PART I

Innovative and Conventional Curricula Compared: What Can Be Said About Their Effects?

HENK G. SCHMIDT

INTRODUCTION

A number of far-reaching recommendations for improving the quality of medical education in the United States have been forwarded by a panel of the Association of American Medical Colleges, published in a report on the General Professional Education of the Physician: the GPEP Report (Muller, 1984).

According to the report, medical education, if it is to remain responsive to the needs of society, should adapt to changing demographics, in particular to the dramatic growth in the number of individuals with chronic disease, the increase of the elderly population, and the roles played by environmental factors and lifestyles in the determination of health and illness. More empha-

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sis should be put on the physician's responsibility to work with both individual patients and communities to promote health and to prevent disease. In addition, basic science teaching and clinical education should be integrated whenever appropriate, and the development of skills, values, and attitudes should be emphasized at least to the same extent as the acquisition of knowledge. Furthermore, it is suggested that medical schools should offer educational experiences that require students to be active, independent learners and problem solvers, rather than passive recipients of information, which, according to the report, will require alterations in the kind of instructional procedures used.

The purpose of Part I of this book is to present a number of studies that have attempted to compare the results of innovative programs with those of conventional curricula. It will concentrate on studies concerning the educational outcomes of the curricula of an international group of medical schools known as the Network of Community-Oriented Educational Institutions for the Health Sciences. This network consists of 30 schools, from industrialized as well as developing countries. The more well-known include the medical faculties of the University of New Mexico in the United States, the University of Limburg in the Netherlands, McMaster University in Canada, Suez Canal University in Egypt, and the University of Newcastle, Australia. Studies on these schools were selected because their objectives appear to reflect the spirit and recommendations of the GPEP Report most clearly (Greep & Schmidt, 1984).

In addition, this part of the book will focus on studies that *compare* innovative and conventional medical curricula. It will not deal with the results of other kinds of program evaluations, abundant examples of which are found in other chapters of this book.

DIFFICULTIES INVOLVED IN COMPARING EFFECTS OF DIFFERENT CURRICULA

Before I proceed with a brief description of the chapters that constitute this part of the book, some of the difficulties involved in the comparison of effects of different educational approaches on the learning and attitudes of students will be discussed. The purpose is to provide the reader with a frame of reference to be used in judging the significance of the findings presented by various authors.

Two fundamental problems are involved. First, the subjects, whose behavior is to be compared are generally not randomly assigned to the "treatments," so a major requirement for true experimental comparisons cannot be met. At best, comparisons of this kind can be considered quasi-experimental (Cook & Campbell, 1979). This means that, in most of the studies presented. emerging differences between the innovative and the traditional school cannot be directly attributed to characteristics specific to each school's curriculum. Other factors, unrelated to the typical structure of the curricula compared, may be equally important in explaining the causes of the differences found, and cannot be ruled out by simple statistical null-hypothesis testing. Some of these factors affecting the outcomes of this kind of research will be listed below.

Second, the period over which the treatments are supposed to do their work is so extended that it becomes difficult, if not impossible, to control for those extraneous variables that might affect the outcomes but are not in themselves subjects of investigation. In the studies cited, these uncontrolled or even uncontrollable variables include (1) differences in admission procedures that may make the populations to be investigated different from the start; (2) differential attrition of students in the course of the program; (3) unforeseen and undocumented changes in a program that affect its outcomes; (4) the use of volunteers; (5) difficulty in composing adequate comparison groups, resulting in the tendency to use "whoever is available"; (6) low response rates; and, in particular, (7) differential exposure to the instrument used to measure curriculum effects. To illustrate the last point, Saunders and his coworkers of the University of Newcastle (Chapter 4) have found that students of the innovative Newcastle curriculum achieved slightly better on modified essay questions when compared with University of Sydney students, whereas the latter did somewhat better on a multiple-choice examination. However, careful reading of that chapter reveals that University of Newcastle students had never encountered multiple-choice questions before in their undergraduate course, while the University of Sydney students had no experience with modified essay questions. Thus, this differential exposure to these evaluation instruments may explain the marginal differences between both schools.

In addition, even if a difference can be trusted to represent a true curriculum effect, it is still difficult to point at those curriculum elements that produced the difference. For instance, are the

primary care career preferences expressed by students, as found at the universities of New Mexico (Chapter 1), Tampere, and Kuopio (Chapter 6), the result of actual *exposure* to primary health care delivery, or is the focus on primary care problems in the theoretical part of the curriculum a sufficient condition for transmitting this preference?

A further difficulty is that although the curricula involved are described in the same general terminology (they all are considered community-oriented and use problem-based learning in small-group tutorial sessions as their method of instruction, emphasizing self-directed study), relatively large differences among these innovative programs can be observed. In a survey of 10 of these schools, Richards, Bannerman, and Wunderlich (Chapter 18), found that 3 of them offered their students hardly any exposure to community experiences, such as making home visits or conducting epidemiological studies in rural areas, and only 5 utilized problem-based learning as the main instructional approach (although all of them employed it to some extent). So, the generalizability of some of the results presented may be doubtful.

CONTENTS OF PART ONE

In the next chapters, data is presented on five attributes of interest: academic achievement, clinical competence, career preferences, student perceptions of their educational environment, and learning styles. These attributes have been selected because they encompass the areas in which differences are to be expected between conventional and innovative curricula.

Each chapter starts with a brief outline of the characteristics of the innovative curriculum to be compared, and presents one or more studies addressing a number of questions of interest. In particular, the chapter on effects of an alternative track at the University of New Mexico by Baca and her colleagues (Chapter 1), and the chapter by Woodward on McMaster graduates (Chapter 2), address more than one issue. These studies attempt to provide a more comprehensive overview of the kinds of changes that are effectuated in students as a result of curricular innovation.

What are those questions of interest? Let us begin with issues pertaining to *academic achievement*, traditionally defined as achievement on a knowledge test. One of the implicit assumptions underlying the structure of many curricula is that students

have a limited amount of time available to study the core content of medicine. Consequently, if emphasis is put upon topics or activities not considered to be part of this core (for instance, students spending time studying nonmedical subjects such as philosophy of science, or having extended community rotations, as are provided in many of the innovative programs), the amount of attention that can be spent on core content will decrease, causing a drop in achievement on these topics. In addition, self-directed learning employed by many of these schools is generally thought to be inefficient because it forces students to figure out themselves what to learn, how to learn it and how much time to spend on it. This process, though in itself valuable, is considered to be time consuming.

The studies of Baca, Mennin, Kaufman and Moore-West (Chapter 1), Woodward (Chapter 2), Verwijnen, Van der Vleuten, and Imbos (Chapter 3) and Saunders, McIntosh, McPherson, and Engel (Chapter 4) deal with the question of whether curricular changes of the kinds described herein are associated with a decrease in academic achievement.

The ability to care for patients and solve their problems is taken by many to be the major objective of medical education. The acquisition of knowledge is, in this view, only useful to the extent that it facilitates *medical problem solving*. A major proponent of this perspective puts it this way: "Doctors with encyclopedic information are useless, if not unsafe, if they do not have the problem-solving skills necessary to accurately and efficiently use that information in the care of their patients." (Barrows, 1984, p. 20). If the acquisition of clinical competence is a vital objective of the innovation, the extent to which students from these innovative schools master this skill in comparison with students from traditional medical education becomes an important question. Data available on this topic are limited, however, possibly because of disagreement on the issues of what to measure and how to measure the construct of clinical competence. Saunders, McIntosh, McPherson, and Engel (Chapter 4) and Woodward (Chapter 2) address this issue.

The *career preferences* of medical students tend to be quite stable in the course of their curriculum. If there is any change between the moment of enrollment and graduation, it tends to be a shift from a preference for primary care to nonprimary care specialties (Glasser, Sarnowski, & Sheth, 1982). This state of affairs presents a challenge for the community-oriented schools, because their goal is to produce doctors with an awareness of the

importance of primary care for the well-being of the population at large. Do they succeed in influencing the preference pattern of medical students? Two studies address the impact of the new curricula on the career preferences of their students. The first has been carried out at the universities of Kuopio and Tampere in Finland, two relatively new medical schools. Isokoski, Kumpusalo, Mattila, Neittaanmäki, Tanskanen, and Virjo (Chapter 5) investigated the type of medical practice for all physicians registered in Finland between 1978 and 1982. The second is reported by Baca and her associates with respect to choices made by New Mexico students of both the traditional and the innovative tracks (Chapter 1).

The way students *perceive* the content of *the curriculum* and the instructional philosophy underlying it may influence their emotional well-being and motivation to learn. Medical faculties clearly differ in their responsiveness to the needs of these students. At the University of New Mexico, for instance, experimental-track students perceive their learning environment as definitively more flexible, more meaningful, as encouraging student interaction, and having a better emotional climate than do the students of the conventional track (Chapter 1). An interesting comparative study of perceived strengths and weaknesses in the content of various curricula has been done by Post and Drop. Their study is presented in Chapter 6.

Recently, considerable emphasis has been put on research into the ways that university students process information. According to Marton, Hounsell, and Entwistle (1984), students appear to develop a preferred style of studying. These different styles or *approaches to learning* show (moderate) correlations with achievement. Individual students have been observed to favor one of three different broad approaches to the study of subject matter: a surface-level, a deep-level, or a strategic approach. The surface-level approach is largely characterized by a rote-learning tendency, aimed at a literal reproduction of the material, and the use of extensive memorization procedures. Students using a deep-level approach attempt to integrate what they learn with what they already know, aiming at understanding the "message" underlying a text and looking for explanations rather than facts. The strategic mode is descriptive of the behavior of those who try to be successful in higher education with a minimum amount of effort. They do only what is required by a course and their depth of understanding of the subject matter is based largely on the amount of external pressure provided by the instructor. In part,

these approaches to learning are embedded in personality traits of the students, but they may also be influenced by the educational context or mode of instruction. In Chapter 7, Coles, an educational researcher from a traditional school, provides an example of the differential impact innovative and conventional curricula have on their students' learning styles.

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