# Technology and Nutrition Education

**Betsy Haughton, EdD, RD, LDN**
**Associate Professor and Director,**
**Public Health Nutrition, University of Tennessee**

## Introduction

We are a technology-paced society. I've always thought that I was, not necessarily an innovator, but I was at least an early adopter. This topic is on technology and nutrition education and I was asked to speak on it at about the time I began to think I was a real laggard. The experience was this. I teach at the University of Tennessee. I get older and my students stay the same. They don't age. I am known for carrying a little calendar with a rubber band around it. It has my pens in it and my week-at-a-glance. It's an academic year calendar. I'm a longer-term planner thinking in terms of semesters and I have everything there. I have done this since 1983. Recently I was meeting with a student and we needed to set an appointment up, and I pulled out my calendar with a rubber band around it and my student pulled out the palm pilot. I thought, "Oh boy, this is the beginning of the dinosaur age for Betsy." But I thought, "Oh, this person is an innovator." The very next student did the exact same thing. And the third student that came in was not an undergraduate. I thought, "Well, this is a unique undergraduate thing." It was one of my students, a public health nutrition student. She said, "Listen, I need to show you something. I have a handheld PC. I can hook it up to this little keyboard." She pulls it out. It's all folded up and I thought, "Okay, where do I get one?" So I am in the midst of trying to learn how to use my handheld PC, and I tell you this story because I'm going to conclude today's talk with the caution that just because we have something it doesn't mean it's the right thing to do because I'm realizing as I use my little handheld PC and try to use the calendaring system that my way of organizing my work and my life has to change because I can't open up a page to see not only that something is booked, but what it is. The concentration that some things require on some days is very different than another, and I can note this on my paper calendar. I can't do that with this PC. So I'm not sure it's going to work for me, but I can pull mine out now when I meet with my students.

## Technology and Nutrition Education

So the topic is technology and nutrition education. I'd to talk a bit about information and technology, to give some examples and then to conclude with what I think are some of the issues. There is a folk song that some of us in the room may know…T*he Times They are a Changing*. For me that's a very relevant song. Sarah Parks in 1994 said that the 1980's were a period of knowledge generation where there was a lot of coming out in terms of nutrition and nutrition science and research. That was followed by the 1990's when technology required information management.

There was so much out there that what we really needed to do was to know how to manage it, how to use it and our roles really as professionals became mentors, not necessarily to convey the information, but to teach people how to access it, how to store it and how to use it. That changes how we learn. It changes how we do things. And it changes the type of interaction that we can have, not only with our communities, but also with individuals. What I'd like to say is the times really have changed. What I'm

proposing is that in the new decade that we're in, it's a decade of computer assisted learning environments where we literally have new learning communities that are online learning communities.

The way I teach in the classroom is very different. Sometimes it's in the classroom. Sometime it's on the web. Sometimes it's in a discussion forum. Sometimes it's through a List Serve. And the same thing is true in terms of public health and how we work with our communities, whether it's those who are very innovative and providing information in terms of one-on-one type of client exchange using the Internet and e-mail for example, or whether it's those who are working with community base building relying upon the Internet as a repository where people can go to get information about their community. So we've got new computer assisted learning environments, and that changes what we do and it's going to continue to change what we do because we have to continue to retrain and retool.

**Traditional Technologies**

I want to remind us again of some of the technologies that we still have that are the more traditional ones, print being a classic one. We have *Bright Futures in Practice: Nutrition* that is a print document. It's also available on the web now as a PDF file where you don't have to buy the book, but you can get the information. You can either read it online or you can print it out. But print is clearly a technology that we still use and that has value. I used to the MRFIT, the Multiple Risk Factor Intervention Trial, and we used a lot of slide/tape shows we thought we were pretty classy. You know, bring in the slide projector and it was linked up with the little tone and then the slide went onto the next slide. But audio visuals are very important. There are many of us who are auditory learners, some of us who are visual learners. So that's very important to keep that in mind as we use more technology.

Mail is still useful as a technology, whether it be snail mail or e-mail. We also have the telephone. My telephone usage has changed a lot with e-mail, but telephone is a very good way of following up with people, whether for individual follow-up or as follow-up to a group-facilitated discussion. Programmed instructions originally started out as print. Then we have multimedia modules. All of these are still relevant in today's environment. They may be packaged a little bit differently.

**Multimedia Technology**

There are the three classifications of technology that we can use in nutrition education. The first is multimedia, the second is interactive multimedia, and the third is linkage applications. Now multimedia, what is that? Well that's anything where you have any type of media such as graphic or text used in the same presentation. So it may be graphics. It may be text. It also may be video. Something you're all familiar with is PowerPoint. I've got movement in it. You have my auditory, but I could have clearly embedded audio into this PowerPoint so it would be a true multimedia presentation. I thought it was interesting when I got the letter confirming this presentation and the request was, "Please bring everything on PowerPoint." There was a time when everybody would come with slides and if you wanted an LCD projector it would be like, "Oh, that's pretty expensive." But the standard now really is a PowerPoint, which automatically allows multimedia. Here are a couple of examples. The first one is called *Maximizing Resources for Results, Extending Bright Futures through Community Based Nutrition Planning*. This is something that Susanne Gregory worked on in association with the

University of North Carolina and University of Tennessee public health nutrition training program. This was focused on using *Bright Futures in Practice: Nutrition* and *Moving to the Future* to talk about community nutrition planning and programming. We used this product for continuing education in a train-the-trainer model and it is now on the web. Every single thing that's used in that train-the-trainer module is available on the web. It's an example of multimedia. We identify where you can either purchase a print copy of *Bright Futures* or where you can get the PDF file. The training manual itself is on the Website, as is the PowerPoint presentation. So it's kind of a course in the box in a way.

Another example of a multimedia presentation is one that's in association with the leadership education training program at the University of Minnesota. This is one on health disparities that Dena Goldberg developed. The complete presentation is on the web. Now the key thing about the multimedia is it's very easily accessible. It can be on the web. It can be on a CD. It can be on a disk. It's easily transferable once it's created from one to the other. This makes it relatively inexpensive. There is standard compatibility, and you have multiple means. Now I don't know about the health disparities one, but the one that's on our website, on *Bright Futures in Practice: Nutrition* and *Moving to the Future,* you can literally download all of that and save it to a disk. So it's transferable, which makes it advantageous for getting it out to people in the public health environment. The disadvantage is it's one-way.

Part of what most of us like about learning is when we have interaction. That's the downside of a multimedia presentation. You just don't have the interaction. That's why when we did the training in region IV using Maximizing *Resources for Results*; we wanted to implement it with groups. We just didn't want to have it on there on the web. We wanted people to be able to know, "This is how you can do it in a small group or a larger group." So interactive media is exactly that. This is where the leaner can actually interact with the media and depending upon how learners answer a question or what they choose to view, different screens will appear. So it's multimedia plus user selection of audio or video clip based on learner response to questions or problem solving. This is a tremendous benefit in terms of being able to tailor things to your learner.

I have three examples. The firsts one is an educational module series that comes out of UNC Chapel Hill. It's designed for physicians. This particular one is on maternal and infant nutrition. It's a CD. If you try this CD it tells you that you need Quick Time and explains how you can get it. Then you are instructed on how to use the module. Then you get into the content. As you get into the content you have the choice of answering questions. If you answer incorrectly it will refer you to something else to read. So there is a great deal of interaction back and forth. This series has eight or ten interactive CDs.

In terms of public education, there is an interactive web-based program on the Dole 5 A Day Website. This is a site designed for children. I went on to it and I found out there was a dramatic difference between using this Website at home versus at work. At work I have an Ethernet connection and just click, click, click right along and I was just having a great time trying all the different menu choices. When I went home, I have a modem connection and I actually have a fairly good modem connection, so I had some wait time. It's a wonderful site

because of the interaction. For example, you can go to the picnic table and click to identify which are fruits or vegetables, it lets you know, "Yes, that's a fruit" or "No, that's a vegetable."

**Interactive Multimedia**

A third example of interactive multimedia is Diego State University's clinical psychology program called PACE, *Patient Assessment and Counseling for Exercise Plus Nutrition*. This program was designed to be in private physician and primary care provider offices with computers. While a patient is waiting to see the clinician they go through the computer screen. There is a little bit of dietary assessment, a little bit of exercise assessment. They get a printout of information that the provider can use for education and counseling. Evaluation of this program found out that it was fairly well received. People liked it. They found it very informative. But one of the things they looked at was adult versus adolescents. The adults didn't have the same level of satisfaction or confidence in using the computer and printouts that they received or the level of satisfaction with the clinician. So there appeared to be differences between adults and adolescents when using this medium.

The Dole 5 A Day as game designed for children, but very interactive. It doesn't require a whole lot of reading. And the professional education one, which requires extensive reading skills, is also very interactive. So advantages. The learner can control the pace and it can be tailored to the learner.

Now this is the dramatic piece about interactive multimedia. This is some of the work that Marcy Campbell has been doing at UNC Chapel Hill where they've really been looking at tailoring messages. She reviewed eight different studies where they extensively evaluated multimedia and computer tailored messaging, and effectively found out that in general most people felt that computer-tailored messages allowed the information that they received to be more personally relevant, they paid attention to them and that they suggested then that that might be more motivating.

**Cost Effectiveness**

So interactive multimedia can take many forms. It can be on a CD. It can be on the web as in the 5 A Day example or it can be in a kiosk or on a computer in somebody's office or in a shopping center. It's time effective. The question is, is it cost effective? Does it really make a difference? Does satisfaction in terms of interacting with a Website really mean that behavior is going to change? And does this lead to improved health outcomes? Interactive multimedia is more expensive than multimedia because of the development costs. So a disadvantage is that it requires technical skills of the educator and the user. Remember in this first example I said the first message you get is if you don't have Quick Time on your computer you need to download it now. It also instructs you that if you have Quick Time Version 6 it won't work. You need to download Quick Time Version 5. Now depending upon somebody's use of the web, which can be a little disconcerting because maybe Quick Time came with your computer and that's great, but they're not quite comfortable with how to do it. A study done at Indiana University with nursing students found that some of the students really got unnerved when their computer displayed a message about something unfamiliar like "plug-ins." In the end, using computer does take some technical skills. The majority of computers use a Windows-based environment where people are comfortable seeing "Print" and

"Save." But some of them are based on JavaScript and HTML, and if somebody has not been a web user that's a whole new interface to get used to. And one of the things you have to keep in mind is Internet access isn't quite as pervasive as we'd like to think. And there's technical skills of the educator. If I want to develop tailored nutrition education messages, I need to have a skill beyond just the knowledge of the content. So it's another skill level, besides the ability, in terms of transposing it into computer language. There is the initial cost. And there can be learner anxiety related to using the computer. And there is no one standard platform.

**Linkage Applications**

Linkage application is when you have your computer linked to a satellite using telephone lines, satellite transmissions or network wires. Many of you are familiar with this technology. First I'll mention e-mail. I've had a number of discussions in the past two days about how e-mail has changed our lives. I think it was Mary Kay who said, "You know, I don't think we should have e-mail any more. I just think we should abolish it. Just get rid of it." But it has dramatically changed things for us, not only in terms of communication with colleagues, but it has been used for patient education. And that raises the issue of confidentiality and privacy in terms of what you put in e-mails. What, for example, do you put in a subject line? Depending upon where the sender or receiver is located the subject line may be a red flag.

We also have list serves. Now list serves are very, very interesting. They're a focused means of having discussion on topic. The particular one I have listed is one that I personally like a great deal. It's the public health nutrition list serve out of the University of Washington. I know the people who join this list serve have public health nutrition topics that they share. Some of us are lurkers and we just read it. Some of us are active participants in it. I'm a lurker. But it's a very valuable means of information for me. We've tried using a list serve in our collaborative training project with UNC and UT. We've created VALTAR, which stands for the Tennessee Volunteers and the UNC Tarheels. VALTAR is a closed list serve for students and faculty. We wanted to be able to have our students exchange and meet and work with each other in a new learning environment. We do have some direct physical exchanges, but we wanted to expand electronic communication. We're learning how to make this work for us because what happens is you have a few people, Jan Dodds and myself, who are trying to make this work and so we put stuff out, but people aren't interacting yet. So then I said, "Okay, well we'll get a student to post questions." So she tried it a few times and it was on content related things. We're talking about this in class. "Has anybody got ideas on that?" That didn't get any responses. So then we said let's try to make it personal like trying to local a block field placement in public health nutrition. "Has anybody had any placements in California? What was your experience and what are the kinds of things do I need to think about?" Well that actually got some response, but we're still trying to learn how to utilize this at the education and professional level as a viable communication option.

**The Language of Technology**

Now, when you navigate the Internet you need to know things like URLs, well I don't use that address, I don't talk URLs any more. I just tell them the Website address. But what this brings up is the idea of the language that goes with technology. And I'm

one of those people who likes things to be understandable. The first time I started hearing about URLs and HTML codes and hyperlinks I thought, "I refuse to learn the language. I'm going to talk about go to this address on the Internet and click on the blue thing to go to where you want to go." And I've learned that I've had to incorporate the language, but not everybody uses that language in the same way that I do. My mother is now an Internet user, which is amazing to me. But she doesn't understand it at all. She knows click. She knows end. And yet she's starting to use it. And she knows when it locks up you turn it off. But the key for her is she's realized she can get information. Now she does not yet realize that anybody in the world can put up a website, therefore don't believe everything you see. Anything she wants she can get on the web. She won't give them her credit card yet. But it's almost scary because I've realized she's interacting with this medium, but she doesn't have the knowledge yet to know how to make it work for her in a productive way. So consequently whenever there is any urban legend out there about viruses, I get them, every one of them because she doesn't yet know, "Don't believe everything you see."

**On-line Information**

Lots of public agencies have information online. I'm sure everybody in this room is familiar with all of these. The U.S. Department of Health and Human Services has great Websites. MCHB has a Website where professionals can access information, data for example, on your communities. They also link to other excellent information sources. Healthy People 2010 has a wealth of information for anybody to access. Anybody can do free Medline searches now, so that a patient on medication says, "I want to know about that medication and what it means to me" can go and get specifics from a Medline search. That's a tremendous asset. But at the same time, how do you use it? Health Finder is a great consumer resource USDA through the food and nutrition information center has the pyramid and dietary guidelines online, and they even have a section that's interactive, the Healthy Eating Index. The National Agricultural Library is also online. Then we have professional associations and private industry with online resources. The American Dietetic Association has their Website. The National Center for Education in Maternal and Child Health has all of their publications available as PDF files. That's a tremendous resource. Tufts University's Nutrition Navigator has been a good resource because as there have been so many websites, it's a means of synthesizing and picking out what's a good Website, what's not a good Website. So for example they use criteria to evaluate websites by age, topic, accuracy of information, etc. That's really helpful because they've sorted through all these different websites and provide reliable web sources for a variety of groups and communities.

Then we have the dot COMs. Why I bring this up is that it's important to think about the source of information. When I see a dot com, and I don't think this is negative, I know that's a commercial entity as opposed to .GOV, which is a governmental entity, as opposed to .EDU, an educational entity. *Ask A Dietician*, by Joanne Larson, hosts a Website where people can go and get information from a registered dietician. Dr. Koop hosts a very interesting site with all kinds of information, some that I agree with, some that I'm not so sure that I agree with. But people know who Dr. Koop is. It's funny, I asked my mom, I said, "If you wanted to go get health information where would you go?" She said, "Oh, well Dr. Koop has a website." Okay. That's very

good marketing because it's Dr. Koop and there is very good information there, but the point is realizing what's good and what's not good. Another professional one that I'll mention is the University of Kansas *Community Toolbox*. It's a tremendous resource for community-based planning. It has extensive information and tools on collaborations, meeting agendas, setting up a board, and doing assessments. Very, very useful information that anybody can access.

**Chat Rooms and On-Line Discussions**

Now let's talk about chat rooms and online discussion forums. It is estimated that 10% of all of the online discussion forms have to do with parenting. For those of us interested in maternal and child health, that's very interesting to know. The is also evidence indicating that women use chat rooms and discussion forums far more than men. So what that says to me is that if I have an issue of concern to women, to people concerned about parenting, I need to know about who is in that chat room and I need to think about how people are interacting. I'm not in chat rooms. I was amazed when my stepdaughter, who is going to be married two years next week said, "Have you ever been in a chat room?" I said no. She said, "Well I've been on one about new marriages." I was like, "Wow! They have that?" Well there are a lot of very, very interesting chat rooms and discussion forums. At the time we had this conversation, I was teaching a course that was semi-online and semi in the classroom. We decided to try a discussion forum. A discussion forum is when everybody is online at the same time, in other words talking to a particular site at the same time. As an instructor, I typed out a question or a comment and then people typed in their answers. There were three of us teaching this course, and we realized early on that we needed rules of etiquette like typing "end" at the end of my question so that everybody knew I was done. We also needed to talk about keeping comments short, sweet and succinct so that other people have a chance to come into the discussion. Some of the students were extremely frustrated. Anybody have an idea why being an online in real time discussion forum might be frustrating? You have to be a good typist. For the hunters and peckers it was very frustrating because they could not get their response in quickly enough. Similarly, those who are fast typers were sitting back watching each letter go up, and they were equally frustrated. So you have to think in terms of technical skills of users as well.

**Web Cast**

Web casting is a relatively new thing to become involved in. Some of you may be going to the University of Minnesota maternal nutrition course next month. Part of their sessions are going to be on the web. I can watch it in real time or it will also be available on their Website for a period of time. Web casting is really good. The technology has gotten much better from the jerky slow motion to much more fluid types of things. One price advantage of web-based is accessibility. As long as you can get to a PC that's hooked to the Internet, you're on. It's instantaneous accessibility. Web cast disadvantages include the need for technological skills. You've got to be able to know how to get onto the web, how to use the web. User modem and Ethernet access varies. One of the websites that I went to is Dr. Healthinstein and it's a very good Website to teach children about health. Even on my fairly fast modem connection at home it was so slow I didn't even get beyond about five or ten minutes. I got the gist of what it was and how it worked, but it was so slow.

**Content Expert or Programmer?**

Now, if you want to develop sophisticated projects, you really need a technology consultant. I happen to like computers and learned how to do HTML coding. But the reality is it takes a lot of my time. I have to think about, "Should I be dealing with the content? Should I be dealing with how the content should be used as the interface? Or should I actually be doing the programming?" and I'm increasingly deciding that, even though I find it lots of fun, I shouldn't be dealing with the technology component. Let somebody else do it. They're better at it. They're faster at it, but it costs. It is not cheap. And there also are copyright laws. It's very nice to go to websites and see nice pictures to use, and I started noticing this in some of my students' PowerPoint presentations. I started asking them, "Where did you get that?" They said, "Oh, I went to this site and I just clicked." They know how to right-click on the picture to get it. I said, "Are you violating copyright?" That is a huge issue with information on the web right now because unless those pictures are designated for your use, you're violating copyright. And in education, is a lawsuit waiting to happen. That's something we hear about in our universities all the time. Just because it's there and you can click on it and save it, are you violating copyright? A very important issue, which is a new concept for me to begin to think about.

Desktop video conferencing or smart classrooms are another form on education. This is where your telephone lines link up PCs, personal computers, with two-way audio and two-way video. One example I know from Kristen Biskeborn in South Dakota Department of Health that they were using this technology all the time to compensate for wintertime weather that made it hard for people to travel. So staff would go to a special room where there was a camera and a computer that was linked by telephone lines across the state and they could hold staff meetings. It's a wonderful way to get rid of some of the travel problems. At the Florida Department of Health and Rehabilitative Services, Sue Wilson told me that they also have this. They are looking at delivering the *Bright Futures in Practice: Physical Activity* training in this format. This is a very, very useful and helpful way of linking people up. There are some issues to consider. It does bridge distance and it does allow real time interaction. The disadvantage is compatibility. Now, within South Dakota compatibility of those rooms works very well. And within Florida compatibility works well. At one time Tennessee could not link up with sites for this type of conferencing because the fiber optic technologies were not the same. So whenever the University of Tennessee wants to hook up with another state, the lines are tested for compatibility. There is not a uniform standard out there right now. We held our block field conference with the field advisors this past spring and one of the sites was not compatible so we went through Kinko's. Well that works real well because Kinko's uses Sprint lines, they're hooked up and they work uniformly. But that costs. It was not cheap. So many times people will say, "We'll just do videoconferencing." Well it's not necessarily cheap, depending upon whom you want to connect. This has been used a great deal in rural areas in terms of health and nutrition where they have had people in rural areas go to a site where they can interact with a health professional. It can also work real well since it's real time. Again, you need technological expertise with cameras. At our Kinko's Website when we linked up last month there was a problem with the cameras. Well, I wasn't about to push the buttons in there. So it's

very helpful to have somebody that has the technical skill.

From a learning standpoint if you're using it for education with large groups and if you really want interaction, there are a limited number of TV screens that you can watch at one time. The particular setup that we had, they had three screens, we had three sites. I could see all of the sites, and I could see what was happening at those sites to draw people in. Had we had five sites at any one time, two of those sites would have not been visual to me. And that immediately is a barrier from a learning standpoint that can be hard to bridge. Similarly, if you have 15 sites, it is extremely difficult to keep track of what's going on, even if it's only 25 people at those 15 sites. So what you have to think about from a learning standpoint is your way of teaching is very different using this technology.

We've used satellite teleconferencing in Region IV. Satellite teleconferencing is great. You uplink from a site to a satellite. Anybody can downlink the broadcast if they have the satellite coordinates. You can be in your home and if you have a satellite dish and you know the coordinates, you can tune in. It can be two-way audio, one-way video. You only see the people in the TV studio. You can either have an open call-in with telephone calls or screen call-in. At the University of Tennessee we used open call-in. We wanted to see how the technology worked. Some of you may have been to the University of Alabama Birmingham pediatric nutrition satellite teleconferences where they've used a screen call-in. These are wonderful. The satellite cost can be considerable. As satellite teleconferencing has become more popular, the costs have come down a little bit but you're still talking anywhere from $400 to $600 an hour, and depending upon the time of day. Given the costs, you really want to reach a large audience to make this cost effective.

Virtual reality. Has anybody here had any type of nutrition education or use of virtual reality? Well virtual reality is where you've got audio, you've got visual and you've got tactile. You can feel and sense. Now I personally have not done virtual reality yet, but I want to try out. It's been used with nursing students in New York State for training on catheter insertion. I have yet to think about how I would use this in terms of nutrition education, but this is something I think we're going to see a whole lot more of, that tactile combination.

**Benefits and Risks of Technology**

There are benefits and risks in terms of technology and nutrition education. One is information access. There is so much information out there. As my mother would say, "You can get anything you want out there." And that's true. It's very accessible. On the other hand, we need to think about accessibility for everybody. For example, how accessible is that health information to you if you are Spanish-speaking? If you are of low literacy, how accessible is that information to you?

I can plop this CD into my CD drive at any time of day, any day of the week, anywhere I want to be as long as I have an electric connection in the case of using this, or I have a laptop computer if the battery is charged, or if I want to get on the Internet I have a telephone line. You can get to all of it very easily. Validity in use of information is something we really need to think about. Who is using the information? Who is it intended for? Who created it? What were their credentials? Where is the information available? What is the source of the site and the validity of that site? Why is it there? Is it there for profit?

So here are some of the technology issues. First, there are issues of hardware and software requirements. If you really want to do a lot of graphics in terms of creation, you're much better with a MAC. How many of you use MACs? We've got a PC environment at our university except for the people who use graphics and those who design websites. They're all MAC users. Now hardware and software requirements differ. That's important to keep in mind if you're going to be the developer of nutrition education materials using technology and you want to make sure you are compatible with your users.

Next, what are your computer skills if you're going to be developing the site? What are the computer skills of the people that you want to interact with? Are you better used as a content consultant, or in the case of the two-way audio two-way visual classrooms then you being the educator just know how to use that and talk and use that medium well? You need to keep in mind the skills you learned in to facilitate discussion will transfer into that environment, but in a slightly different way. Content specialists have a tremendous role to play in terms of technology and nutrition education.

Access is a really big issue. Many, many public libraries have access to the Internet now, but somebody still has to have transportation to get to that library. If you have people of limited income, you can't just assume that they're going to have a computer, number one. They may have a computer, but they may not always have telephone access.

In terms of literacy level, many of the low literacy sites, or the lower level literacy sites, are designed for children. There was a report the Partnership for Children where they talked about interacting with limited resource audiences. And in fact, people who are of lower reading level really felt disenfranchised, as did people of different cultural backgrounds. There are some Spanish websites, but most of them are from Spain; they're not in the U.S. What about people who speak other languages?

Effectiveness is important. Does it really, really make a difference in terms of what people do? Tailoring the interactive learning has tremendous potential, but that really means knowing our audiences well and also how tightly can you tailor this. Can you tailor it to somebody who is low income, 130% of poverty and Hispanic or for somebody who lives in Minnesota? Is that the same for somebody living in Texas? I don't know that. Complimenting what the nutritionist does. I think it's a tremendous asset.

**Evaluation**

I'd like to conclude with evaluation. What are the implications for public health? In other words, when you translate the research to practice, what does it mean for what you and I do at the individual level with individuals that we serve, but also at the institutional level within the agencies that we work within. Now, there are many ways to think about how to do this, but the model that I want to use is called REAIM. This comes from the work by Glasgow. The "R" in REAIM stands for reach. If you want a public health intervention that will impact people, you need to think about how well it reaches individuals and how well agencies or institutions adopt that intervention. So the idea for this is that you can evaluate an intervention in terms of participation rate of individuals. So that's reach. How many people do you reach? And obviously the Internet can reach a wide number of people.

If somebody interacts with this intervention, do they have the desired outcomes? How successful is it? That's the "E" for efficacy. The "A" and the "I" are at the organizational level. "A" stands for adoption. In other words, if this intervention is out there, maybe it's a video kiosk, what is the degree to which organizations or institutions use that? Implementation, or "I" is the degree to which the organizations implement it as intended. I'm sure many of you can think about interventions that are implemented, but not the way that they were intended. Then "M" is maintenance, referring to both individuals and agencies or organizations in terms of sustainability. For an individual, the degree to which they're knowledge or the intended behavior is sustained. Or in terms of organizations, the degree to which that intervention is maintained and used within that institution. So what Glasgow did was pull together an expert panel and evaluate eight different types of public health interventions using the five components of REAIM - participation rate, success in terms of efficacy, adoption by agencies, implementation by agencies and maintenance. The panel concluded that there was moderate reach in the interventions focused on community-based group counseling, the Internet, and a kiosk using in primary care. These three intervention strategies had the potential to reach the same percent of people. When it came to efficacy they're probably all equally the same. But when you look at the adoption by organizations and institutions, use of kiosks in primary care was very relatively low. That didn't surprise me. Think about a kiosk in a primary care physicians office, kind of like the PACE example. They've got to have the equipment set up for it. The panel thought that Internet was moderate in terms of adoption, but community-based group counseling, tremendous in terms of adoption, very high level. When you go to implementation, which takes a lot of resources, community-based group counseling drops down, but the kiosk would go up because once it's there it's very easy to maintain. And similarly what jumped up was the Internet. When you look then at maintenance, that's sustainability for individuals and groups, you find then that the Internet remained high, but the kiosk and community-based group counseling would be moderate. What they argue is that these profiles are useful and that reach times efficacy will equal impact. What this allows us to do is to think about different public health interventions, but it allows us to think about technology and where it fits in. Just because a lot of people can get on the Internet does not mean that it makes a difference in terms of outcomes. Or just because we can reach a small number of people in group counseling doesn't necessarily mean it will be adopted or in many places. So these profiles are useful in thinking think about how to use technology.

So this is what we need to learn. We need to know how knowledge translates to problem solving, regardless of those traditional technologies that I showed you in the beginning or some of the newer ones. We really need to know the impact on long-term health outcomes. Does it make a difference in terms of health outcome and what about the interaction of race, culture and learning mode? We need to understand this.

What are the cost benefits and the cost effectiveness of it? It takes a lot of resources to develop some of these technologies, especially the interactive projects. What are the effects of information provision without validation of comprehension and understanding? If I have something on the Website and people get to it, it's an educational tool. But I don't validate what they learn. What are the other things that are

happening? How they use that information or whether they tell other people about the information.

So those are the things I think we need to learn. What I personally need to learn is how to use my new handheld PC and about a simple thing like how I have to transition to a new way of calendaring. That's a huge challenge for me because my simple, paper calendar works for me real well. But these are the kinds of things we have to think about technology. It may be that I get rid of my handheld PC for calendaring and I use it for Word and PowerPoint because I won't have to carry my laptop. But I may not use it for calendaring. I have the skill to be able to use the technology, but is it appropriate for me? So from my perspective I think those are the things we need to think about in terms of nutrition education technology. Thank you.