# Medical Education in the 21st Century

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## INTRODUCTION

As with many disciplines, the fields of healthcare in general and medicine, in particular, have made vast strides in improving patient outcomes and healthcare delivery. But, have healthcare professionals and medical academia been able to maximize the utilization of new technologies to improve the delivery of the right knowledge, to the right people, at the right time across geographical boundaries? In order to provide the best quality of care, regardless of patient or provider location, specific issues must be addressed.

Healthcare consumers and providers recognize that the system is often over worked, time constrained, poorly funded and desperately in need of a means to maintain up-to-date knowledge and efficient skills in order to deliver the best quality of care (Health Canada, 1998). We also know that there is a large disparity in both the quality and types of healthcare available between developed and developing countries (Lown, Bukuchi & Xavier, 1998). Within a single country there are also differences in healthcare services based upon location (rural vs. urban areas), wealth, age, gender and a host of other factors (Health Canada, 2004). However, because Information and Communication Technologies (ICT) can be a simple and cost effective tool, it can make desperately needed medical knowledge available to developing countries (Pakenham-Walsh, Smith & Priestly, 1997). Furthermore, it is becoming more difficult to get physicians and extended healthcare professionals to participate in face-to-face seminars in order to learn about the progress and changes in the delivery of healthcare. Time, travel requirements and cost are the biggest barriers to overcome. For rural areas and developing countries these issues are even more evident (Ernst and Young, 1998). Today, many institutions and countries are exploring and implementing ICT solutions to help reduce these inequities. The fact remains however that in the case of developing countries, a critical shortage of healthcare professionals remains (Fraser and McGrath, 2000). Adding to the problem is the fact that the telecommunications network, the backbone of ICT, in Africa is the least developed in the world (Coeur de Roy, 1997)

This article concentrates on two main aspects of ICT. First, it examines ways in which ICT can assist in information and knowledge transfer and second, it explores the challenges of ICT implementation.

## ICT AND ITS ROLE IN MEDICAL EDUCATION

Providing the right medical knowledge and training to healthcare professionals can be a challenge in the best of circumstances. In developing countries dissemination of the best clinical practice protocols at an affordable cost regardless of the location of the targeted audience is even more daunting. While technology such as CD-ROM-based learning can be tremendously efficient in helping medical students learn fast and well, there may be a lack of individual access to the necessary infrastructure such as equipment and power. In these cases the material is often used in classrooms and the goal of facilitating individual learning and allowing students to go at their own pace may not be met (Pakenham-Walsh, 2003). It is important to keep in mind that even developed countries have, in spite of relatively easy access to the necessary technology, difficulties in properly managing its introduction and use in medical schools (Greenhalgh, 2001).

Tele-education can help in reaching remote communities in developing countries. However, in many regions, technological compatibility and training remain a challenge (Pakenham-Walsh, 2003). The birth of the

Internet, in spite of its many imperfections, has dramatically changed the way information, communication and learning are delivered. Although there still exists an imbalance (Davison, Harris, Vogel & Vreede, 1999), in many ways the Internet Age can reduce the gap between developed and developing countries in terms of access to all types of information (United Nations ICT Task Force-1, 2004). While the full potential of the Internet as an ICT tool has yet to be defined it does allow access to information at a speed, quality, and cost previously unseen and defies the notion of geographical boundaries. The Internet allows access to medical information through online articles, video presentations, videoconferences, e-mail-based information and communication. Today, a medical student or healthcare practitioner in India, Africa or any developing country can gain access to the latest medical information from around the world. This new reality has set the foundation for a truly worldwide medical and healthcare community of practice. However, the lack of technological infrastructure and training in developing countries can affect the delivery and use of this health care information (Lown et al., 1998).

As mentioned earlier, users of ICT in the healthcare field face many challenges. Yet despite these challenges, we are at the beginning of a marvelous adventure that has the potential to create a healthcare arena for all with unrestricted access to information and knowledge for practitioners around the world. While this could be viewed by some as simple, utopian rhetoric, the group "Doctors without Borders (Medecins sans Frontières)" already demonstrates the willingness of medical communities to create a vast exchange of information and knowledge (Orbinski, 2000). The term "doctors without borders" captures the spirit of the new world order and sets the future stage for sharing healthcare information. This growing global community of healthcare workers may bring about the desperately needed improvement in the availability of healthcare information around the world (Jareg & Kaseje, 1998).

Despite the great potential, we need to both understand and address the limitations of ICT as a tool in the acquisition and transfer of information and knowledge. The Achilles' heel of the ICT user is not, in our opinion, in terms of access to information, but rather in terms of prior training in healthcare, possession of the necessary technical skills, and an efficient infrastructure (United Nations ICT Task Force-2, 2004). These are the basic requirements in understanding and transforming the rich information that is available into meaningful and useful medical knowledge. When the introduction of ICT is paired with proper access and training, it can lead to the successful creation of a community ready, willing and able to use the ICT to its fullest extent possible (United Nations ICT Task Force-2, 2004).

While such a community can create, share and apply important healthcare knowledge on a wide range of issues, it has to be done accurately and in a timely manner in order to be beneficial (Using ICT to Empower Communities, 2003).

An additional benefit of ICT is the degree to which it can help reduce the sense of isolation often felt by healthcare professionals, especially in rural areas. As a result, staff morale can be improved (Using ICT to Empower Communities, 2003; Ballantyne, 2003).

At this point, the question arises: Can a viable knowledge community exist through the use of ICT?

Before answering, one must differentiate between ICT as a tool on the one hand and the knowledge it can help foster and transfer across boundaries on the other hand. Unlike Marshall McLuhan, who stated that the medium was the message (McLuhan, 1994), we say that ICT is not the knowledge, but only its channel.

## FOSTERING A KNOWLEDGE COMMUNITY

Up until now we have discussed the use of ICT as a method of sharing information and knowledge. However, there are conflicting opinions regarding the differences between information and knowledge and the transferability of knowledge (Wilson, 2002).

## Exploring the Definition of Knowledge

What is knowledge? How can it be defined? These questions have been posed for thousands of years and answered with varying degrees of clarity. Plato described knowledge as justified true belief. Other definitions have been as simple and direct as what we know (Wilson, 2002), or as detailed as a mix of experience, values, information and insights that are applied in the minds of individuals as well as embedded in organizations (Davenport & Prusak, 2000).

Related to knowledge, but not interchangeable, are data and information. Although they are sometimes used interchangeably with each other and with knowledge, they are different. Data is considered the most basic level of discrete facts. Information is more sophisticated than data in that it is a set of related facts. Both data and information, while important, are not knowledge. They generally have no meaning attached to them and they are much more likely to be objectively measured and agreed upon by those preparing and using them. They are also likely to be more generally available than knowledge.

While related to each other, these three concepts are

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