Chapter 2
Using Digital Technology to Enhance Medical Education and Improve the Quality of Patient Care in a Changing Global Healthcare System

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ABSTRACT

The use of digital technology as an effective method of educating the emerging generation of physicians and improving the quality of services that patients receive has become an expanding trend in recent decades. The application of alternative methods of instruction in higher education, such as online degree courses, learning apps on smartphones, and computer-generated virtual reality models that simulate actual clinical situations, combined with frequent use of digital assessment tools, have made diagnosis and treatment of medical conditions online more precise and less time-consuming. These technological breakthroughs have redefined the roles of providers and patients across the spectrum of care. This chapter will present a comprehensive analysis of the beneficial impact that digital technology is having on medical education and the delivery of healthcare services to patients. It will examine how incorporating technological advances such as telemedicine is changing the dynamic of patient care and transforming healthcare systems globally.

TECHNOLOGY IN MEDICAL EDUCATION AND CLINICAL TRAINING

In recent decades, the rapid expansion of various types of digital technology at hospitals and ambulatory care centers around the United States has facilitated significant changes in how physicians and other primary care professionals are trained and how patient services are delivered across the spectrum of medical specialties. Incorporating the advantages of technology as an essential part of the educational

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process is opening doors to a wide range of instructional possibilities for medical school faculty who want to share their accumulated knowledge and clinical expertise with a growing global audience of medical students, interns, and residents who will become the next generation of practicing physicians. During periods of national crisis, such as that which occurred after the September 11, 2001, terrorist attack on the United States, medical schools and other institutions of higher education have sought to protect the safety of their students and faculty by transitioning their in-house instructional and training programs to online access in response to these catastrophic circumstances. The COVID-19 global pandemic fostered a similar reaction from medical institutions across the country, seeking to find remote venues to educate and train students while protecting them from this deadly disease. A joint study conducted by Professor of Psychiatry and Medical Education Jacob Appel and his third and fourth-year medical students at Mount Sinai School of Medicine, published in *Academic Medicine* in 2020, provides evidence supporting the efficacy of this approach to medical education and training. Data analysis indicates that implementing restrictive COVID-19 policies is one of the primary factors fueling the exponential growth of remote education and training programs for medical students using the distance learning approach known as telemedicine. The analysis revealed that using telemedicine platforms in medical education effectively facilitates the acquisition of basic medical knowledge and helps improve students' decision-making skills. For example, the research confirmed that using technology-assisted techniques such as three-dimensional computer-generated simulation models greatly enhances medical students' ability to absorb and understand essential human anatomy and physiology knowledge. The study disclosed that incorporating technological innovations such as video conferencing into the academic curriculum of medical institutions is a highly effective method of fostering the sharing of case discussions, short instructional presentations, and real-time case evaluations with students studying medicine at educational institutions located in underserved countries where access to knowledge about the benefits of remote care would otherwise be unavailable. The investigation also showed that technology-assisted simulation is a highly effective tool instructors can use to improve students' clinical assessment and diagnostic capabilities through engagement in virtual situations that mirror actual crisis events they will encounter when they become physicians

Based on these findings, Dr. Appel and his team concluded that incorporating telemedicine-based instructional methods such as remote lectures, online examinations, and computer-assisted preclinical skills training has significant positive benefits for fourth-year medical students who want to complete their studies at an accelerated pace. The investigators contend that integrating remote methods of instruction into the traditional medical school curriculum accelerates the process of academic learning, allowing more medical students to graduate early and enter hospital-based internship and residency programs where they will learn the applied knowledge and gain the practical experience necessary to become board-certified service providers (Appel et al., 2020).

Similar outcomes in other studies affirm the positive effects of technology-assisted instruction on medical education. Research by Professor Phyllis A. Guze of the University of California School of Medicine documented in a 2015 article in Transactions of the American Clinical and Climatological Association online posits that the expanding trend toward the use of digital learning techniques in medical education is a direct response to changing social and economic conditions taking place within the infrastructure of healthcare institutions across the United States and abroad. Dr. Guze argues that such internal changes at all levels of the U.S. healthcare system create a broad set of new educational challenges for medical school faculty that must be addressed effectively through technological intervention. Dr. Guze points to several critical factors as responsible for mitigating this emerging trend; key among