The Potential Of Technology In Health Education: In Recognition Of The First HEDIR Award

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The HEDIR Award: Sponsored By Jones and Bartlett Publishers.

Robert S. Gold was awarded the first annual HEDIR Award during the 1997 American Public Health Association's national conference. Dr. Gold was selected from the HEDIR subscribers from among four other candidates. The Awards Luncheon was sponsored by Jones and Bartlett Publishers. This is an article based on Dr. Gold's presentation.

It is a great pleasure, indeed, to be the first recipient of the HEDIR award. I am thrilled to be here today to share with you some thoughts about where technology and health education have, and will continue to cross paths. As Green (1983) has stated:

> *The World Health Organization has made 'technology transfer' and 'health education' two of the pillars of its global strategy of 'Health for All by the Year 2000.' But its caveat with respect to technology transfer is that the transfer must involve 'appropriate technology', meaning technology that can be applied and managed locally to analyze and solve a people's own health problems. The caveat with respect to health education is that it must involve and enable people to take control of the determinants of their own health. These, then, are the challenges for computer applications in health today.*

When thinking about the use of technology in health education, I prefer to use the term communications technologies. Since this is such a broad term, it is important as a first step to define exactly what kinds of technology are encompassed by this term. This is no easy task given that technologies are rapidly emerging and converging. However, many see communications technology as the focal point of three now converging areas**C**computing, information systems, and telecommunications. As Waterworth (1992) writes:

> *". . . systems that integrate these three powerful elements will have an impact on daily life more than equivalent to that of the introduction of telephones, television, and computer games combined into one. Application areas such as education, cooperative work, authoring, entertainment, military command and control, information access, and ideas generation will all benefit from these developments."*

Given the caveats referred to earlier by Green, rather than tie our thinking to specific technologies, we should instead define technology broadly. The term technology is often incorrectly used as synonymous with cutting edge computer and other electronic technologies, when, in fact, technology is any effective strategy used to accomplish a specific goal.

Technology applications in health education are the media through which our strategies are applied, and include the full range of hardware and software for education, training, and learning. These include print based media (e.g., pamphlets and other printed materials), audio media (e.g., audiotape), visual media (e.g., videotape, graphics, pictures, slides), electronic media (e.g., interactive computer programs), as well as hypermedia, multimedia, and web-based the technologies that now permit the merging of these various media. At this time, we can call these *communications technologies*.

The potential of health education to successfully apply communications technologies presupposes recognition of two issues:

- The importance of the appropriate application of technology and the science bases in the fields of concern;
- The importance of understanding behavior change theory, learning theory, and instructional technology science bases;

The key to a successful application of modern communications technologies stems from the capacity to meld these science bases with professional practice principles and guidelines for instructional technology and communications.

Milestones

There are two driving forces that guide my thinking about the design and use of communications technologies in health education. First, many of you are familiar with the name Stephen Hawking, a brilliant theoretical physicist. Stephen Hawking has authored ***A Brief History in Time***, a book that has for many, simplified some of the most difficult concepts

of physics. It is thought by many that Hawking may be one of the few capable of breaking through to a super-set theory of physics that bridges the gap between relativity and quantum mechanics. This super-set theory is essential if we are to predict with greater precision the behavior of both microscopic and macroscopic objects in the universe. Yet Stephen Hawking has ALS - Lou Gerhig's disease. He has not been able to communicate other than through speech generated via his computer for several years. He crafts words with a mouth stick on a keyboard. We should ask ourselves how Hawking's contributions to science would be made in the absence of communications technologies effectively applied. The larger tragedy emerges as we ask ourselves "How many others are trapped in a body that does not allow them to communicate to achieve their potential"? How many other Stephen Hawkings remain unfulfilled, and in their inability to achieve their potential, how much worse off are the remainder of us? Among them, how many would be "reached" with the appropriate application of technology? I am not asking only about those whose physical impairments may be the primary barrier, but also about those who live in poverty and squalor and are unreached as well.

Second, I am concerned when we compare ourselves to professionals whose practice skills affect the lives and health of others. No commercial airline pilot can fly a plane without demonstrating competence in simulators. The same is true of astronauts and others. Yet, we allow people to practice on communities all the time without demonstrating competence in a simulated, risk free environment. The potential is in our hands to build simulations that would allow health educators to train, practice, experiment, and demonstrate competence in an environment in which neither the health educator nor the population would be placed at risk. If we can create simulations of HIV/AIDS transmission, pollution control, and epidemic control, there is no reason we could not create a simulated community. The potential is extraordinary -- the payoff potentially momentous. Further, there is no reason that a credentialing exam, like the CHES, could not benefit from this kind of technology.

Basically it is not unreasonable to believe that:

Communities and their populations can be modeled.

Enabling technologies are available that allow us to develop sophisticated educational, training, simulations and other interventions, as well as research based applications.

There are many potential benefits of these technologies, interventions and products.

For more than10 years, Mike McDonald, one of our visionaries has been saying:

The dominant training and educational media strategies today, and electronic media (e.g., tv, radio) are insufficient to accommodate the full potential of today's marketplace.

If we are to . . .

motivate ever larger numbers to achieve their potential

deliver and track our efforts to remote and diverse populations

build societal databases that allow us to monitor the multiplicity of factors that determine the capacity and productivity of individuals, families, communities, and nations

Then. . . *we must establish and act on a vision of a technology research and development paradigm that propels public health into its future of choice*.

To do this, we must invest in a complex, diverse, well organized technology research and development infrastructure that will ensure that this vision is realized.

Having laid the context, it is worth looking back at some of the milestones in health education that got us to this point. These certainly do not represent all of the critical events over the last 25 years, but those that affected my thinking most directly.

In 1970, William Zimmerli talked about adapting the technology of Computer Based Resource Units (CBRUs) to health education. At the time, few in health education could see the potential. With support from the state of New York, Zimmerli led a team of health educators in the process of converting the statewide health education curriculum, The Five Strands of Health Education, to CBRUs. This was not an attempt to provide interactive instruction to students, but rather to provide the ultimate in tailoring curricular materials to the characteristics of learners. It was leading edge technology -- unfortunately, it was also at least 15 years ahead of its time. It was not until the innovative work of Vic Strecher and colleagues,

and more recently with Matt Kreuter that the value of tailoring began to be appreciated, and the strategies for doing it better understood.

Van Cura (1975) and Slack (1977), with some innovative work in clinical settings demonstrated that individuals would interact with computers on very difficult, and sometimes sensitive issues. Computer-based interviewing systems and data collection on sensitive issues began with this work.

At the beginning of the 1980's, there was a health educator in Iowa who believed there was some potential for the use of communications technologies to improve health education. He set up a bulletin board with "real time" messaging capabilities. You could actually sit at a microcomputer (before the release of the IBM PC) and type a message that someone hundreds of miles away could see. Michael Pejscach was this person. His vision led to the creation of the Health Education Electronic Forum, which I believe was the first of its kind for health education.

At about the same time, I had the good fortune of working with David Duncan at Southern Illinois University. With our joint interest in the potential of computers in health education, we began to explore the benefits and constraints that such technology could provide (Gold & Duncan, 1980a, 1980b).

Concurrently, Ellis, Raines et al. (1981) were publishing in ***Preventive Medicine*** about the potential for using computers in clinic and other waiting rooms for health and patient education. This was among the earliest research that demonstrated the potential of interactive technology for patient education. Their research clearly demonstrated that patients enjoyed interacting with computers on matters related to their health.

One of the few health educators who has been able to sustain a body of work utilizing the potential that comes from communications technologies has been Darwin Dennison. The DINESystem (1982) was one of the first sophisticated dietary analysis systems available to health educators. It is based on innovative research that provided structure to dietary analysis, and a reporting system that was based on user needs and effective health education strategies.

In 1983, the National Health Information Clearinghouse produced the first of three HEALTHFINDERS, or information packages on computer applications in health education. These publications were the result of Glen Gilbert's interest, and Michael McGinnis's support through the U. S. Office of Disease Prevention and Health Promotion. The first was a list of computer software for health promotion, the second described computer health-risk appraisals, and the third provided sources of on-line information for health educators.

In that same year the journal, *Health Education*, a publication of the **Association for the Advancement of Health Education,** was entirely devoted to the topic of microcomputer applications in health education (14(6), 1983). Buzz Pruitt's vision, and Glen Gilbert's support provided an opportunity for health educators to describe how they were using this "fledgling" technology at the time.

A substantive body of work in expert systems technology has helped shape some exciting new avenues for health educators. Largely growing out of the work of Miller (1982), Ozbolt (1982), and Shortliffe (1986), we began to see the potential for expert systems to provide support for professionals dealing with complex health problems. Though their work was principally clinical in nature, it provided a new avenue for research and development. This potential, coupled with the creativity of Larry Green and Marshall Kreuter resulted in our later development of EMPOWER -- a decision support system for planning community based interventions based on the PRECEDE / PROCEED model.

One of the first comprehensive health education programs provided on computers was the Body Awareness Resource Network (BARN) -- largely the work of Bosworth, Chenowith, Gustafson, Hawkins, and others (1987). This series of programs for middle school students used interactive instruction, simulation, gaming and other strategies in ways that had not been done before. Perhaps more importantly, they also systemmatically evaluated the impact of these technologies.

My first recollection of a health educator calling for computer literacy training for all health educators was Ernie Randolfi and colleagues (1986a, 1986b) at the University of Oregon. While this still has not occurred, we are finding a great many such opportunities now at institutions training health educators.

Barry Portnoy, and later D. Michael Anderson helped demonstrate how the Federal Government could support such efforts. Portnoy initiated, and Anderson expanded a portfolio of substantive research and development through the National Cancer Institute's Small Business Innovative Research Grant Program. At one point, more than 60 concurrent SBIR projects were in development with direct applicability to health educators. It was this program that provided

the initial funding for the development of EMPOWER.

Gustafson and colleagues have been able to show with their work on CHESS, the potential for building communities of social support in a virtual environment. Beginning with HIV / AIDS and now expanding to other health issues, they have been able to demonstrate how such communities could provide support on demand -- a vital element to the work we do.

Finally, I'd like to congratulate Mark Kittleson. His work in creating and fostering the International Health Educators Listserv (HEDIR) and all its incarnations has resulted in a communications forum unlike any we have had as health educators. On a daily basis, health educators around the world are able to share ideas and inspirations on a wide range of subjects. While not the only listserv devoted to content of interest to health educators, it is perhaps the only one whose focus is health education from a professional perspective.

Communications Technology

Recent trends in health education interventions and training methods suggest that there are many potential benefits to be derived from the appropriate application of communications technologies. Among the strengths of advanced communications technologies is their ability to store and retrieve enormous quantities and types of data, reliability, connectivity and ability to be networked in many ways. This is taken in the context of several potential difficulties for health education. Communications technologies come at a cost that is beyond the reach of some, they lack native intelligence and are unable to react to the moods of users as a human would. There remains some potential for invasion of privacy and a threat of dehumanization. Further, there are some concerns about barriers to access to these technologies for some populations.

What must drive our use of technology, both its development and deployment, is a commitment to multidisciplinary, multiprofessional, and multiorganizational development and evaluation teams; whose efforts revolve around the appropriate application of communications technologies, which are designed to allow us to understand and deliver effective interventions regardless of the complexity with which human communities operate.

I would like to close my presentation today with a brief description of an exciting new project. This project uses the potential of communications technologies to foster collaboration on community-wide efforts to promote improved quality of life. The application is called the Outcomes Toolkit, but the project is called Accelerating Community Transformation. This is a five-year applied research project, with The Healthcare Forum of San Francisco taking the lead with funding support from Astra-Merck Pharaceuticals.

ACT Toolkit - A Prototype Application

The Accelerating Community Transformation Project (ACT) is a major effort to evaluate community-wide efforts to improve the quality of life in a community, and determine how these efforts can be accelerated. The focus of ACT is to work with cross-sectoral leaders to rethink the ways that health education and health services are currently conceived and delivered. Participants in the ACT Project explore ways to move beyond current delivery systems, creating new models explicitly intended to improve the health and well-being of the communities they serve. The centerpiece of the ACT initiative is the Healthier Communities Outcomes Toolkit. ACT communities are serving as a principal co-designers and recipients the Outcomes Toolkit. The Toolkit is being developed collaboratively with ACT communities as well as with leaders representing approximately 20 additional communities from around the country.

Why a Healthier Communities Outcome Toolkit?

To grow and sustain community development efforts, requires the ability to demonstrate to participants, funders, and community members that these efforts are achieving measurable improvements. The Toolkit includes an array of indicators, strategies and tools to enable cross-sectoral coalitions to monitor and adjust their efforts to improve quality of life. It will provide coalition members with an ability to communicate strategies and progress to a wide range of community members.

Communities select specific indicators that represent key goals. The aggregate of these indicators reflects the overall community vision. Using these indicators, each community will target objectives for the year 2001. They will be also be tracking yearly progress toward these five-year goals through the Toolkit.

A Co-Development Process In Creating the Outcomes Toolkit

While we began the development process with some broad objectives established for the Toolkit, this is a work in progress. We anticipate that the development process for the Toolkit will have taken

approximately 18 months -- and each community's participation was essential to its success. We anticipate full deployment of the Toolkit by June of 1998 in the ACT communities. The full Co-Design Team is composed of Healthcare Forum staff, along with Macro International Inc. staff. But, at several points in time over these 18 months, each community's site coordinator, steering committee and other leaders and stakeholders participated in the design and testing of the Toolkit by providing information and feedback on the following developmental steps:.

designing the overall framework for the Toolkit;
developing a menu of indicators;
determining the feasibility of data collection methods;
determining the type of reports / analyses required;
adding best practices; and
alpha and beta testing the toolkit.

In the end, we see the Outcomes Toolkit as a . . .

performance-based planning tool that contains an array of indicators, strategies and tools that facilitate the active and systematic engagement of communities in defining and dealing equitably and intersectorally with their health issues and concerns. It should also enable communications among all levels and types of communities.

The ACT Toolkit is a 32-bit "web-connected" application designed to run on Windows 95 compatible computers. For full functionality, each user machine must be running Windows 95 and have access to the World Wide Web either by modem or direct connection. The Toolkit has been designed with three different viewing windows, called "Views." These views are described here and illustrated in subsequent pages.

The Community Profile View

The Community Profile View is a window into each community's database of information. As work is done in each community, and data are gathered and entered into the Toolkit, a community profile is built. This View is a direct pathway to that databas (see Figure 1).

The Communications Gateway and Technical Assistance View

The Communication Gateway and Technical Assistance View is a window into the World Wide Web. This is an active window that permits Web-based communications and information exchange, as well as access to other information relevant to the ACT project (See Figure 2). Decision support strategies and technical assistance are also available through this view.

The Action View

The Action View is the primary work window for the Toolkit (See Figure 3). This is where the user will create and enter information and data, maintain the community profile, and generate analyses of data and reports.

Summary

There is much that lies ahead of us while we explore ways to effectively and appropriately utilize advanced health communications technologies. We also stand on some broad shoulders. Given the context of:

a favorable atmosphere for development of technology infrastructure;

growing recognition of the importance of alternative technology based solutions to human problems, needs and interests; and,

the philosophical guideposts provided by public health education traditions and vision;

. . . it is an opportune time to examine new and even more effective ways to apply communications technologies to catalyze, instigate, guide, support, and monitor our progress.

Imagine an array of strategies and tools that facilitate the active and systematic engagement of communities in defining and dealing equitably and intersectorally with their real issues and concerns.

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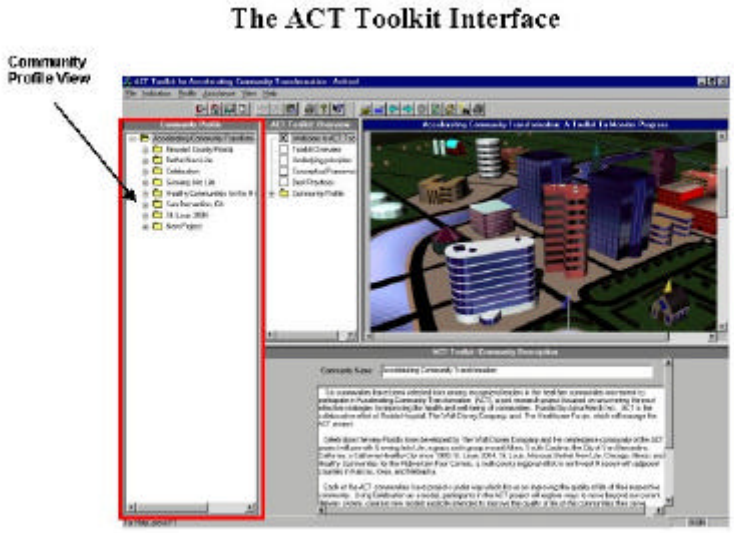

Figure 1 Community Profile View

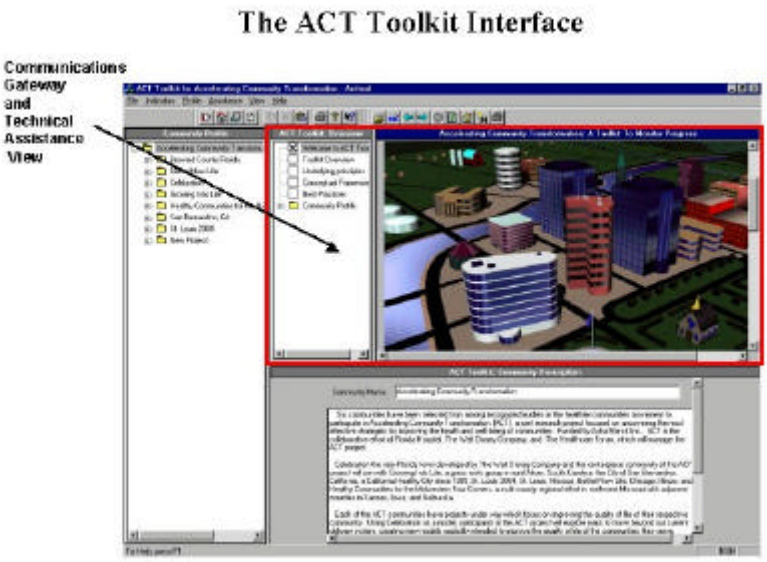

Figure 2 Technical Assistance View

The ACT Toolkit Interface

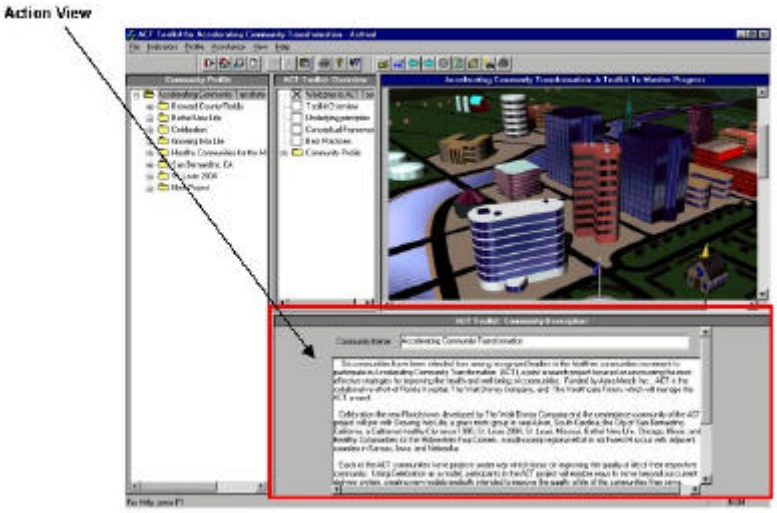

Figure 3 Action View

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