

The Future of Technology in Health Education: One Person's Vision

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Abstract

Dr. Mark Kittleson, Founder and Editor of the International Electronic Journal of Health Education (IEJHE), provides a vision for the future of technology in health education.

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Keywords: health education, technology, AAHE, IEJHE

Introduction

As the health education profession welcomes its second on-line journal, I have been asked to comment on its potential impact. In 1997 I created the first on-line journal—the *International Electronic Journal of Health Education* (www.iejhe.org) and the first issue was released January 1, 1998. The *IEJHE* was sold to the American Association of Health Education in 2001. Since that time I have served as its editor.

When I was asked to comment on this new journal's debut, I was somewhat puzzled as what to write: I wondered if my comments should take the form of advice, outlining the do's and don'ts of an electronic journal, or whether I should address the problems associated with maintaining an online journal? Although these are indeed important issues, such discussions may, at best, be interesting only to those involved with the actual production of an e-journal. Instead, I thought it timely to look at how technology will continue to impact the health education profession. This new e-journal, although greatly anticipated and valuable, is just the tip of the technological iceberg, one tiny aspect of the uses of technology to promote our profession. I predict that newer technologies will revolutionize all aspects of both our personal and professional lives.

People have mistakenly compared the achievements of computer technology (information age) to that of the development of

the television, or even the industrial revolution. The comparison of the computer to television is inappropriate, even inadequate, in my opinion. First, television has never achieved what the educators of the 50s and 60s dreamt it would. Comparing the information revolution to the industrial revolution is more appropriate, to the extent that both events changed human lifestyles significantly. This paper will illustrate how the information age or revolution has had a far more dramatic and significant impact on the world than the Industrial revolution.

I would like to compare the information/technology revolution to the invention of the printing press. The world undoubtedly changed when written (or printed) words began to be mass produced. The changes were felt in every realm of human existence: the religious, economic, social political and of course, the educational. The invention of the computer and associated technology however, dwarfs any other by comparison, in its potential to revolutionize communication and change the world as we know it.

The purpose of this paper will be to attempt to outline the foundation of the future of technology and its impact on the profession of health education. In this attempt, my discussion will focus on what we'll be like in the year 2023. I of course realize that I setting myself up for ridicule—much like we do when we look back at the futurists of the 1950s who predicted flying cars, moon colonies, metallic clothing, and

synthetic food. We will focus on two areas: the computer and hardware itself, including hard disk storage, temporary memory storage, speed, size, and access to the Internet. The second part of the paper will be on how the health education profession can use this information to help deliver programs and to help itself advance professionally.

Technological Changes

To start this adventure, let's first look at how technology has changed since 1995. Remember 1995? It was only eight years ago...less than a decade. Yet in 1995 the World-wide Web was really just getting started. E-mail, although it had been around for many years, was just starting to become popular. Commercial advertising on the web and through email was minimal or non-existent. Discussions groups, such as the HEDIR, were just starting to become popular. Chat rooms didn't really exist and software such as Instant Messenger had not yet been popularized. Only a very few thumped along using cumbersome (not user-friendly) computer mainframes to send and receive e-mail and files, and conduct basic real-time chats.

Although Microsoft was already the major player in computer technology, programs such as Power Point were just coming into existence. CDROMs were becoming more popular, especially to distribute software programs. The government was just starting to convert their documents in to pdf format. Personal Digital Assistants (PDAs) were a mere twinkle in their inventors' eyes still in their infancy. At best, they were address books only, attached to either word processing or data entry software. . American Online was an up and coming service, the first of its kind to allow individuals to explore this new thing called the Internet. In 1995 Sally Struthers was still being heralded as the 'dean' of correspondence schools. Most such schools were primarily focusing on basic training and the instruction was delivered via paper and traditional strategies.

The Computer

Let's focus now on the computer. There is no secret to those who have purchased a computer...the moment you take it out of the

box there's a newer, faster, cheaper version available. Gordon Moore, the founder of Intel, said in the mid-1960s that the processor will double its speed each year. That prediction has been true since that time, and there's good reason to believe that trend will continue. In addition, with research focusing on the nanobyte, the size will no longer be a cumbersome issue.

To assist in understanding future discussions in this article, I've compiled a list of computer terms commonly used (Table 1). It's important to know such terms because the technology of tomorrow centers on being able to comprehend the potential of the computer. To attempt to make it somewhat more understandable (at least for me), the bytes have been converted to dollars.

In 1995 a Dell XPS was available for \$3,799. It had a Pentium 100 Megahertz speed, 8 MB RAM of memory, 1 Gigabyte of hard disk storage, a 15 inch monitor, 4 megabytes of video, a 32 speed CD-ROM along with Windows 3.1.

In late 2002, a Dell system can now be found that has a 2.5 gigahertz speed; 512 MB of RAM, 80 gigabytes of hard disk space; a CD-Rewritable Disk along with a combination of a DVD; a zip drive of 250 MB; a 21 inch monitor; a sound system that is spectacular. All of this is for \$799!

Hard Drive Storage

Table 2 shows the advances in hard drive capacities from 1995 to 2002. If advances continue at that rate, I've projected what those rates will be in 2009, 2016, and 2023. We have seen an 80 fold increase from 1995 to 2002 (note that this is the 'average' hard drive now sold on computers...there are many larger sizes available). If that trend continues, the typical hard drive will become 6.4 TB by 2009. Seven years later that size will be 512 TB, and seven years after that, in 2023, the typical hard drive will be 41 KB.

If one were to compare hard disk size to that of a dollar, you would have seen an increase from 1¢

in 1995, to \$800 in 2002; \$6,400 in 2009; \$512,000 in 2016; and \$410,000,000 for 2023. Thus, using a bank account to represent the

typical hard drive of a computer, your account has grown from 1¢ to \$410 million in 28 years.

Table 1
Terms Used in Technology

This...	...Becomes This	Imagine it in Terms of Dollars
1024 Kilobytes (KB)	1 Megabyte (MB)	\$.01
	10 MB	\$.10
	100 MB	\$1
1,000 MB	1 Gigabyte (GB)	\$10
1,000 GB	1 Terabyte (TB)	\$10,000
1,000 TB	1 Kittlebyte (KB) ^a	\$10,000,000
^a My local computer guru was unable to identify what comes after the terabyte, thus, the name		

Table 2
Hard Drive Advances

Year	1995	2002	2009	2016	2023
Size	1 GB	80 GB	6.4 TB	512 TB	41 KB

To further describe this increase, it is possible to store 250,000 single-spaced typed pages in one gigabyte. One terabyte could hold 250,000,000 typed pages. Based on this projection, one would be able to store 10.24 billion pages. Morris Library, SIUC's award winning library and an Association of Research Library, has 2.4 million volumes. Imagine that the average book has 400 pages. The amount of typed pages in this library would total 960 million pages. Based on the 2023 projection, one's computer would hold the equivalent to 10.5 Morris Libraries!

RAM Memory Storage

Table 3 shows the advances predicted for RAM (Random Access Memory) memory. As you know, RAM is the temporary memory that a system can hold while the computer is operating. The use of RAM allows for multi-tasking to take place...being able to conduct two or three functions on your computer at the same time. RAM is also important in that it allows for the computer quicker maneuverability between various programs running simultaneously. Again, using the differences between 1995 and 2002, I predict that we will have an immense increase in temporary memory at our fingertips.

Table 3
RAM Memory Advances

Year	1995	2002	2009	2016	2023
RAM	8 MB	512 MB	32.7 GB	2.09 TB	134 KB

Using typed pages as a reference point, in 1995 8 MB of RAM would hold about 4,000 single typed pages. In 2002 that number has increased to more than 256,000 pages. By the year 2023 one's computer's RAM will be sufficient to hold 137 trillion pages! Using SIUC's Morris Library as an example, this is the equivalent to having 142,000 Morris Library's in a given computer's temporary memory.

Obviously, nobody's going to need 137 trillion pages in RAM memory. But it does illustrate the enormous temporary storage that will take place. Multi-tasking will be incredibly quicker, easier, and flawless. The ability to use voice

command (already in place) will be the 'norm'. No longer will people have to wait those irritating 10 seconds for a program to boot up...such boot ups will be almost instantaneously.

Speed

For the third issue, let's talk about the speed of the computer. In 1995 the typical computer had a speed of 100 Megahertz. In 2002 the typical speed is 2.5 gigahertz (or 2,500 Megahertz). The computer of today is 25 times faster than that in 1995. Table 4 shows the projection of this speed up until 2023.

Table 4
The Speed Advances

Year	1995	2002	2009	2016	2023
Speed	100 Megahertz	2.5 Gigahertz	62.5 Terahertz	1.5 Kittlehertz	37.5 Kittlehertz

To try to illustrate this speed, let me give this example. In 1800, the pioneers who wanted to travel from New York City to San Francisco might have or did so by wagon. Imagine trying to cross the forests of the east and the Rockies of the west in a covered wagon. Also imagine trying to cross the many rivers, creeks, and maneuvering around massive lakes. I can only imagine that the pioneers jumped for joy when they saw the plains of Illinois, Iowa, Kansas, and Nebraska. Overall, let's say they averaged 5 miles a day. At that rate it would take about 600 days (about 1.64 years) to make the journey from New York City to San Francisco.

Since the mid-1970s, it became possible to take a jet from these two cities and arrive within 4.5 hours...that's .17 days. When one looks at the improvement in speed, this means that today's travel is 3,500 times faster than that of 1800. Imagine what the pioneers would have thought if they were told that it would take a mere 170 years for people to make that journey in less than five hours. Such advances wouldn't have been fathomable for our ancestors; they would have thought them impossible, even magical.

The projected increase in the speed of the computer between 1995 and 2023 is 105 times FASTER than the increase in cross-country travel between 1800 and 1970 (Table 4). It's now our turn to imagine what that such increases in speed can do for us. Perhaps some of us might ask "what we need such speed for?" Probably the same words came from the pioneers in 1800... "Why would we want to get there that fast?"

Computer speed allows for the simultaneous operation of variety of applications and activities. Artificial intelligence, for instance, will be at such an advanced level that we will have incredibly smart machines that can think, calculate, and produce products, leaving the higher order abstract thinking and creative applications to us: A sure step in making the world a "better place."

Size

Fourth, let's talk about the size of the computer. What started off as 2 tons of machinery that would fill an entire room in the 1970s, our current laptops, weighing between 2.5 to 5 lbs,

and fitting compactly inside tiny brief-cases, are more powerful, quicker, and have thousands of times more storage capability. I remember my first computer purchased in 1988...an 'XT', with a processor speed of 8088, and a hard drive of 10 MB. I watched as the technician added some hardware to this machine and made an observation that the hard disk was "enormous." Yet, recently I removed the hard drive from my new laptop, a 40 gigabyte system, and it was smaller than the palm of my hand. Here was a hard drive that could hold 4 billion times more information, yet it was 1/10 the size. That's like getting paid \$4 billion dollars to do what you were paid \$10,000 in 1988. In all likelihood, the task of 2002 is probably significantly easier also.

I imagine the typical computer of 2023, will look a lot like a PDA. This will probably be the size...easily transportable, small, and adaptable. It will plug into a monitor and keyboard (that is unless we use voice commands for everything). In the world of 2023 smaller is indeed better. We now laugh at pictures of computers of the 1970s...the new generation of computer users in 2023 will laugh at the pictures of the monstrosities we call laptops of the 1990s and early 2000s.

Access

Finally, we need to talk about access. The ability to access this data via the world-wide web has grown enormously since 1995. As stated earlier, the world-wide web was just in its infancy in 1995. Already it has grown into a massive, complex mechanism...something that many cannot imagine living without. Access to the Internet by many people is through a phone line. The phone modem capability has grown from 300 bauds to now 56,000 baud. However, people can now order an ISDN line; a special phone line that would allow much quicker access. In addition, cable companies now can provide on-line access, along with satellite companies (i.e., DirecTV). A lucky few can access a T1 line: usually reserved for companies, universities or schools. More recently, the advent of the Internet2 will allow for even more efficient delivery of services.

To give you an illustration of the Internet access, first imagine the original access as a country road--certainly passable, but a bumpy surface and other impediments (i.e., cows, other vehicles), and the occasional dead-end (i.e., bridge is out), promise a slow and rocky ride.... It wouldn't matter how fast a computer you had (how fast a car you have), your speed was limited by many external factors. As the speed of the bauds became better this bumpy road is now a paved road, with fewer distractions. At the 56,000 baud rate, one can imagine a 4 lane road (not a freeway) that has occasional stop signals, traffic snarls, but with a limited speed limit.

A T1 line is your typical freeway system. Two lanes, with no possibility of cross traffic, trains, or traffic signal interruptions. If somebody is slow you can pass on the left with little problems. Occasionally though, one's trip will be delayed, stopped or interrupted because of a traffic accident or a vehicle breakdown.

Internet2 is your super freeway. Imagine a road with 25 lanes going both ways. Imagine how fast you can go, how much traffic it can hold, and how interruptions can be limited in the flow of traffic. Even a traffic accident will still allow many lanes of traffic to flow.

Internet2 is currently an exclusive club among universities. Its intent is for the delivery of mass data. What this means is that one can now have digital quality interaction between two sites. Similar to Ted Koppel's "Nightline", where Mr. Koppel interviews people thousands of miles away, you too will be able to talk in digital quality to people thousands of miles away. It is currently being done now in the medical field. Many medical facilities discuss, diagnosis, and treat medical cases via the Internet. Internet2 will allow for a crisper, clear dialogue between all parties.

Think of this from an instructional standpoint. Imagine having a world-renowned health educator speak to your class. It would be great...but how many people have the funds to pay their expenses? Plus, the speaker has to take time out of their busy schedule to come to your

facility. Instead, imagine having a digital setup where you can speak, interact, and talk to people as if they were in the same room? That technology now exists. Currently it is restricted to universities, but eventually this will move into all aspects of the world. One will hear of the 'width' of the 'band'...basically we are talking about how much data can be transmitted at once. Internet2 will allow this 25 lane freeway the ability to transport enormous amount of data with little interruptions.

Impact on Health Education

Delivering the Instruction

So what will this speed mean to you as you continue to deliver your instruction? As we discuss this we also need to keep in mind what you need to do to prepare yourselves for this transition. Your role as a health educator is going to change...just like it has over the past 25 years. There will definitely be a transition...make no mistake about it. We will see a revolution take place that we may think unfathomable at this time. But, not all change is good, some may take away from what we think is best...but as the eternal optimist I see this change as being fantastically positive. We, as health educators, must keep in mind that we must be part of the decision-making process and allow those areas that we value highly to be maintained.

First, I do not see at any time the school teacher, public health educator, university professor, or the community college instructor ever being completely replaced. I do see a better utilization of their resources. For example, do we truly need to lecture over materials covered in the book? Could not the Internet, with its interactive qualities, be available for that type of service? Could not technology allow the individual learner to experiment with scenarios to 'test' their decision-making skills? Absolutely. What I see is the health educator will oversee the implementation of such programs, making sure that the factual information is correct and that the efforts are designed for maximum or optimal learning. I also see the contact that health educators will have with students or clients will be much richer and focused on more interpersonal interactions.

Currently, we do not have that opportunity because we're too busy providing the foundation. Rarely are we able to extend past that effort. Imagine walking into a classroom where the students have already learned the basics of nutrition. You could spend your entire time working with them on dealing with decisions regarding diet, weight control, etc. That is much more worthwhile than providing cognitive information (which is important but can be provided in other ways).

Prochaska's Transtheoretical Model has surfaced at the most appropriate time. We now have a framework that we can determine a particular stage a person is at, and then direct their instruction toward this particular stage. No longer do we need to 'shoot in the middle' hoping to catch people from both sides. We can address people at their particular 'need'. The promotion of Prochaska's model during this computer technology revolution is most appropriate. We can (are currently doing it) develop tailored programs to meet those particular needs. Imagine with the technological advances of 2023 and what you could do. One could have voice active, fast interaction that could address a whole array of health issues. Currently Prochaska's theory has been extensively studied on a handful of practices—smoking, intravenous drug use, condom use, diet, and exercise. The theory is strong to allow more creative use of the concept associated with stages of change. Our job may be to create learning strategies to help people at various stages. The computer will allow us to do this at a much easier fashion.

Thus, I see much of the health educator working in the development of such programs. As we currently now have, it is the researchers at the universities to develop and test for effectiveness. The school teacher or the public health worker will be responsible for the delivery of such programs. Yet, the latter needs to know how to modify, manipulate, or change programs to meet the needs of their particular targeted population. It is also up to the practitioners to relay onto researchers on what is needed in the community.

Because of the increase prevalence of the World-wide web, more work will need to be done by health educators to serve as informants to the public on how to ascertain accurate from inaccurate information. Consumer health has always been important, but its role will become even more critical as we approach 2023.

With the great advances in memory and speed, one can also provide instructions to a group of people who may never ask for such help if it was face to face. Questions about sex, sexual behavior and sexual dysfunction could be asked and answered in a completely anonymous format. We are doing that to some extent already. Go Ask Alice took the world by storm 7 years ago when it allowed Columbia University students (and virtually the rest of the world) to ask any questions about anything (most tended to be about sex).

The issue of technology and the delivery of instruction would not be complete unless we discuss the impact of distance learning via teleconferencing or the web. As stated earlier, we already have video conferencing at a small cost, although the quality is not very good. With the advent of the Internet2, and its progressive growth throughout the world, we'll all have complete access in digital quality. You can have guest speakers from throughout the world speak to your class. You could have students anywhere in the world attending your class. Such involvement would allow for complete interaction between you, the students on location, as well as students from a distance. You can arrange for small group discussions that would allow interactions between the persons on site and the person from afar.

Instruction via the web has already taken place. It's hard to imagine but we are still in its infancy. The health educators of 2023 will laugh when they look back into their history books on the way we use the web for instruction in 2002. One will have videos, observe guest speakers, participant in small group discussions. All textbooks will be on-line and quickly revised if need be. Interactive learning strategies will allow students to focus on a variety of decision-

making skills and then receive feedback on the consequences of such decisions.

Advancing the Profession

Another critical role of technology will be to help train prospective health educators, serve as a way to help with continuing education of health educators, and to allow for professional growth. Currently technology has been used more for this than with the actual delivery of instruction. The HEDIR is an example of a wonderful means for health educators from all areas of employment to share concerns, ideas, request help, or vent frustrations.

The use of the Internet2 will allow people to meet in a much easier fashion. Illinois, like many states, is a tough state in terms of traveling. People from southern Illinois are five hours from Chicago...about 3 hours from the capital of Springfield. Like other states (i.e., California), to meet in the capital (Springfield) people in southern Illinois need to get up extremely early in the morning for their 9:00 am meeting. They then have a 3 hour trip back...six hours in a car. Can you imagine the convenience of meeting on-line? One could straddle up to their computer, get on-line with public health officials in Springfield, meet, and then continue with one's workday without having to waste six hours in the car?

Another way to advance the profession is to be able to share what goes on at national meetings. There are many practitioners who do not attend national conferences. First, it may be cost prohibitive; second, they are often not given the time to go; third, state reimbursement policies often prohibiting reimbursement outside the state. Thus, you don't see a lot of public health officials at the local level going to the American Public Health Association's annual meeting in Washington, DC. You don't see a lot of public school teachers from New York City attending the American School Health Association meeting that is being held in Denver, Colorado. Even those that do attend often complain that they could not be present at some of the meetings because of conflicts with other presentations. Before the end of this decade (2010) we will have, besides our regular

conferences, those conferences placed on-line. One will be able to listen to speakers, observe their presentations (i.e., PowerPoint), and be given an opportunity to respond to them. One would be able to do this from the comfort of their home or work office, at a fraction of the costs. This is not difficult to do from a technological standpoint. Organizing such an adventure would obviously take a significant amount of time.

Robert Gold, the Dean of the College of Health and Human Performances at the University of Maryland, and one of the country's leading health education technologists, has been working on the creation of a simulation to help train health educators. Dr. Gold likens this to pilots of major airlines. Pilots don't learn to fly in a real plane...they use simulators and in the course of their training they are given an array of problems to overcome. If they fail, there's no real harm to anybody. The pilots learn from their mistakes and are given an opportunity to continue to hone their skills.

Dr. Gold wants to do the same thing for health educators. He wants to create a sort of simulator that would test the health educator in a variety of situations. We could use it as we train health educators, to continuously reinforce current health educators, or allow us to explore ways to deal with new and emerging topics. If the student commits an error, he or she will be able to learn why they failed and how they could prevent such problems in the future. Think of the enormous resources that this would take...now take a look at how these resources are going to be available in a very short time (i.e., 41 KB hard drives and 134 KB of RAM). This is another example of Dr. Gold being 'slightly ahead of his time.'

This concept is currently available in a variety of computer games. One, called SimCity, is a pretty good example of planning a city. As one makes the plans, they are called upon to solve problems such as sanitation, energy supplies, and population growth. Several community development programs at various universities use SimCity as a learning tool.

Finally, one will be able to use technology to have, and continue to have, professional relationships with colleagues. Real-time discussions, face to face talks, and the sharing of professional materials will be easier, more reliable, and at one's beck and call.

Technology will make our lives exciting and it will allow us to become better professionals. It is my hope that we, as a profession, will be able to adjust and adapt to such changes. What can we do as a profession to prepare for this? First and foremost, be opened to ideas that technology can enhance what we are doing. Too many health educators focus only on the potential problems and abuse of technology. That will occur, as it has with all advances. But, as a profession we need to keep an open mind and explore what ways technology can be used to enhance what we do.

The second plan to prepare for the future is to become involved with those individuals or groups identify protocol for the use of technology. If we fail to get involved, we will become reactive instead of proactive. Technology will change our lives...whether we want it to or not. But how we will allow technology to change us is up to us.

Good luck to the Californian Journal of Health Promotion and to Dr. Mark Tomita for the guidance he will provide to this journal.

Acknowledgement

The author would like to thank Dr. Priya Banerjee, SUNY Brockport, for her assistance in the development of this manuscript.

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My World in 2023

In 2023 I will be 71 years old and recently retired. I awake at my usual 6:30 am with the use of my PDA/computer's alarm. It instructs me to take my medication and provides me up-to-date information on the current weather. As I go for my daily 5 mile run, the PDA keeps a record of my various body functions. My physician receives a monthly update on all such recordings.

Upon completion of my run, I relax in the morning by pulling up the newspaper from my PDA. The transponder within the system allows me to show the pages in the mirror of my bathroom, or in the shower stall via holographic image. I also am able to bring in the local television channel for updates on what's happening in the world. The PDA of 2023 is the future computer and television, digital recorder, phone, and message retriever. During the course of my dressing my grandson from Phoenix calls to indicate that he has been admitted to the University of Minnesota. I mute the TV component and start talking with him. I can tell by his looks that he is incredibly happy. He's planning on majoring in engineering. The new PDA/computer that I gave him for graduation certainly will be of help during this endeavor. The newest and latest model, the system cost a whopping \$150...but hey, he's my grandson. He's worth it.

After bidding my goodbyes, I finish dressing and get into my 1982 Toyota (well, not everything needs to be new) and drive to work. The new auto control modulator for the car is nice. No longer do I need to battle the continuous traffic jams of Carbondale, Illinois. The car drives automatically. During this time I can continue reading my paper and to see how my investments are doing.

I get to my office around 9:00 am. Although I am an emeritus faculty member, I still am able to have an office to conduct some research. I oversee the HEDIR messages for the previous day and archived them just like I have been doing for nearly 30 years. The HEDIR messages are vastly different than when the HEDIR was first created. None of the messages are in text...all are video-based. In addition, I oversee the hundreds of HEDIR chats being conducted by professionals throughout the world. At 10:00 am I am meeting with the *American Association of Health Education's* technology committee of which I have been a member for nearly 20 years.

I think back to the frustrations I've had with the hosting of the HEDIR web site and the discussion group. Due to various regulations, I decided to host the HEDIR on my own private server. When I informed my wife of this she was furious. She didn't want me to take up that much room on my desk at home hosting a server. Oh well, perhaps when technology becomes really advanced servers of this magnitude can be reduced from their present size of a toaster to something smaller.

At my office I participate in my technology meeting. Afterwards I am beeped by my PDA that I need to take my medication for my blood pressure. The PDA also notes the actual consumption of the medication in the event that I forget to take it. As I get older I tend to forget the things I don't like to do!

At noon I am teaching my research methods course...a course that I've taught for nearly 30 years. This is the first class that I've had a group of students from Australia. They are top-notch. Having 10 students from throughout the world, along with the 15 students in class poses

some major challenges, but these doctoral students are the best...just like they've been over the past 30 years.

At 2:00 I am being interviewed by an up and coming graduate student from Texas A & M. Her dissertation is on the technology of the 90s in health education. She is interviewing and video recording the interview. In addition, I've been able to transit the massive amount of data I have had from HEDIR archive messages and back issues of the *International Electronic Journal of Health Education* that I created 25 years earlier. She has written a series of responses that I am suppose to provide, and then she will be able to create a virtual questions and answers activity for future students based on such responses. It took me nearly 3 days to complete all questions...I can't imagine how long it would take if I was forced to type such commands, especially since the arthritis in my right hand is very touchy. Today's meeting was much less informal and she was able to get my thoughts and ideas to help 'fill in the gaps'.

At 4:00 I am participating as a doctoral committee member for a student from the University of South Florida. This is a special project for it represents the last doctoral student for Dr. Robert McDermott. Bob is retiring within the next couple of months. I've probably served on 20 of his students committees. At first I had to fly down to Tampa to participate. But since 2009 I've been able to attend in a 'virtual world'. Since I hit the age of 60 I've had problems flying. It seems like my hearing and ears are really bothersome. I lost my hearing in my right ear around 2009. After having an artificial cochlea transplanted in my ear in 2015 my hearing became 100%. I now couldn't pretend to ignore my wife by pretending I couldn't hear her. Although my hearing is now fine, flying causes me to have pretty severe headaches. But no need to fly...I can serve via the Internet4 connection. The nice thing about Internet4 is that it allows me to communicate privately with any of the other members of this student's committee. Thus, if Dr. McDermott is asking a question, I can quietly pass him a follow-up question. The other nice thing about the Internet4 is that it uses a series of satellites above the earth to distribute messages at the speed of light.

The defense ends at 6:00, but I am able to activate the dinner in the oven from my PDA around 5:15. In addition, as I am heading home, I am able to watch the evening news with Dan Rather Jr. (by the way, a spitting image of Dan Rather Sr.) with the holographic technology available from my PDA. Although the news is on at 5:30, I've been able to program the recording of that news on my PDA.

As I get home I am activated by the US Postal memo that I've received numerous bills and letters from my USPS e-box. The post office eliminated all physical mail delivery around 2017. All bills and other commercial products must now be delivered by the USPS e-box system, a program developed by the Federal Government to reduce commercial abuse of regular email.

My wife gets home around 6:30 and I have the table set and ready for dinner. During dinner we call her sister who lives in New Mexico to wish them a happy anniversary. Our dinner conversations focus on her workday...she spent 5 hours teleconferencing with officials from the Illinois Department of Public Health. She is truly frustrated because their system is still operating on the Internet3 component. The speed and clarity are fine, but the many fine nuisances of Internet4 are missing.

After a relaxing dinner my wife and I retreat to our home office to complete the programming on the new strategies to market health education. Thanks to Dr. Bob Gold's persistence, we are able to create simulations to help train prospective health educators. We base our programming on the thousands of hours of previous experiences. During the midst of the programming we contact Dr. Kelli McCormack Brown, recently retired from the University of South Florida, to get her input on some of the work. We're able to pull up the simulations in both places so she can provide her critique.

Around 10:30 my wife and I head to bed. I vocalize to my PDA to set a wake up call for 6:30 the next morning. The PDA then provides soothing white noise to allow us to fall asleep.