

Basic Science in a Predoctoral Family Practice Curriculum

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A course in applied basic science was designed with topic material organized according to anatomic body regions. Details of the diagnostic method were explained early in the course, and clinical procedures for data gathering and problem analyzing were followed while the significance of basic science knowledge in dealing with clinical situations was described. A collection of 35mm slides constituted the focal point of the course. The authors conducted the course together and an atmosphere of intellectual honesty was developed through open discussion between faculty and students. Student curiosity was respected and rewarded. Summaries of the discussions were prepared retrospectively by the faculty instructors for review by the students. This experience proved that family physicians can demonstrate effectively the relevance of basic science to clinical medicine.

As relative newcomers to the academic scene, departments of family practice have a unique opportunity to complement as well as benefit from the teaching efforts of other disciplines as they develop their own predoctoral medical curricula. This has been found true in the basic as well as the clinical sciences, and a primary teaching goal of the Department of Family Practice at the Medical University of South Carolina, Charleston, has been to improve the students' appreciation of the importance of basic science knowledge in the un-

derstanding of patient problems.¹ This paper describes this attempt at making the basic sciences relevant to the practice of clinical medicine by making use of the family physician's vantage point.

The traditional method of teaching the basic sciences as "pure" disciplines has been described as a process whereby the answers are supplied without the questions being asked. Undeniably most freshmen medical students learn a large number of sophisticated scientific facts without having the reason for obtaining this knowledge described to them in terms of patients and patient problems. Within the past decade attempts to change this intellectual orientation have been made by such institutions as Case Western Reserve University and McMaster University, but most medical centers of education have continued to follow the traditional pattern while acknowledging the need for relevance whenever such can be demonstrated conveniently. However, even the

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most conservative medical academician would agree that correlating basic science with clinical circumstances results in a higher level of motivation for learning by students, and there are those others who argue that the clinical application of basic science is of such importance that it may warrant a distinct teaching faculty and even its own identity as, for example, in a separate clinical department of anatomy.² No definitive answers have been found, and the question of "relevance" in medical predoctoral education continues to be controversial.

The family physician is in an advantageous position as a teacher and can gain rapid acceptance by medical students. In a study of 141 medical students, Zimet and Held reported that "medical students, regardless of specialty interests, rated themselves as having traits similar to those they assigned to the family practitioner."³ Thus the family physician may act as the basic "role model" for a majority of students. For this reason Baker has emphasized the need for medical students to be exposed to the philosophy and skills of the family physician at an early stage in their educational development.⁴ Granted such credibility, it would seem highly desirable and most appropriate for the family physician to teach the relevance of basic knowledge in clinical practice during that difficult, early period in the student's education when his/her patient-oriented motives for coming to medical school tend to become obscured.

It was on the premise of these beliefs and attitudes that a course in "applied" basic science was conceived and offered through the Department of Family Practice at the Medical University of South Carolina.

Behavioral Objectives and Course Design

The following broad behavioral objectives were described to each class at the beginning of the course:

1. That the student understand the methodology available to the clinician in performing the diagnostic process. These methods can be described in at least six categories:

- a. history and physical examination
- b. radiologic procedures

- c. electrographic procedures
- d. endoscopic procedures
- e. other special procedures (thermography, ultrasound, etc)

f. biopsy, "biologic sample," and laboratory methods of analysis.

2. That the student, by using diagnostic methods, gain insight into a selection of clinical problems in terms of the basic morphologic and functional derangements present (in practice, most emphasis was placed on data derived from the history and the physical examination).

3. That the student develop an appreciation for the holistic medical approach to patients, their families, and their problems; and further, that the student learn to formulate diagnoses in physical, psychological, and social terms.

Eleven two-hour sessions were scheduled at weekly intervals; during each session a 15-minute rest-break was called at the end of the first hour. The course was organized in terms of anatomic body regions. The introductory lecture dealt with the diagnostic process and described the various methods used to acquire clinical data about patients. Thereafter two sessions each were devoted to clinical problems occurring in the "Head and Neck," "Thorax," and "Abdomen." The eighth week was used to deal with clinical aspects of the "Pelvis." A variety of problems afflicting the "Limbs" were described during the ninth session, and "The Hand in the Diagnosis of Systemic Disease" was the topic of discussion during the tenth session. The final meeting was devoted to evaluation and student feedback.

An organized theme of topic material was followed by using a collection of 35mm slides. These slides were prepared from illustrations found in a wide variety of clinical and basic science texts and in many different medical journals. The slides included photographs of patients with demonstrable lesions, normal and abnormal x-rays, ECG tracings, examples of thermograms and other special procedures, photographs and diagrams of normal and abnormal anatomy, and finally, but not least, the occasional cartoon and other attention-getting visual device. From modest beginnings, the slide collection grew into the hundreds and became the focal point around which the course was conducted.

Handouts were used. At the first meeting a printed description of the course and its behavioral

objectives was accompanied by a detailed discussion, in the handout, of the diagnostic process and diagnostic methodology. After the introductory session student handouts were prepared on a *retrospective basis*. This was done deliberately to encourage spontaneity of thought and discussion on the part of both the instructors and the students. After each session the instructors jointly reviewed the slides and recalled the conversation that had occurred at the time of their presentation to the class. A description of the slides accompanied by a transcript of the discussion which they had stimulated (and also including any reflective, factual amendments) formed the substance of the next printed handout.

Conduct of the Course

Initially this course was offered on an elective basis to all students who had completed the Core Curriculum course in gross anatomy. When it was first made available 107 students enrolled. A response of this magnitude had not been anticipated and the number proved to be too large for free-flowing discussion to occur easily. Subsequently an attempt was made to limit the number of participants to 40 and the course was repeated each academic quarter. Over the ensuing two-year period the course was offered on seven successive occasions with an enrollment of 306 students. During three of the seven sequences enrollment was allowed to exceed 40 due to the very large number of applicants. At the end of the two-year period the Curriculum Committee of the Medical College incorporated the course into the Core Curriculum as a "requirement" for all medical students.

The authors were the only instructors and they conducted the course together, both being present for each session whenever possible. This duality of sponsorship became increasingly significant as the course progressed. The instructors had known each other and had been good friends and clinical associates prior to their teaching collaboration. They brought this easy and trusting relationship into the classroom. The informality and relaxed exchange of words and ideas between faculty undoubtedly prompted similar behavior on the part

of the students. There was a perceptible alteration of mood among the students during each introductory session. With the loss of tension, a non-threatening atmosphere conducive to open discussion and active student involvement rapidly evolved.

Each session commenced with an informal dialogue between faculty and students concerning the activities of the class during the preceding week. Any concerns which might have arisen in connection with the content or conduct of the course were discussed. A slide would then be projected and one of the instructors would make some brief introductory comment. Usually the comment would terminate with a question, thus initiating a student discussion of the slide. At an appropriate point the second faculty member would join in by introducing his viewpoint on the topic material, again usually ending with a question. Sometimes further discussion would proceed directly between the two faculty members as they questioned the limit of each other's knowledge and experience relating to a particular topic; a student might well have something to add when they had come to the end of their pooled knowledge! On other occasions discussion would occur between students or between faculty and students. There were few rules of order except that the theme of the topic material be followed broadly and that a proper respect be observed for the rights of everyone to be heard without unreasonable interruption. The instructors deliberately attempted to create a non-threatening atmosphere of intellectual honesty in which student curiosity was respected and rewarded.

Evaluation Procedure and Student Feedback

One examination was given at the end of the course. This consisted of projecting no more than 50 slides selected from among the 500 or more that were used to conduct the course. One or more questions were asked relating to each slide, all of the requested information having been mentioned in the handouts. At the conclusion of the examination students were asked to provide brief, written, anonymous responses to three questions:

“What did you like about this course?” “What did you not like about this course?” and “What would you suggest to improve this course?” Student response was strongly positive and no significant criticisms were made.

Discussion

Kane et al advocate study of the end product of medical education thereby enabling working competencies to be identified. Once this has been done, learning experiences can be designed for specifically teaching these competencies in the medical curriculum.⁵ The family physician is the most common end product of medical education. Among his/her many competencies the family physician must have a working knowledge of the basic sciences. This course provided a setting whereby the practical value of such basic knowledge could be demonstrated in the context of the family physician's professional experience and background. Primarily the course was intended to be motivational, although in practice there was a significant cognitive content. The consistently high enrollment and continued good attendance at all the sessions would seem to demonstrate that the course did indeed motivate students. In addition, only two of the 413 students who enrolled failed to achieve a grade of 75 or higher in the examination, which was based on the cognitive content.

The conceptual design of the course appears to be philosophically aligned with some recent trends in medical education. Levine et al, summarizing the findings of a conference of medical educators and social scientists involved in medical education research, state a number of current assumptions.⁶ There is a school of thought which strongly promotes the integrated teaching of basic sciences with clinical medicine, believing this to be a superior form of education providing a more intellectual clinical experience. In addition, modern educators are realizing the need to “humanize” medical education by discussing clinical problems in social, ethical, and personal terms as well as in biological language. Whether these are preferred modes of educational experience is continuing to be investigated, but the course described in this paper certainly attempted to incorporate features of this kind into its design.

Viewing the matter from a student's perspective, Strayhorn has debated what motivates a

preclinical medical student to learn.⁷ His thesis reasons that relevance of information coupled with a high degree of active student participation are key factors. Specifically, he advocates the use of questions to stimulate what he terms “socially originating motivation,” the stimulus to a student when called upon to perform before his peers. In this process the teacher becomes more of a background influence rather than a generator of knowledge. These principles were observed in the conduct of this course.

It is the authors' belief that the family physician does indeed appear to students as a nonthreatening figure to whom they can relate.⁴ While conducting this course faculty and students became very well acquainted. After each class five to ten students would linger behind to chat with the instructors; rarely did the last one leave before another half hour had passed. On many occasions the students treated the instructors as confidants and would bring personal problems and concerns for their advice. In addition to this empathetic relationship, the instructors deliberately assumed the “lead-learner” role. As one of the authors¹ has described, this involves the instructor asking questions of himself and being prepared to learn answers along with the rest of the class. It is impossible to avoid an atmosphere of intellectual honesty under these circumstances. Finally, the authors are convinced that their high regard for each other combined with a willingness to interact together in a relaxed, warm, and honest manner before and with a group of students, contributed a significant and perhaps novel dimension to this particular learning experience. On reflection the authors have realized that certain television newscasters discovered the benefits of this particular technique some time ago!

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