Guest Editorial

Information (Not Time) is Money

This editorial is taken from an essay by Dr David W. Chambers, editor of the Journal of the American College of Dentists *and Professor and Associate Dean for Academic Affairs at the University of the Pacific, San Francisco, California. The original essay was published as "Information (Not Time) is Money," The* Journal of the American College of Dentists, *Volume 62, in the Spring issue (1) of 1995, pages 34–36.*

The world's leading authority on the value of things—the IRS—tells me my (volunteer) time is worth nothing. That is okay by me. I figure if time really is money, I would be as rich as Sam Walton of Wal-Mart, if I can just live that long. It may be possible to waste time, but no one knows how to stretch it. Sam Walton's trick had nothing to do with his spending more time in retailing. His computerized check-out systems are networked and each day these nationally linked computers cut purchase orders for merchandise based on current purchases. This ensures the availability of hot items and drastically reduces expensive markdowns of excess stock. Sam Walton was in the information business.

America in general is rushing toward the information age. For every one person who earns a living by making something, there are more than two who add value through manipulating information. The wealth of this country, and every developed nation, is now deposited in offices rather than factories. As we enter any such new territory, we must become familiar with the terrain and novel rules and customs. Leadership in the 1990s requires mastery of information skills.

Information is changing the practice and profession of dentistry. The cost-effective computerized clinical record is only about five years away. Its display will be highly visual and its input will be verbal and electronic instead of manual. It will be more accurate, quicker, and will support more analysis than current record systems. Computer-enhanced radiography is here now.

So-called expert systems allow for exhaustive, instant, and accurate searches of patient knowledge bases such as indications and contraindications for drugs and diagnoses to support the dentist's decision making. More commonly available decision support systems (DSS) include spreadsheets which capture important data on practice characteristics, patient information, and personnel to monitor key practice variables and even model hypothetical changes. Cephalometric analysis on the computer is an obvious improvement. The cost of intraoral cameras and computer image manipulation software is falling rapidly, thus putting within the reach of every dentist and patient a graphic understanding of the present condition and the results of possible treatment alternatives.

Even more revolutionary than these simulations is work being done on virtual reality. A virtual reality tour of your new office would require putting on a visor and actually moving your body and head, with each movement changing the computer representation to correspond with the virtual change in your orientation. This creates a true interaction with both actual and potential (virtual) worlds. Sound and tactile interaction can be added to virtual reality to create lifelike representations of dental procedures. The opportunities in dental education and licensure examination are exciting. It is even theoretically possible to create virtual simulation of actual cases such as a complex surgical extraction. Thus a practitioner could rehearse various approaches to a complex procedure several times before having to perform it.

The information contained in a dental chart has expanded tremendously over the past several years, particularly in the medical area, allowing for more complete

and accurate patient care. As larger actuarial databases are developed, the probability of insurance companies or dentists being driven out of business by inappropriate fee schedules decreases because of reduced surprises. Outcomes-based care decisions—using analysis of public or personal databases of the outcomes of various therapeutic interventions to guide treatment choice—makes both scientific and economic sense. In a very literal way, every sustained improvement in dental care, both generally and in each practitioner's office, is information based. Research is a formalized and sophisticated application of information. The wisdom of experience is the same thing on a personal basis.

Equipment is only one aspect of technology. Sometimes, greater improvement in efficiency, quality, and work satisfaction can be achieved by changing other parts of the technology mix, including better trained people and more effective scheduling and work procedures. Sometimes the money spent on new equipment is wasted—or can even damage productivity—if it is not carefully integrated into the mix of technology. The same thing can happen if one hires more talented individuals (one part of technology) without changing their job responsibilities (another part). As a general rule, the effectiveness of technology is partially determined by its capacity and partially determined by overall changes in the way work is done.

The most recent ADA *Survey of Dental Practice* reports that 93% of dentists have computers in their offices, used mostly for accounting and word processing. Five percent have intraoral video systems. During the next decade, the profession will be bombarded by a dazzling array of electronic technology. Dentists will be required to make choices of great complexity and significance. Information technology decisions will be difficult because the field is evolving rapidly and there are no clear standards; the expenses can be large; choices will involve how one connects with the rest of the world; dental training does not prepare individuals for these choices; and the correct choices will involve large-scale changes in the way dentistry is performed. Dentists will have to go to school on this question.

The selection of new dental technology for the dental office, especially electronic technology, cannot be made on the basis of the features and capacity of technology itself. The following is the best selection criteria: Alternative A is the way the office is organized currently. Alternative B is the way the office can be reorganized if the new piece of technology under consideration were added and appropriate adjustments made. Alternative C is the way the office would be organized if the same amount of time and money required to purchase and install the new technology were spent making any other improvement in the office. Selection criteria: Which alternative (A, B, or C) adds the greatest value to the practice measured in terms of patients' oral health?

The information revolution is more than adding another technique to the armamentarium. It is a change in focus. We must get used to looking at the pattern of things rather than the things themselves. This was recognized by the Taoists in China almost three thousand years ago. "Thirty spokes share one hub. Adapt the space therein to the purpose in hand, and you will have the use of the cart."

David W. Chambers