

# Internet-based Approach to Continuing Medical Education in Developing Regions

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Video and Internet technologies offer, as never before, fresh fields for medical education over long distances and demanding environments. Until the 1990s, for most practical applications, someone had to get on a plane to fly to a conference, hold a lecture, or demonstrate a procedure; today we send electrons instead of people, and medical education can arrive by video not only by Airbus.

Medical knowledge delivered electronically has many virtues. Not only is it less costly, it also leaps across hostile environments and locations otherwise difficult to reach. Indeed, if the WiRED experience during the past few years in Iraq, Kosovo, and elsewhere proved one thing, it is the advantage of IT-based healthcare education in difficult settings.

Cheaper, safer, and faster, live programming allows for a far greater number of participants. With hundreds of trainers, we can reach thousands of physicians and nurses, from wide geographic regions, in distant medical communities. The scope is almost without limits. We can address all medical specialties, involve the most respected medical educators, cover topics in great depth, and allow receiving physicians to select material that is both relevant and at a level appropriate to their knowledge and skills.

## **Two Delivery Approaches: Examining Their Advantages and Disadvantages**

The WiRED experiences in telemedicine from the Middle East, the Balkans, and Central America have a common thread: long- distance education involving two delivery approaches. They are 1) live sessions via video conferencing, and 2) stored material via the Internet coupled with live down streaming and up-stream chat.

### **1. Live, Large Format Video Sessions**

Large format live sessions (Video Conferencing or VTC), popular since the mid-1990s, can connect large numbers of people typically gathered in lecture halls. These systems usually involve sophisticated cameras and a lot of costly bandwidth. Because the VTC sessions collect participants in a single location at a prescribed time, they must be carefully arranged well in advance. Operating these sessions requires a fair amount of coordination. Hosting the VTC facilities and running the sessions must have administrative endorsement and support. This is often a weak link in many developing regions where VTC programs suffer from ineffectual and unfocused central administrations.

Advocates for the VTC approach are often drawn to the appearance of two rooms full of people connected by a video bridge. No question, these sessions often make striking photographs, casting the appearance of colleagues working hand-in-hand across the miles. The pictures, however, are often more compelling than is the educational value of video sessions. Yes, people can see and hear each other in real time, but the burdens imposed by arranging and attending these sessions often outweigh their usefulness. Moreover, as a key communication tool in a recurring Continuing Medical Education program, they run into serious problems.

**Time zone differences often make scheduling difficult.** In the Middle East, for instance, the 8- to 11- hour difference with the United States requires people on one side of the video link or the other to arrive very early or to stay very late. Security conditions in some locations require doctors to be home, behind locked doors before dusk, imposing even tighter time restrictions. For recurring sessions, the inconveniences become significant; they can even halt a program.

**Access to video equipment for live sessions can be problematic.** In our sessions between San Francisco and Baghdad, for instance, doctors in Iraq have to be in a single location (Medical City Center). This is difficult for doctors in Baghdad, a sprawling, congested and sometimes dangerous city, and nearly impossible for doctors outside the city.

Given the cost of equipment and connectivity, the number of working sites is small, restricting access to all but limited audiences, and these are almost always in major cities. Meanwhile, more than 95 percent of medical professionals remain out of “live” reach simply because they are not near a video conferencing facility, or are unable to travel to one, given pressing schedules and travel conditions.

**Live sessions are ephemeral** – they disappear the moment they conclude. Someone with a schedule conflict, or who shows up late, or who lives outside key cities will miss the session.

**Feedback is immediate, but restricted.** Advocates argue that because interactions are immediate and visual, feedback in a video conference is ideal. While these features are appealing, they don’t ensure an optimal exchange. Why? For one, in group settings, the vocal few often monopolize discussion, eclipsing the input of others. For another, once the group sets an agenda other important topics become buried by a few items that preoccupy the discussion. Compounding these problems is an inevitable time limitation that restrains participants from engaging in a thorough exchange.

Despite their virtues of interactivity, spontaneity, and audience involvement, live video conference sessions are not the most effective and efficient approach to sustaining medical education, especially in developing and war-affected regions.

## **2. Stored content with live video streaming**

Stored content is almost the equal and opposite of live video conferences. Stored material does not permit instant feedback, the audience cannot ask questions and register its views, and the speaker cannot benefit from immediate audience reaction. That said, these inadequacies are reduced or eliminated by live streaming and other IT feedback tools now available. Before looking at these tools, let’s consider the variety of types of stored material.

**By stored content, we mean digitally recorded lectures, seminars, and grand rounds.**

Any session that can be delivered live can be recorded and archived. The recordings can then be indexed (by topic, key terms, words spoken in a lecture), and made searchable and available for downloading or streaming. Think of it as a Medical Education YouTube with a few extra bells and whistles.

**By stored content, we mean self-pacing tutorials, such as PowerPoint presentations.** Topical outlines, graphic images, photographs and other visual elements allow users to study the lessons at a time and in a place convenient to them. Moreover, adding voice and audio extends the capacity and the interest of this educational tool.

**By stored content, we also mean electronic “print.”** One of the best examples is the World Health Organization’s HINARI database of biomedical journals and textbooks, available to doctors throughout the developing world. This extraordinarily rich archive of medical knowledge allows qualifying institutions to access the most current editions—and previous editions—of leading journals from around the world in multiple languages.

In addition to HINARI, doctors can access a number of other collections containing journals, books, monographs, research archives, tutorials, and raw empirical databases. They can systematically search this material as conveniently in Kirkuk as in Kansas City, in Baghdad as in Boston. The point: Distance no longer imposes isolation from resources once trapped on paper; electronic delivery removes the barriers. Access requires Internet connections, but these are far easier to provide and less costly than high-end video links. Accordingly, for the same amount of money, we can outfit a greater number of Internet access sites than we can video conferencing centers.

## **Stored Content – Whether Digitally Recorded Video or Electronic “Print” – Offers Many Other Advantages.**

**Stored content provides the capacity to join a variety of formats into a high-impact curriculum.** For instance, journal articles, book chapters, and PowerPoint tutorials can be linked with video lectures and organized through connective discussions packaged as a complete course. Research data and study guides can be joined with Websites to prepare doctors for illness outbreaks, epidemics and other public health issues.

Recently in Kirkuk, we provided access to readings and tutorials in preparation for video conferences that readied doctors for an impending cholera outbreak. These study tools enabled doctors in Kirkuk to acquire the background knowledge necessary to obtain the most value from live video sessions that followed. They allowed doctors and medical students to access the information where and when they found it convenient. For stored programs, in general, the readings, lectures, study guides, and other resources are mutually supportive, approaching the subject through a variety of formats.

**Stored content opens access beyond the cities where video conference facilities are located.** Any doctor with Internet access (and remember Internet access is easier to provide than VTC access) can participate in the program. They do not need to be in a particular seat at an inconvenient hour, but can study the readings and view the videos from any place at any time they choose.

**Stored content allows physicians to pursue a range of interests.** With live VTC video conferences, only physicians in relevant specialties are likely to attend. A lecture on psychiatry will be of limited interest to a gastroenterologist; a lecture on dermatology is unlikely to attract many pediatric cardiologists. The stored material, by contrast, allows physicians to pursue their interests—in their own fields or in others.

*The point here is simply that a stored program serves a larger audience and has a greater potential impact because it expands the audience by geography, time of day, and medical interest. Whereas a lecture can reach a few dozen doctors for an hour, a stored program can reach many thousands every day with a wealth of material.*

### **Maximizing Feedback and Interaction of Stored Content**

We pointed out earlier that a practical weakness of the stored program is its lack of capacity for audience/speaker interaction. (Even VTC video conferences allow only limited interaction.) Doctors cannot interact with a digitally recorded video, but adding live streaming with instant feedback capabilities, brings us very close to a genuine face-to-face exchange. Thus, we address one of the shortcomings of a stored program by building in live interactions between lecturers and participants.

Like VTC conferences, the live video streaming—sometimes referred to as a Webinar--

allows participants to view a lecture as it happens. The difference is that live streaming takes place on the Internet and not in a large lecture hall. We know the drawbacks of assembling large audiences for a video conference. The benefits of Internet-delivered live lectures is that doctors in the remotest regions need only Internet access to participate. They can sit at home or in an hospital-based Internet facility to engage in the live session.

But what about feedback? When we join the live stream with live chat and other up-line tools, we close the loop. The lecturer in, say London, will be seen live on line. The receivers anywhere in the world, with the click of a mouse, can engage in interactive chat (video or voice) through which they can send questions and comments—while the lecture is ongoing or during the Q&A session. Moreover, the chat allows participants from around the world to meet in one location for a virtual discussion with the lecturer. And, for those who cannot attend, we can record the entire exchange, and post it for later viewing. Email and other means of exchange permit the discussion to continue.

Consider this scenario: Each month (or week, it doesn't matter), we feature a medical topic, including appropriate stored videos, readings, and study material. This material is highlighted for example, from August 1-15, during which time participants are encouraged to study or review the readings and videos.

On the following week (August 18, 19, and 20), from 9:00 a.m. to noon, we will provide a content expert, via live streaming, to answer questions and engage in a discussions with clinicians who have studied the stored material. The live video image of the lecturer would be available to participants around the world; the participants could engage by way of video, voice or live chat, depending on the number of participants in the exchange.

This approach offers a constructive feedback channel, it's accessible from anywhere, and it requires minimal equipment. Moreover, it allows highly effective and productive interchanges among subject experts and professionals in the field.

There is reasonable expectation that audience members will have studied the material beforehand and formed more thoughtful questions than they might form on the fly in a live video conference. Whereas the live video conference typically limits interaction to 15 or 20 minutes, on-line interaction permits hours. Furthermore, with the potential for

even larger audiences, we might anticipate a richer information exchange as more people participate in the discussion.

Of course, other feedback opportunities are available including traditional email, VOIP telephone conversations (e.g., Skype) and Webcam discussions. If we discover a sustaining interest in a given topic, we can easily open another discussion session or chat room to allow wider audience participation. In response, we also can prepare additional video and text material for further study.

So, while many people have favored large format VTC sessions because, they believe, the “face-to-face” sessions permit the richest feedback, recent developments in on-line streaming and instant message exchange (text, video or voice) trump that argument. In fact, on-line approaches offer greater opportunities for information exchange among participants. The feedback is every bit as rich; it permits live images and voice, opens other feedback channels (email, discussion groups, chat), expands the time frame for exchanges and accommodates a larger number of participants.

#### **Final thoughts: A Large VTC Program Requires Administrative Support**

Whereas a Continuing Medical Education program using stored and live streaming formats can function without strong administrative support within the host country, a live VTC-based program, requires the backing of a central health ministry or medical specialty association. Both programs benefit from official support, but the VTC program requires it. This issue is addressed in this final section.

The most important element for success of a live content video program (VTC) isn't hardware or connectivity or even content from a reputable medical school. The most important element is support from an administrative body. Without backing from the government or other credentialing agency, a VTC program cannot succeed. Providing video program tools without administrative leadership is like pushing a rope. An authoritative agency must support, encourage and even require participation. It must provide for the equipment and a meeting place, schedule and coordinate events, and recruit clinicians into the CME program. Outsiders can provide equipment, buy bandwidth, and construct medical curricula, but administrative support in the host country is critical for success.

Generally, institutional support for a live content program begins at the national level where decisions about credentialing, public health policy, and the overall direction for medical study takes place. A health minister's direction for continuing medical education and continuing professional development has a direct impact on how training programs—and video conferencing and other IT programs—operate. The minister's mandates for training programs affect local decisions about medical curricula, including the video conferencing program. This is especially true for live, centralized training.

A stored content program with live streaming also benefits greatly from institutional support, but it does not require it. Because communication equipment—computers with Internet connections-- is widely available, any physician, on his or her own initiative, can participate. Intrinsic motivations, such as a physician's personal interest in professional development and a desire to know and practice the most advanced medicine possible, are enough to engage many clinicians. Stored programs with live streaming allow a physician to participate using personal equipment, at a convenient time, studying preferred topics without the need for complicated logistics of a large VTC program.

Consequently, In locations with weak health ministries and medical school administrations, an on-line-based CME system may be the only effective approach to CME study. Doctors with sufficient interest in their own skills development can pursue medical study directly from the outside. Continuing Medical education, therefore, is not at the mercy of a dysfunctional administrative system.