

The Necessity for Major Reform in Dental Education
A Santa Fe Group Planning Conference
August 29-30, 2004

**“A NEW MODEL OF DENTAL EDUCATION:
AN UPDATE ON THE DISTRIBUTED DENTAL
EDUCATION MODEL”**

A Topic Paper and Presentation

By

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Introduction

Although the potential exists for technology to revolutionize teaching in the health professions, there have been few sustained efforts to alter the traditional models of teaching and learning in these fields. In the profession of dentistry, an emerging, well-documented manpower shortage may provide the impetus needed to facilitate acceptance of a new model of professional education – one that combines curriculum reform with the integration of technology to teaching and learning.

Because the rhythms of professional practice are largely evolutionary, professional education strikes a balance between a mission to explore and a responsibility to conserve. On the one hand, the academy is expected to be the experimenter and innovator, inventing as well as testing new theories and new paradigms of practice along with new modes of instruction. At the same time, the academy is expected to preserve standards, making certain that the new ideas that gain acceptance in professional training and practice are not just different but demonstrably better. When the pace of change accelerates, however, the role of the professional school shifts as well, bringing both new responsibilities and new opportunities.

Many believe this is just such a moment for the practice of dentistry and hence the style and delivery of dental education. Shifts in the demographics of both the profession and the patient population, changes in how the delivery of dental care will be funded in the future, and the emergence of new technologies that have the potential of recasting dental education itself – all have combined to make substantive, non-evolutionary change not only possible but perhaps necessary.

Background: Feasibility Assessment

In 2002 the National Library of Medicine funded investigators at the University of Pennsylvania both to conceptualize and to begin the process of assessing the feasibility of a New Model of Dental Education. That model is based on a curriculum that stresses learning by doing and problem solving. The model's instructional methods employ interactive technology in conjunction with a redefined and shortened preclinical program, as well as a community-based program of clinical education. Among other characteristics of the model is its ability to expand and contract readily to meet changes in the demand for dental care professionals. Moreover the model would be designed to:

- Integrate components of the learning experience by combining the basic science, preclinical, and clinical phases of dental education in more coherent ways.
- Educate more students at a given time with fewer faculty and minimal expansion of "brick and mortar" facilities by using state-of-the-art distributed learning tools and virtual reality-based training.
- Increase the number of dentists in underserved communities by designing the clinical component of dental training to occur wholly in community-based setting located in underserved areas.

- Make dental education more affordable by taking advantage of economies of scale and reducing the average completion time from four years to three.
- Prepare “relevant” dentists – social entrepreneurs who are general practitioner, motivated by a concern to address the needs of the public and community, yet with the business sense to survive in a volatile economy.

It was to address this set of needs and test the feasibility of the New Model of Dental Education that this project sought initial funding from the National Library of Medicine. Guiding the model’s conceptualization and design process was a Steering Committee of national experts representing the full range of relevant fields and constituencies, including dental education, health policy, e-learning, corporate health care, and organized dentistry. Supplementing the work of the Steering Committee were three topic-specific Advisory Panels similarly comprised of national leaders. The principal task of these Advisory Panels was to examine, revise, and provide practical contexts for the three main components of the proposed model for dental education: its digitized “Story-Centered Curriculum,” its use of community-based practices to provide the program of clinical education, and its incorporation of preclinical training sequences that utilize simulation, virtual reality, and haptics.

Through December 2002, the Steering Committee focused on defining the critical set of issues the New Model of Dental Education would be expected to address – including the financial, pedagogical, technological, and market barriers to success. Having satisfied itself that the emerging model could in fact address these concerns, the Steering Committee unanimously embraced the concept of a new approach to dental education and identified a set of steps to guide further discussion of the proposed model.

Meeting of the Community-based, Didactic, and Preclinical Advisory Panels occurred in March and April of 2003. Collectively, these panels provided an opportunity for some 60 leaders in dental education, health policy, and other fields to review the model and consider its feasibility. In addition to examining the feasibility of the model as a whole, each Advisory Panel considered how various aspects of the model could work from the standpoint of its members’ particular experience and expertise. The overall consensus of these Advisory Panel meetings was that the model would prove both desirable and feasible. Within this central finding were some strong themes arising from all three panel discussions:

- There is an urgent need for dramatic steps to address a growing shortage of professionals in the dental field.
- Now is the time for curricular and pedagogical innovation of the kind this model represents.
- While the proposed model is not the only approach to addressing the problem, it nonetheless represents one of the most attractive and potentially successful.
- The model offers particular strength in its combination of curriculum reform with the application of technology-based instruction.
- Another strength is the model’s emphasis on working in the community to serve areas in which the shortage of dental care is most acute.

In June 2003, the Steering Committee used the work of the Advisory Panels to specify the steps necessary for the development of a detailed specification of the proposed model for the New Model of Dental Education. These included:

- Convening a development committee to begin working out the specific details of the model.
- Developing a business plan that specifies anticipated costs, revenue, and possible funding sources.
- Beginning conversations with educational institutions that might be interested in partnering with the project.
- Identifying funding – public and/or private – for a pilot project.
- Beginning the work to develop, implement, assess, and evaluate the pilot program.

During the summer of 2003, a comprehensive cost model was developed for the New Model of Dental Education. Initial simulations demonstrated that the per dental student annual costs could be accurately projected.

Current Status

In June 2004, a new proposal was submitted to the National Library of Medicine to support the next phase of this project. This phase will focus on program development and cost assessment and is expected to encompass 12 months. The objects of this phase are:

- To map the virtual dental curriculum to a set of learning architectures.
- To develop and demonstrate prototype technologies required to support the virtual dental curriculum.
- To develop a small working prototype simulation.
- To use the curriculum specifications to estimate the specific costs of launching and sustaining the New Model of Dental Education.
- To identify both funding and academic partners for pilot testing of the New Model of Dental Education.

Closing Comments: Theoretical Considerations – Learning Theory and Technology-Mediated Instruction

The traditional model of education organizes the training of dentists in ways that parallel academic divisions and departments within the academy. It breaks into discrete parts the knowledge and skills that a practicing professional must ultimately apply as a coherent whole. While the traditional model accommodates faculty members' natural tendency to specialize, dental education in the classic mode is time consuming and increasingly expensive to deliver. The pedagogy adopted in this proposed model deliberately integrates the conceptual and practical elements of knowledge. Drawing from the principles of Problem-Based Learning and – even more particularly – from what the

cognitive scientist Roger Schank calls a "Story-Centered Curriculum," the model breaks down artificial barriers between theory and practice that exists in the traditional curriculum. The proposed model's emphasis on learning by doing, combined with its employment of digital technology in the delivery of instruction, makes it possible to reduce substantially both the cost of a dental education and the time required to complete the degree without compromising quality.

The proposed model combines solid principles of learning theory and state-of-the art technology. Sophistical interactive courseware has demonstrated its effectiveness in both corporate and academic contexts. Such state-of-the-art learning software, supported by faculty contacts as needed, makes it possible to deliver most, if not all, of the dental curriculum in a distributed environment. Be advised that we are not referring to some off-the-shelf or cookie cutter approach to computer assisted learning. This is NOT an electronic reproduction of lecture notes and Powerpoint presentations.