later years of the curriculum, to see whether their perceptions had changed, and also to test the perceptions of subsequent cohorts of students (still in the earlier years of the course) to examine whether the favourable perceptions of the earlier cohorts were being maintained. Accordingly, this paper reports the results of a cross-sectional study undertaken on all five years of Newcastle medical students in 1982, and it compares their perceptions with those obtained 3 years earlier.

Craig, P. and R. Bandaranayake (1993). "Experiences with a method for obtaining feedback on a medical curriculum undergoing change." *Med Educ* 27(1): 15-21.

Successful innovation and change in the way medical students are prepared are notoriously difficult. The relationship between the administrative structures of the medical school and its teaching hospitals, other responsibilities of its teachers and administrators, and the intricacies of the curriculum as a system of interrelated components, mean that any real change has wide repercussions. An opportunity for evaluation of a curriculum undergoing change was presented at the University of New South Wales, when the Faculty of Medicine introduced a new 6-year medical curriculum in 1988. The change was made to address a number of problems experienced with the old 5-year curriculum. The Course Evaluation Committee was in a unique position to conduct an ongoing evaluation of the new curriculum, year by year, as it was being introduced. A method for obtaining feedback from both staff and students on a medical curriculum undergoing change, is described. While some sample results are presented, the paper concentrates on the advantages and disadvantages of, and our experiences with, this method. Advantages include the specificity and timing of the information collected, and the high response rate. One disadvantage was the repeated use of the same cohort of students. Some staff still perceived the evaluation process as a threat, or were sceptical about the value and validity of student feedback. Whether staff acknowledged ownership of the new curriculum also affected the use of feedback.

de Oliveira Filho, G. R., E. J. H. Sturm, et al. (2005). "Compliance with Common Program Requirements in Brazil: Its Effects on Resident's Perceptions about Quality of Life and the Educational Environment." *Acad Med* 80(1): 98-102.

Purpose In 1981, Brazil's National Committee on Medical Residency established the Common Program Requirements (CPRs), to regulate residents' work hours. The authors studied whether program violations of the CPRs regarding residents' duty hours, time for educational activities, and faculty supervision

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adversely affected residents' perceptions about the quality of their lives and about the educational environment. Method From October through December 2003, 88 residents from four institutions in Florianopolis (SC), Brazil were invited to participate of the study. Residents completed four instruments: a questionnaire about their program's compliance with CPRs; the Dundee Ready Educational Environment Measure (DREEM) that assesses perceptions about the learning environment; the Quality of School Life Scale (QSL), which assesses the quality of life at school; and the WHO Quality of Life Assessment (WHOQOL), which assesses the general quality of life. Residents were categorized according to gender, institution, year of training, specialty, and their answers on the CPRs questionnaire. DREEM, SQL, and WHOQOL scores were compared between categories. Results A total of 62 residents (70%) responded. A significant number of residents reported their program's noncompliance with CPRs. Residents reporting program compliance rated higher parameters of general quality of life, quality of life in residency, and the educational environment. Conclusion Violations of Brazil's residency program CPRs are associated with residents' worse perceptions of several aspects of general quality of life, quality of life in residency, and the educational environment.

Delva, M. D., J. Kirby, et al. (2004). "Assessing the relationship of learning approaches to workplace climate in clerkship and residency." *Acad Med* 79(11): 1120-6.

PURPOSE: To determine what approaches to learning are adopted by clinical clerks and residents and whether these approaches are associated with demographic factors, specialty, level of training, and perceptions of the workplace climate. METHOD: In 2001-02, medical clerks (n = 532) and residents (n = 2,939) at five medical schools in Ontario, Canada, were mailed the Workplace Learning Questionnaire. The correlation between the approaches to learning at work and perceived workplace climate and the influence of gender, age, location, residency program and level of training on outcomes were measured. RESULTS: A total of 1,642 clerks and residents responded (47%). The factor structure and reliability of the Workplace Learning Questionnaire were confirmed for these respondents. A surface-disorganized approach to learning was correlated with perception of heavy workload ( $r = .401, p < .001$ ). The deep approach to learning was correlated with perception of choice-independence in the workplace and a supportive-receptive workplace ( $r = .32, p < .001$ ;  $r = .23, p < .001$ ). The climate factors, perception of choice-independence and supportive-receptive workplace, were correlated ( $r = .60, p < .001$ ). There were significant differences among the mean scores for scales based on residency, year of training, and location of training. CONCLUSIONS: Perception of the workplace climate was associated with the approach to learning in the workplace of clerks and residents. Perception of heavy workload was associated with less effective approaches to learning. These associations varied with the residency program and the level of training.

Dolmans, D. and H. Schmidt (1996). "The advantages of problem-based curricula." *Postgrad Med J* 72(851): 535-8.

Problem-based curricula provide a learning environment in which competence is fostered not primarily by teaching to impart knowledge, but through encouraging an inquisitive style of learning. Preliminary discussion in small groups, contextual learning, integration of knowledge and an emphasis on patient problems, have several cognitive effects on student learning. These effects are increased retention of knowledge, enhancement of integration of basic science concepts into clinical problems, the development of self-directed learning skills, and the enhancement of students' intrinsic interest in the subject matter. In this paper a number of studies will be reviewed that provide empirical evidence for these premises.

Elam, C. L., M. M. Johnson, et al. (2001). "Diversity in medical school: perceptions of first-year students at four southeastern U.S. medical schools." *Acad Med* 76(1): 60-5.

PURPOSE: To assess students' perceptions of the extent of diversity in their classes, the role of diversity in their first-year curriculum, and their predictions of the amount of diversity in their future patient populations. METHOD: In 1998, students at four southeastern U.S. medical schools that had distinct demographics and differing institutional missions completed a questionnaire on diversity at the end of the first year. In the instrument, diversity was defined according to nine population characteristics: age, sex, race, ethnic background, physical disability, religious affiliation, sexual orientation, socioeconomic status, and rural background (growing up in a community of less than 5,000). Responses were compared according to students' institution, sex, and race. RESULTS: Questionnaires were returned by 349 of 474 students (74%). Students at the school with the most diverse first-year class placed the greatest value on the contributions of diversity to the learning environment. Women students placed more value on the inclusion of

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diversity issues in the curriculum than did men students, and they placed greater value on understanding diversity issues in their future medical practices than did men. Compared with Asian American, Hispanic, and white students, African American students were the least likely to think that the curriculum contained adequate information about diversity. CONCLUSIONS: The results indicate that perceptions of diversity were influenced by the students' own demographic characteristics and those of their medical school. The more diverse the class, the more comfortable the students were with diversity and the more they valued its contribution to their medical education.

el-Hazmi, M. A. and S. M. Haque (1985). "Students' and teachers' views of a medical college environment in Saudi Arabia." *Med Educ* 19(6): 437-44.

The instrument used for the assessment of the environment of the College of Medicine at King Saud University, Saudi Arabia consisted of 22 contrasting adjective pairs, separated by a seven-point interval scale along the degree of positive and negative response. The data were collected both from students and teachers. A total of 100 teachers and 150 students were randomly selected. All the respondents were mailed the final instrument with complete sets of instructions and directions. In all, 69 teachers and 97 students returned the completed questionnaire. In order to analyse the data, in addition to analysis of variance, multivariate discriminant analysis was utilized to interpret the data in more than only statistical sense. The implications of these findings for developing intervention strategies to minimize the inadequacies in the academic environment and to influence the development of the students towards the attainment of institutional objectives are discussed.

Fan, A. P., C. H. Chen, et al. (2004). "Interacting factors of students' perceptions on an effective curriculum." *Med Educ* 38(11): 1196-7.

Feletti, G. I. and R. M. Clarke (1981). "Review of psychometric features of the Medical School Learning Environment Survey." *Med Educ* 15(2): 92-6.

Growing concern over the stresses imposed on medical students by their undergraduate educational programme has led to a proliferation of surveys designed to measure students' global perceptions of the medical school as a learning environment. The present study aimed at a comprehensive analysis of the psychometric features of a recently-introduced questionnaire. Students at four Australian medical schools completed the Medical School Learning Environment Survey (Marshall, 1978). Data on the retest reliability, internal consistency and factorial validity of the MSLES are presented. Its potential usefulness for future evaluations within and between medical schools is discussed.

Frierson, H. T., Jr. (1987). "Black medical students' perceptions of the academic environment and of faculty and peer interactions." *J Natl Med Assoc* 79(7): 737-43.

Geertsma, R. H. and L. S. Halstead (1973). "The analysis of a medical school's competitive status." *Br J Med Educ* 7(2): 89-93.

Genn, J. M. (2001). "AMEE Medical Education Guide No. 23 (Part 2): Curriculum, environment, climate, quality and change in medical education - a unifying perspective." *Med Teach* 23(5): 445-454.

This paper looks at five focal terms in education - curriculum, environment, climate, quality and change - and the interrelationships and dynamics between and among them. It emphasizes the power and utility of the concept of climate as an operationalization or manifestation of the curriculum and the other three concepts. Ideas pertaining to the theory of climate and its measurement can provide a greater understanding of the medical curriculum. The environment is an important determinant of behaviour. Environment is perceived by students and it is perceptions of environment that are related to behaviour. The environment, as perceived, may be designated as climate. It is argued that the climate is the soul and spirit of the medical school environment and curriculum. Students' experiences of the climate of their medical education environment are related to their achievements, satisfaction and success. Measures of educational climate are reviewed and the possibilities of new climate measures for medical education are discussed. These should take account of current trends in medical education and curricula. Measures of the climate may subdivide it into different components giving, for example, separate assessment of so-called Faculty Press, Student Press, Administration Press and Physical or Material Environmental Press. Climate measures can be used in different modes with the same stakeholders. For example, students may be asked

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to report, first, their perceptions of the actual environment they have experienced and, second, to report on their ideal or preferred environment. The same climate index can be used with different stakeholders giving, for example, staff and student comparisons. The climate is important for staff as well as for students. The organizational climate that teaching staff experience in the work environment that they inhabit is important for their well-being, and that of their students. The medical school is a learning organization evolving and changing in the illuminative evaluation it makes of its environment and its curriculum through the action research studies of its climate. Considerations of climate in the medical school along the lines of continuous quality improvement and innovation are likely to further the medical school as a learning organization with the attendant benefits. Unless medical schools become such learning organizations their quality of health and their longevity may be threatened.

Genn, J. M. (2001). "AMEE Medical Education Guide No. 23 (Part 1): Curriculum, environment, climate, quality and change in medical education-a unifying perspective." *Med Teach* 23(4): 337-344.

This paper looks at five focal terms in education - curriculum, environment, climate, quality and change - and the interrelationships and dynamics between and among them. It emphasizes the power and utility of the concept of climate as an operationalization or manifestation of the curriculum and the other three concepts. Ideas pertaining to the theory of climate and its measurement can provide a greater understanding of the medical curriculum. The learning environment is an important determinant of behaviour. Environment is perceived by students and it is perceptions of environment that are related to behaviour. The environment, as perceived, may be designated as climate. It is argued that the climate is the soul and spirit of the medical school environment and curriculum. Students' experiences of the climate of their medical education environment are related to their achievements, satisfaction and success. Measures of educational climate are reviewed and climate measures for medical education are discussed. These should take account of current trends in medical education and curricula. Measures of the climate may subdivide it into different components giving, for example, a separate assessment of so-called Faculty Press, Student Press, Administration Press and Physical or Material Environmental Press. Climate measures can be used in different modes with the same stakeholders. For example, students may be asked to report, first, their perceptions of the actual environment they have experienced and, second, to report on their ideal or preferred environment. The same climate index can be used with different stakeholders giving, for example, staff and student comparisons. In addition to the educational climate of the environment that students inhabit, it is important to consider the organizational climate of the work environment that staff inhabit. This organizational climate is very significant, not only for staff, but for their students, too. The medical school is a learning organization evolving and changing in the illuminative evaluation it makes of its environment and its curriculum through the action research studies of its climate. Considerations of climate in the medical school, along the lines of continuous quality improvement and innovation, are likely to further the medical school as a learning organization with the attendant benefits. Unless medical schools become such learning organizations, their quality of health and their longevity may be threatened.

Gottheil, E., I. N. Hassenfeld, et al. (1969). "Students' perceptions of medical school and their attitudes towards patients." *Br J Med Educ* 3(4): 355-8.

Haidet, P., P. A. Kelly, et al. (2005). "Characterizing the patient-centeredness of hidden curricula in medical schools: development and validation of a new measure." *Acad Med* 80(1): 44-50.

**PURPOSE:** The "hidden curriculum" has a powerful influence in shaping medical students' attitudes and behaviors toward patient care. The purpose of this project was to develop and test a tool (the C(3) Instrument) to help educators characterize and understand the hidden curriculum at their own institutions. **METHOD:** In 2000, the authors developed survey items to measure three content areas of the hidden curriculum with respect to patient-centered care. These content areas include role modeling, students' patient-care experiences, and perceived support for students' own patient-centered behaviors. The survey was distributed to third- and fourth-year students at ten medical schools in the United States. Using factor analysis, the authors selected items for the final version of the C(3) Instrument. To examine validity, they compared instrument scores to results of a poll of members of two organizations devoted to teaching patient-centered care. **RESULTS:** A total of 890 students completed the survey. The mean age of students was 27 (SD 3). Fifty-two percent of students were women, and 70% were white. Twenty-nine items were selected for the C(3) Instrument, with internal consistency measures ranging from .67 to .93 for instrument subdimensions. In the validation analysis, summary scores for all three content areas of the C(3) Instrument

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were consistent with results of the poll of patient-centered organizations. CONCLUSION: Despite some issues that still need to be resolved, the C(3) Instrument proved to be a reliable and valid tool that characterizes a medical school's hidden curriculum with respect to patient-centered care. It can be used to guide educational interventions by addressing the context that exists around formal teaching activities. It also makes possible the study of hidden curricula across multiple medical schools. Further research on the hidden curriculum should be aimed at developing a greater understanding of the dynamics between formal teaching activities and school culture.

Harris, A. (1980). "Evaluation of a medical school learning environment." *Annu Conf Res Med Educ*(19): 169-74.

Hayter, C. R. (1996). "Physics for physicians: integrating science into the medical curriculum, 1910-1950." *Acad Med* 71(11): 1211-7.

One of the most difficult problems in twentieth-century medical education has been finding ways to successfully integrate the basic and applied sciences into the medical curriculum. Not only have medical students regarded basic sciences such as physics and biochemistry with distaste, but these subjects traditionally have been taught by pure scientists with little interest in the needs of medical students. In this paper, the author reviews the history of physics teaching at the Queen's University Faculty of Medicine in Canada, placing particular emphasis on the work of J.K. Robertson (1885-1958), professor of physics. Although physics no longer has the relevance to general medical training that it once had a study of Robertson's ideas and methods provides insight into the process of integrating basic science into medical training. Robertson's success in the endeavor was based largely on two factors his "sympathetic understanding" of the needs of medical students and his innovative combination of basic and applied science in one course--factors that are as important to medical teaching today as they were 50 years ago.

Hoff, T. J., H. Pohl, et al. (2004). "Creating a Learning Environment to Produce Competent Residents: The Roles of Culture and Context." *Acad Med* 79(6): 532-539.

Six core competencies have been developed for use by residency programs in assessing individual resident training outcomes. The authors propose that it is important to consider the role of residency culture and work context in helping residents achieve the required competencies. Specifically, the development of a learning-oriented culture and favorable work conditions that facilitate the presence of that culture should be a high priority for residency programs and the organizations (e.g., hospitals) in which they are housed. This places formal accountability at the doorstep of these programs and organizations in helping to create a "competent" resident. Using ideas from management theory, the authors identify specific attitudes, behaviors, and interactions that define a learning culture and show their usefulness when applied to residents' achievement of the competencies. They assert that current features of everyday resident work life decrease the chances that such attitudes, behaviors, and interactions will occur. Identifying and prioritizing the components of desired work environments for promoting a learning-oriented culture, in addition to assessing the presence or absence of both the components and learning best practices within residency programs, should become normal activities that complement the process of assessing competencies.

Hutchins, E. B. (1961). "The 1960 medical school graduate: his perception of his faculty, peers, and environment." *J Med Educ* 36: 322-9.

Jason, H. (1974). "Editorial: Evaluation of basic science learning: implications of and for the 'GAP report'." *J Med Educ* 49(10): 1003-4.

Johnson, H. C. (1978). "Minority and nonminority medical students' perceptions of the medical school environment." *J Med Educ* 53(2): 135-6.

Jonas, H. S., S. I. Etzel, et al. (1993). "Educational programs in US medical schools." *Jama* 270(9): 1061-8.

As described in the introduction, the data presented in this report can be viewed in both a historical and an environmental context. From a historical perspective, there has been change in many areas of medical education. The number of applicants to medical schools has risen sharply in the past few years, a result seemingly inconsistent with the dissatisfaction with medicine expressed by many physicians and with the uncertainties about the eventual outcomes of health system reform. The number of minority applicants

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and enrollees is slowly rising, but at rates below the goals identified by such initiatives as the Association of American Medical Colleges' "Project 3000 by 2000." Even with the expansion of the applicant pool, however, most medical schools do not anticipate enrollment increases. Medical school tuition also continues to increase significantly, in both public and private schools. The number of faculty members in the clinical disciplines also has continued to rise, although the rate of increase has become less marked. The decrease in the number of basic science faculty members that occurred this year will need to be monitored to ensure that appropriate faculty resources are available for teaching, especially with the initiatives to introduce more active learning formats during the basic science years. The medical curriculum continues to evolve at differing rates across schools. Many "innovations" have become part of the curricular repertoire; for example, medical schools have incorporated educational formats, such as problem-based learning or computer-assisted instruction, which emphasize active student learning, although in a number of cases they are limited to a small portion of the curriculum. In addition, the availability of clinical experiences during the first 2 years of the curriculum, especially those located in ambulatory settings, gives students an early glimpse of the world of actual medical practice. The use of standardized patients provides system and structure in the teaching and evaluation of clinical skills. Therefore, a look at medical education as a whole in the historical context reveals many positive changes (for example, an increase in student diversity over time, the introduction of alternative instructional formats, and attempts to evaluate student clinical competence more reliably). Within the context of environmental expectations, however, many challenges still remain. Medical schools are experiencing pressure to solve perceived problems with the specialty distribution of their graduates and with the specialty distribution of the general physician population, even though factors outside the control of the medical school, such as reimbursement and the practice environment, also influence specialty choice.(ABSTRACT TRUNCATED AT 400 WORDS)

Kaufman, D. M. and K. V. Mann (1996). "Comparing students' attitudes in problem-based and conventional curricula." *Acad Med* 71(10): 1096-9.

**PURPOSE:** To compare the attitudes of students in a new problem-based learning (PBL) medical curriculum and in the previous conventional curriculum after the second curriculum year, prior to the clinical clerkships. The authors hypothesized that the PBL students would have more favorable attitudes toward their learning environment, social issues in medicine, and their curriculum. **METHOD:** The students in the classes of 1995 (conventional curriculum) and 1996 (PBL curriculum) at the Dalhousie University Faculty of Medicine were asked to complete two main questionnaires and a few additional items that measure attitudes. The admission variables of the two classes were equivalent. Their attitude ratings were compared using t-tests. **RESULTS:** Response rates averaged 87% (73 of 84 students) and 68% (57 of 84) for the PBL and conventional classes, respectively. The students in the PBL class had more positive attitudes toward their learning environment on the subscales for enthusiasm and authoritarianism (i.e., they rated their curriculum more favorably for democratic decision making); they were less positive on the student-interaction subscale. No significant difference emerged between the two classes on any subscale for attitudes about social issues in medicine. The PBL students reported more positive attitudes toward their curriculum. **CONCLUSION:** The study results support the superiority of the PBL curriculum regarding the students' attitudes toward their medical education.

Keitz, S. A., G. J. Holland, et al. (2003). "The Veterans Affairs Learners' Perceptions Survey: The Foundation for Educational Quality Improvement." *Acad Med* 78(9): 910-917.

**Purpose.** The U.S. Department of Veterans Affairs (VA) supports 8,700 resident positions nationally to enhance quality of care for veterans and to educate physicians. This study sought to establish a yearly quality indicator to identify and follow strengths and opportunities for improvement in VA clinical training programs. **Method.** In March 2001, the VA Learners' Perceptions Survey, a validated 57-item questionnaire, was mailed to 3,338 residents registered at 130 VA facilities. They were asked to rate their overall satisfaction with the VA clinical training experience and their satisfaction in four domains: faculty/preceptor, learning, working, and physical environments using a five-point Likert scale. Questionnaires were received from 1,775 residents (53.2%). A full analysis was conducted using 1,436 of these questionnaires, whose respondents were categorized in four training programs: medicine (n = 706), surgery (n = 291), subspecialty (n = 266), and psychiatry (n = 173). **Results.** On a scale of 0 to 100, residents gave their clinical training experience an average score of 79. Eighty-four percent would have recommended VA training to peers, and 81% would have chosen VA training again. Overall, 87% were satisfied with their faculty/preceptors, 78% with the learning environment, and 67% with the working and physical environments. The survey was

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sensitive to differences in satisfaction among the trainee groups, with residents in internal medicine (IM) the least satisfied. Conclusion. The VA Learners' Perceptions Survey is the first validated survey to address comprehensive satisfaction issues in clinical training. The survey highlights strengths and opportunities for improvement in VA clinical training and is the first step toward improving education.

Kiessling, C., B. Schubert, et al. (2004). "First year medical students' perceptions of stress and support: a comparison between reformed and traditional track curricula." *Med Educ* 38(5): 504-9.

BACKGROUND: The authors hypothesised that medical schools need to support their students by identifying the challenges inherent in the demanding study of medicine, especially during the transitional phase at the beginning of study. Therefore, a study was conducted to evaluate Year 1 students' perceptions on how well 2 different programmes--a reformed and a traditional programme--helped students make a good start to their studies. DESIGN: Cross-sectional survey. METHOD AND PARTICIPANTS: A questionnaire was distributed to Year 1 medical students on reformed (RT) and traditional track (TT) curricula. Its 5 subscales measured perceived stress and support. RESULT: A total of 155 students (70% of the year group) responded. Significant differences between groups appeared in 4 of the 5 subscales. Students on the RT felt more supported than students on the TT in terms of study conditions, social support at university, perceptions of their own attitudes and competencies, and living conditions. No differences in perceptions of social support outside university were apparent. CONCLUSION: Key aspects that were perceived as supportive included good contact with fellow students and teachers, high quality of courses, and a curriculum that fulfilled students' expectations and made sense to them. In identifying particular features that led to the positive judgement of the RT, the authors hypothesised that the following aspects were crucial: the specific orientation unit in the first 2 weeks, the problem-based learning workshop, the coursebooks and extracurricular social activities.

Kwan, C. Y. (2002). "Problem-based learning and teaching of medical pharmacology." *Naunyn Schmiedebergs Arch Pharmacol* 366(1): 10-7.

In the Faculty of Health Sciences at McMaster University, the traditional discipline-based boundaries dividing the teaching and learning of basic medical sciences, such as physiology and pharmacology, do not exist. For more than 3 decades, student-centered, self-directed problem-based learning (PBL) has been the main form of instruction for students learning pharmacology within the medical curriculum and the pharmacological issues are always embedded within a health-care problem, with consideration of many other relevant non-pharmacological issues. In PBL, pedagogic emphasis is placed on the process of learning via constructive inquiry rather than cumulative acquisition of factual knowledge. For the science students, typically in the Biology/Pharmacology cooperative courses, both student-centered learning and teacher-centered teaching approaches are being used. In this case, the PBL approach is adopted to complement the conventional lectures at the course level. For medical students, PBL continues to be the major form of instruction in a small-group tutorial setting at the curricular level. The PBL curriculum is integrated across organ systems (cardiovascular, renal, respiratory, gastrointestinal, neural, etc) and across the life cycle, spanning population- and behavior-related perspectives, rather than being recreated from discrete disciplinary areas (such as physiology, anatomy, biochemistry, pharmacology, and community medicine). Those students who lack a pharmacology background or wish to enhance their pharmacological knowledge can take a block elective or horizontal elective in pharmacology. Unlike science students, medical students need to sort out pharmacological principles from the overload of information, to integrate them into the clinically relevant situations, and to ultimately apply them to the management of patients' illness. This is most effectively achieved in a student-centered environment conducive to life-long learning.

Lebenthal, A., I. Kaiserman, et al. (1996). "Student abuse in medical school: a comparison of students' and faculty's perceptions." *Isr J Med Sci* 32(3-4): 229-38.

A perceived abuse or mistreatment has been identified in the United States as a major source of stress for undergraduate medical students. The objective of this paper is to explore whether medical students in Israel have similar complaints, and if so, whether medical faculty members are aware of students' perceptions of mistreatment. Third and fifth year medical students of the 6 year undergraduate program of the Hebrew University-Hadassah Medical School were asked to respond to a self-administered questionnaire similar to those used in previous studies in the USA. An additional questionnaire was developed for faculty members. Response rates were 75% for students and 39% for faculty members. Analysis of the responses indicated that similar to the results of American studies, the number and severity

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of all forms of perceived incidents of abuse increased from the third (pre-clinical) to the fifth (clinical) year. Verbal abuse was the most frequently reported form of mistreatment. The most frequently identified abusers were nurses, followed by clinical faculty members, and general surgery was reported as the most abusive clinical department. Students' complaints of denial of basic privileges were more common than those reported in the USA, while verbal abuse and physical threats were more frequently reported by American medical students. Analysis of the responses of faculty members indicated that clinical faculty, residents and interns were unaware of the extent of these students' perceptions, while pre-clinical faculty overestimated the extent of verbal and psychological abuse. We conclude that the perception of abuse or mistreatment among Israeli medical students is more prevalent than either students or faculty believe.

Lee, J. and A. V. Graham (2001). "Students' perception of medical school stress and their evaluation of a wellness elective." *Med Educ* 35(7): 652-9.

**CONTEXT:** Because medical education is known to be demanding and stressful, Case Western Reserve University developed a programme which included a wellness elective which focused on stress reduction and personal wellness. **OBJECTIVES:** The purpose of this study was to explore students' perceptions of medical school stress and to assess their perspective on the wellness elective. **SUBJECTS:** The essays of 60 medical students enrolled in the wellness elective were used. **METHODS:** The essays were analysed using qualitative methodology. Results were validated by questionnaires mailed to the students 2 years later. **RESULTS:** It was found that the students felt that: (1) wellness issues should be important for physicians; (2) their own wellbeing had been diminished by the burden of information to be learned in medical school; (3) talking to peers was a useful coping mechanism, and (4) the elective gave permission to engage in wellness activities without additional guilt. **CONCLUSIONS:** Based on the students' responses, a wellness elective could be a useful addition to the first- or second-year medical curriculum.

Levy, M., P. K. Morse, et al. (1973). "Use of the learning environment questionnaire to assess curricular change." *J Med Educ* 48(9): 840-5.

Maheux, B., C. Beaudoin, et al. (2000). "Medical faculty as humanistic physicians and teachers: the perceptions of students at innovative and traditional medical schools." *Med Educ* 34(8): 630-4.

**BACKGROUND AND OBJECTIVES:** The training of caring physicians represents an important goal of medical education. Little is known however, on whether medical faculty constitute good role models for teaching humanistic skills to medical students. In this study, we examined to what extent medical students at innovative and traditional schools perceived their teachers as humanistic physicians and teachers. We also explored whether pre-clinical and clinical students shared the same perceptions. **METHODS:** A mail survey was conducted in Canada of all second-year students and senior clerks at one innovative medical school (problem-based learning (PBL), patient-centred, community-oriented) and three traditional medical schools. Students were asked to what extent they agreed or disagreed that the majority of their teachers behaved as humanistic physicians and teachers; 10 statements were used. Overall, 65% of the 1039 students returned the questionnaire. **RESULTS:** Over 25% of second-year students and 40% of senior clerks did not agree that their teachers behaved as humanistic caregivers with patients or were good role models in teaching the doctor-patient relationship. More than half of second-year students and senior clerks did not agree that their teachers valued human contact with them or were supportive of students who had difficulties. There were few differences in the way medical students at innovative and traditional schools perceived their teachers' humanistic qualities. At the pre-clinical level however, there were more students from the innovative school than from the traditional schools (around 60% vs. 40%,  $P < 0.005$ ) who agreed that their teachers valued human contact with them and were supportive of students. **CONCLUSION:** Our results indicate that the PBL curriculum fosters better teacher-student relationships during the pre-clinical years. They also suggest that an unacceptably large number of medical students are taught by physicians who seem to lack compassion and caring in their interactions with patients. This study questions the adequacy of medical faculty as role models for the acquisition of caring competence by medical students.

Marshall, R. E. (1978). "Measuring the medical school learning environment." *J Med Educ* 53(2): 98-104.

Medical educators' growing concern over the high level of student stress has been accompanied by a shift in their conceptualization of the problem. Student stress is increasingly seen as a problem resulting from the individual's interaction with the learning environment and not as an indication of personal deficiency. This shift has made evident the need for an instrument capable of assessing the significant

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dimensions of the medical school learning environment. This report describes how the Medical School Learning Environment Survey (MSLES) was developed to measure aspects of the learning environment relevant to student stress. Results of the first administration and plans for future projects using the survey are discussed.

Maudsley, G. and J. Strivens (2000). "Promoting professional knowledge, experiential learning and critical thinking for medical students." *Med Educ* 34(7): 535-44.

It has been recognized internationally that undergraduate medical education must adapt to changing needs, as illustrated by the Tomorrow's Doctors recommendations from the General Medical Council. This paper aims to relate contemporary educational theory to under-graduate medical educational requirements, specifically highlighting conditions (e.g. experiential learning) for: professional knowledge acquisition; critical thinking, problem-solving and clinical problem-solving; and lifelong professional learning. Furthermore, problem-based learning (PBL) is highlighted as potentially providing such conditions. There are lessons from contemporary educational theory for the reform of undergraduate medical education. These include valuing prior knowledge and experience; promoting learner responsibility through facilitating rather than directing learning; encouraging learners to test out and apply new knowledge, and using small-group work to foster explicitly the elusive skills of critical thinking and reflection. Contemporary educational theory contributes valuable insights, but cannot dictate the ultimate 'mix'; at best it provides some principles for reflective analysis of the learning experiences created for tomorrow's doctors.

Moffat, K. J., A. McConnachie, et al. (2004). "First year medical student stress and coping in a problem-based learning medical curriculum." *Med Educ* 38(5): 482-91.

**OBJECTIVE:** To examine the prevalence of psychological morbidity, sources of stress and coping mechanisms in first year students in a problem-based learning undergraduate medical curriculum. **DESIGN:** Longitudinal cohort questionnaire survey. **SETTING:** Glasgow University Medical School. **PARTICIPANTS:** All first year students (n = 275) in the 1997-98 intake. **MAIN OUTCOME MEASURES:** Scores on the 12-item General Health Questionnaire (GHQ-12), sources of stress and coping strategies. **RESULTS:** The prevalence of psychological morbidity and mean GHQ-12 scores increased significantly between term 1 and term 3, with no significant gender differences. Principal stressors were related to medical training rather than to personal problems, in particular uncertainty about individual study behaviour, progress and aptitude, with specific concerns about assessment and the availability of learning materials. The group learning environment, including tutor performance, and interactions with peers and patients caused little stress. Students generally used active coping strategies. Both stressor group scoring and coping strategies showed some variation with gender and GHQ caseness. **CONCLUSIONS:** Increased student feedback and guidance about progress throughout the year and the provision of adequate learning resources may reduce student stress. Educational or pastoral intervention regarding effective coping strategies may also be beneficial. Continued follow-up of this cohort could provide information to inform further curriculum development and, if appropriate, aid the design of programmes for the prevention of stress-related problems.

Moore-West, M., D. L. Harrington, et al. (1986). "Distress and attitudes toward the learning environment: effects of a curriculum innovation." *Proc Annu Conf Res Med Educ* 25: 293-300.

Nossal, G. J. (1976). "Science in the medical curriculum." *Lancet* 2(7990): 840-2.

Pololi, L. and J. Price (2000). "Validation and use of an instrument to measure the learning environment as perceived by medical students." *Teach Learn Med* 12(4): 201-7.

**BACKGROUND:** Aiming to inform curriculum changes in medical school, we developed, administered, and validated a 31-question survey to measure the learning environment as perceived by medical students. **DESCRIPTION:** We administered the survey annually in 4 medical school classes in a Southeastern medical school from May 1994 through May 1997 (N = 619). **EVALUATION:** The survey responses reflected 3 dimensions of the medical school learning environment: the teacher-learner relationship (T-L R), the physician-patient relationship (Phys-Pt R), and self-efficacy. We found that the 3 dimensions are equally valid and reliable for all students, but that the mean values on all 3 dimensions differed by year in school and number of survey responses. **CONCLUSIONS:** As students progress through school, they perceive deteriorating T-L Rs, feel diminishing self-efficacy, and accord less value to the Phys-Pt R. Based on these results, we developed training programs for faculty members to promote teaching

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attributes known to facilitate relationship formation between teacher and learner, and learner-centered and self-directed learning.

Rezler, A. G. (1974). "Attitude changes during medical school: a review of the literature." *J Med Educ* 49(11): 1023-30.

Robins, L. S., Alexander, GL, Oh, MS, Davis, WK, Fantone, JC (1996). "Effect of Curricular Change on Student Perceptions of the Learning Environment." *Teach Learn Med* 8(4): 217 - 222.

Robins, L. S., L. D. Gruppen, et al. (1997). "A predictive model of student satisfaction with the medical school learning environment." *Acad Med* 72(2): 134-9.

**PURPOSE:** To examine differences in attitudes toward the medical school learning environment among student subgroups based on gender and race-ethnicity, to identify the most influential predictors of student satisfaction with the learning environment, and to create a model of student satisfaction with the learning environment. **METHOD:** Three years of survey data (1992-93 to 1994-95) from first-year students at the University of Michigan Medical School were combined. The total sample consisted of 430 respondents, broken into two sets of subgroups: women (n = 171) and men (n = 259), and whites (n = 239) and underrepresented minorities (n = 74). Asian students were removed from analyses when comparisons were made by race-ethnicity, but were included in the analyses for all students and those comparing men and women. Student's t-tests were used to identify differences between gender and racial-ethnic groups in mean responses to seven survey items, and effect sizes were used to characterize the magnitudes and practical significances of the differences. Forward stepwise regression was conducted to determine the best predictive models for each student subgroup and for the total sample; the subgroup models were compared with each other as well as with the total-sample model. **RESULTS:** Cross-validation of the gender and race-ethnicity models showed that the men's satisfaction and the women's satisfaction were predicted equally well using either subgroup's model, and that the white students' satisfaction and the underrepresented-minority students' satisfaction were predicted equally well using either subgroup's model. Furthermore, the total-sample model, employing a subset of five predictors, was similar in its predictive power to the subgroup models. **CONCLUSION:** The study's findings suggest that curriculum structure (timely feedback and the promotion of critical thinking) and students' perceptions of the priority faculty place on students' education are prominent predictors of student satisfaction (across all subgroups) with the learning environment. In contrast, students' perceptions of the learning environment as a comfortable place for all gender and racial-ethnic groups, although less prominent predictors of satisfaction, will discriminate among the subgroups.

Roff, S., McAleer, S., Harden, R., Al-Qahtani, M., Ahmed, A., Deza, H., Groenen, G., Primparyon, P. (1997). "Development and Validation of the Dundee Ready Education Environment Measure (DREEM)." *Medical Teacher* 19(4): 295 - 299.

Roff, S. and S. McAleer (2001). "What is educational climate?" *Med Teach* 23(4): 333-334.

Roff, S., S. McAleer, et al. (2001). "A global diagnostic tool for measuring educational environment: comparing Nigeria and Nepal." *Med Teach* 23(4): 378-382.

The paper reports comparative data from a Nigerian undergraduate medical school and a Nepalese health professions institution in order to explore the value of the previously reported Dundee Ready Education Environment Measure (DREEM) in 'diagnosing' the environment and climate of particular institutions and making comparative analyses in two culturally diverse situations. The Nigerian undergraduate medical school scored 118 out of a possible 200 on the DREEM global score. There were significant differences on five of the items between the male and female students and several significant differences on individual items between the students in Years 4 and 5, Years 5 and 6, and Years 4 and 6. The Nepalese global score was 130/200 and there were significantly different scores for six items between the male and female students. The scores for Years 1-3 also showed several significantly different items. These scores permitted two distinct 'diagnoses' of the two medical schools.

Ronaghy, H. A., A. A. Iqbal, et al. (1974). "Evaluation of student opinion regarding curriculum in an Iranian medical school." *Br J Med Educ* 8(2): 127-30.

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Rosenberg, P. P. (1971). "Students' perceptions and concerns during their first year in medical school." *J Med Educ* 46(3): 211-8.

Rothman, A. I. (1970). "Learning environment of a medical school: expectations versus perceptions of a first-year class." *Br J Med Educ* 4(4): 289-92.

Schultz, K. W., J. Kirby, et al. (2004). "Medical Students' and Residents' preferred site characteristics and preceptor behaviours for learning in the ambulatory setting: a cross-sectional survey." *BMC Med Educ* 4(1): 12.

**BACKGROUND:** Medical training is increasingly occurring in the ambulatory setting for final year medical students and residents. This study looks to identify if gender, school, level of training, or specialty affects learner's (final year medical students and residents) preferred site characteristics and preceptor behaviours for learning in the ambulatory setting. **METHODS:** All final year medical students and residents at the five medical schools in Ontario (N = 3471) were surveyed about the site characteristics and preceptor behaviours most enhancing their learning in the ambulatory setting. Preferred site characteristics and preceptor behaviours were rank ordered. Factor analysis grouped the site characteristics and preceptor behaviours into themes which were then correlated with gender, school, level of training, and specialty. **RESULTS:** Having an adequate number and variety of patients while being supervised by enthusiastic preceptors who give feedback and are willing to discuss their reasoning processes and delegate responsibility are site characteristics and preceptor behaviours valued by almost all learners. Some teaching strategies recently suggested to improve efficiency in the ambulatory teaching setting, such as structuring the interview for the student and teaching and reviewing the case in front of the patient, were found not to be valued by learners. There was a striking degree of similarity in what was valued by all learners but there were also some educationally significant differences, particularly between learners at different levels and in different specialties. Key findings between the different levels include preceptor interaction being most important for medical students as opposed to residents who most value issues pertaining to patient logistics. Learning resources are less valued early and late in training. Teaching and having the case reviewed in front of the patient becomes increasingly less valued as learners advance in their training. As one approaches the end of ones' training office management instruction becomes increasingly valued. Differences between specialties pertain most to the type of practice residents will ultimately end up in (ie: office based specialties particularly valuing instruction in office management and health care system interaction). **CONCLUSIONS:** Preceptors need to be aware of, and make efforts to provide, teaching strategies such as feedback and discussing clinical reasoning, that learners have identified as being helpful for learning. If strategies identified as not being valued for learning, such as teaching in front of the patient, must continue it will be important to explore the barriers they present to learning. Although what all learners want from their preceptors and clinic settings to enhance their learning is remarkably similar, being aware of the educationally significant differences, particularly for learners at different levels and in different specialties, will enhance teaching in the ambulatory setting.

Schwartz, P. L. and E. G. Loten (2003). "Effects of a revised preclinical curriculum on students' perceptions of their cognitive behaviors, attitudes to social issues in medicine, and the learning environment." *Teach Learn Med* 15(2): 76-83.

**BACKGROUND:** A modular, systems-based preclinical curriculum acceptable to faculty members who had rejected problem-based learning was introduced in 1997. **PURPOSE:** To evaluate to what extent the new curriculum is meeting some of its major goals. **METHODS:** We administered selected scales from 3 survey instruments to the last 2 classes in the old curriculum and the first 3 in the new curriculum. We also compared our results with those from other medical schools that had used the same scales. **RESULTS:** The new curriculum has had positive effects on students' perceptions of the learning environment (effect sizes mostly small to medium,  $d = .03$  to  $.60$ ) but less effect on their attitudes to social issues in medicine or on their preference for conceptualization versus memorization when studying (most effect sizes below small; largest  $d = .026$ ). Our results are similar to those for problem-based learning curricula for the learning environment scales and to traditional curricula for the cognitive behavior scales. **CONCLUSIONS:** Some of the goals for the new curriculum are being achieved almost to the levels reported for problem-based curricula.

Schwartz, P. L. and E. G. Loten (2004). "Influence of type of curriculum on students' perceptions of the medical course: a compilation of results from the Cognitive Behavior Survey, Attitudes Toward Social Issues In Medicine survey, and Learning Environment Questionnaire." *Teach Learn Med* 16(2): 123-32.

**BACKGROUND:** This study administered selected scales from the Cognitive Behavior Survey, Attitudes Toward Social Issues in Medicine survey, and the Learning Environment Questionnaire. Data were gathered from other medical schools to put results into context. **PURPOSE:** To present results on these scales from other medical schools and to compare the effects of type of curriculum on the results.

**METHODS:** Articles that had cited the articles that originally presented the scales used were searched for. Results were organized by type of curriculum and effect sizes were calculated where possible. **RESULTS:** Within the limits of small numbers of studies so far, problem-based learning (PBL) curricula appear to have much more positive effects on students' reported cognitive behaviors than do hybrid curricula. Both have substantial positive effects on students' perceptions of the learning environment (PBL medium to large; hybrid small to medium). Neither appears to have much effect on students' attitudes toward social issues in medicine. **CONCLUSION:** These data provide a starting point for further study of some of the effects of curricular interventions.

Schwartz, P. L. and E. G. Loten (2004). "Effect of year in school on medical students' perceptions evaluated with the Cognitive Behavior Survey, Attitudes Toward Social Issues in Medicine Survey, and Learning Environment Questionnaire." *Teach Learn Med* 16(4): 333-44.

**BACKGROUND:** We administered selected scales from the Cognitive Behavior Survey, Attitudes Toward Social Issues in Medicine survey, and Learning Environment Questionnaire. We gathered data from other medical schools to put our results into context. **PURPOSE:** To present results on these scales from our own and other medical schools to identify the effects of "year in school" on the results. **METHODS:** We searched for articles that had cited the articles that originally presented the scales we used. We organized the results by type of curriculum and presented data from multiple points in each course. **RESULTS:** With a few exceptions, the data suggest that students' perceptions of their cognitive behaviors, their attitudes to social issues in medicine, and their impressions of the medical school learning environment deteriorate as they proceed through the course. In the case of PBL and hybrid curricula, this may represent a reversal of gains conferred by these curricula during the early phases of the course. **CONCLUSIONS:** These data provide a starting point for further study of some of the influences on students' perceptions of medical curricula as they proceed through the course.

Seabrook, M. A. (2004). "Clinical students' initial reports of the educational climate in a single medical school." *Med Educ* 38(6): 659-69.

**INTRODUCTION:** The quality of the educational environment has frequently been identified as crucial to effective learning. Aspects of the clinical context differ from those of other higher education environments. This study explored the educational climate (the environment perceived by students) at a single medical school. The article focuses on the perceptions of students in the early stages of their clinical course. **METHODS:** A longitudinal study of the school was carried out over a 5-year period from 1995 to 2000, using ethnographic methods. Data collection methods included participant observation, in-depth interviews, focus groups, and collection of written documentation. Analysis was conducted using a grounded theory approach. **RESULTS:** At the beginning of their clinical course, students were motivated by the patient contact and enjoyed clinical teaching. However, they also felt daunted because the earlier years of the course had not prepared them in terms of the knowledge or style of learning required. Aspects of the hospital environment were perceived as being unhelpful to learning, for example, doctors' frequent late arrival for, or cancellation of, teaching. Students often perceived that they were "in the way", and that their individuality was not valued. Maturity, gender and ethnicity impacted on students' perceptions and on their career aspirations and expectations. **DISCUSSION:** Students' transition to the hospital environment was difficult. This may become less of an issue as medical curricula become more integrated. Specific strategies to induct students into the hospital, and increased staff awareness of their needs, could also help. Ensuring an inclusive atmosphere may be more difficult, requiring cultural change.

Shaver, J. A. (1967). "The learning environment." *J Sch Health* 37(5): 226-31.

Sheehan, T. J. (1970). "Medical school climate: comparative faculty and student views." *J Med Educ* 45(11): 880-7.

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Smith, H. C. (2002). "A course director's perspectives on problem-based learning curricula in biochemistry." *Acad Med* 77(12 Pt 1): 1189-98.

Knowledge of the applications of biochemistry, molecular biology, and genetics in the practice of medicine has been and continues to be a vital part of medical students' and continuing education. The technical background and the rapid expansion of information and new applications have made it an arduous task to learn and teach this material within the already crowded medical school curriculum. Problem-based learning (PBL) formats are rapidly being adopted at all levels of education as not only a major paradigm shift in education but also a solution for the instruction of biochemistry in medical school. Designing an effective biochemistry curriculum with PBL-based or lecture-based formats requires an appreciation for their strengths and weakness. The author's experiences in the Double Helix Curriculum at the University of Rochester School of Medicine and Dentistry (which employs PBL cases and complementing lectures) has shown that students are excited about learning in the PBL environment and explore in depth ways of integrating biochemistry, cell biology, genetics, and molecular biology into the practice of medicine. At the same time, complementary lectures greatly enhance uniformity in the quality and, importantly, the accuracy of the students' learning.

Strayhorn, G. (1989). "Effect of a major curriculum revision on students' perceptions of well-being." *Acad Med* 64(1): 25-9.

The impact of a major curriculum revision on students' perceptions of the quality of the medical school learning environment, social supports, and their own mental and social well-being was determined. First-year students' perceptions one year before the curriculum revision were compared with first-year students' perceptions two years after the introduction of the new curriculum. In the new curriculum, students reported better overall quality of the learning environment ( $p = .019$ ), a trend toward fewer stresses ( $p = .091$ ), no difference in social supports ( $p = .721$ ), better mental well-being ( $p = .043$ ), and a trend toward better social well-being ( $p = .099$ ). Students at a comparison school that did not undergo curriculum revision did not have more favorable perceptions during the study period. The findings suggest that well-considered and well-executed efforts to improve the quality of a medical school's learning environment can be successful and can raise students' perceptions of their overall well-being.

Strayhorn, G. and H. Frierson (1989). "Assessing correlations between black and white students' perceptions of the medical school learning environment, their academic performances, and their well-being." *Acad Med* 64(8): 468-73.

From 1982 to 1985, first-year students at a medical school were invited to participate in a longitudinal study that assessed the correlations between their perceptions of the learning environment, their academic performances, and their perceptions of their own well-being. Differences between black and white medical students' perceptions of the medical school's learning environment and the predictors of their academic success and mental and social well-being were determined at the end of their first year. Black and white students had similar perceptions of the learning environment's quality. Black students experienced more stress but found more support from faculty, class advisors, and administrators. Although black and white students shared some predictors of academic performance and well-being, there were important differences that should be considered when resources are developed to assist students with their academic performance and the maintenance of their social and mental well-being.

Till, H. (2004). "Identifying the perceived weaknesses of a new curriculum by means of the Dundee Ready Education Environment Measure (DREEM) Inventory." *Med Teach* 26(1): 39-45.

The Canadian Memorial Chiropractic College is in the fourth year of implementing a new four-year Integrative Curriculum. In order to determine how the students experienced the educational environment generated by the new curriculum, the Dundee Ready Education Environment (DREEM) Inventory was administered on the same day to 148 (96%) first-year, 131 (87%) second-year, and 128 (84%) third-year students ( $n = 407$ ). Resultant scores indicated many areas of concern. However, bimodal and large numbers of 'uncertain' responses also occurred. In order to establish and compare areas of most concern between the three year groups, responses were calculated as percentages indicating for each item those who agree, disagree or are uncertain. This result clearly indicated areas of joint concern for each of the five domains addressed by the DREEM Inventory. Analysis of these concerns formed the basis of strategic planning in order to institute remedial action, and on which to focus institutional resources.

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Walton, H. J. (1967). "The measurement of medical students' attitudes." *Br J Med Educ* 1(5): 330-40.

West, M., S. P. Mennin, et al. (1982). "Medical students' attitudes toward basic sciences: influence of a primary care curriculum." *Med Educ* 16(4): 188-91.

The emerging popularity of family medicine and primary care among medical students with an attendant pressure for clinical relevance in pre-clinical coursework and early clinical exposure has raised questions in the minds of many academicians about the students' perceived value of basic sciences in such an educational environment. A comparison was made of attitudes toward the basic sciences between students in two, concurrent, pre-clinical medical school curricula at the University of New Mexico School of Medicine. The conventional curriculum offers a teacher-centered, 2-year curriculum of basic sciences taught predominantly by basic scientists in a lecture format. The experimental curriculum entitled the Primary Care Curriculum (PCC), offers a student-centered, 2-year curriculum in which pertinent basic and clinical science learning is derived primarily from common, primary care, patient problems, discussed in small group tutorials. There are no formal lectures. Half the tutors are primary care clinicians, half basic scientists. Attitude scales were administered in two successive classes of students in both curricula at the beginning of the first and second terms of the first year. Increased cynicism toward the curriculum and its relevance to future practice was observed among conventional, but not among PCC students. This finding lends support to the hypothesis that modification in educational methods in general and relevant, primary care experience in particular can favourably influence students' attitudes toward basic sciences.

White, G. E. (2000). "Sexual harassment during medical training: the perceptions of medical students at a university medical school in Australia." *Med Educ* 34(12): 980-6.

**CONTEXT:** A survey of medical students' experiences of sexual harassment during medical training. **OBJECTIVE:** To assess the prevalence and nature of workplace sexual harassment as perceived by undergraduate medical students in order to address their learning needs concerning setting and maintaining sexual boundaries. **DESIGN:** A questionnaire involving both quantitative and qualitative descriptions. **SETTING:** A university medical school in Australia. **PARTICIPANTS:** The medical student population. **MAIN OUTCOME MEASURES:** Estimated prevalence of sexual harassment according to gender and year of training; frequency of sexual harassment reported by category of behaviour, year of training and gender; type of sexual harassment and alleged harasser reported by gender; frequency of sexual harassment reported by category of behaviour and alleged harasser. **RESULTS:** Female students encountered an unacceptable amount of sexual harassment in medical training from fellow students, patients, faculty and doctors they worked with, which was perceived as affecting learning opportunities. **CONCLUSION:** Genderized sexual harassment exists in medical training. While both male and female students report episodes perceived as sexual harassment a difference in interpretation results in greater vulnerability for female students. Medical educators need to address issues of gender, sexual harassment, and the setting and maintaining of sexual boundaries in order to avoid a hostile learning environment.