Journal of Aviation/Aerospace Education & Research

Volume 9
Number 1 *JAAER Fall 1999*

Article 4

Fall 1999

Tech'knowledge'y Anxiety

Wm Francis Herlehy III, Ph.D.

Merodie A. Hancock Ph.D.

FORUM

TECH'KNOWLEDGE'Y ANXIETY

Wm. Francis Herlehy III, Ph.D. and Merodie A. Hancock, Ph.D.

There is a plethora of literature on educational software and hardware. Equally as much has been written about technology and the learning environment. Conspicuous in its absence is discussion of the liveware component of educational technology, the faculty member. Changing educational technologies are threatening many faculty members' sense of security and even, in some cases, their very livelihoods. Those faculty members who are willing to face their concerns 'head-on' can learn to convert their apprehension into the motivation needed to make changes that will assure them of success in today's high-technology, learning environment.

Change in educational technology has always been, and continues to be, a constant. This being the case, why do today's educational advances appear to be so much worse than the educational technology changes of the past? The answer lies, at least in some part, in the speed, constancy, scope, and complexity of the current changes. When it appears that rapidly advancing educational technologies will lead to obsolescence, it is logical and expected that faculty will be unsettled.

The faculty member who is technology poor needs to take advantage of every available developmental opportunity to learn even a little bit more about '**tech**knowledgey'. And, when he or she has mastered what is needed for the current change, it is time to prepare for the anticipated next wave of change. The only thing faculty have to fear is fear itself—and complacency. Faculty members must actively search for the ways needed to cope with the ever-changing educational environment. To maintain a faculty asset of the highest value, colleges and universities must make developmental opportunities related to technological change readily available to all faculty members.

It is not only the faculty member who has never used a computer that is nervous about the effects of technological change in the educational environment. What appear to be constant reports of significant advances in educational technology create anxiety for everyone involved in the learning process. Recently, I asked an instructional technologist who attended a seminar on 'technology in the classroom' I conducted at the University of South Carolina why he was attending the class. He answered: "The kind of stuff I am working on is changing so fast that I am being left behind. I need to learn everything I can, just in case." And, this is coming from someone who has chosen to make educational technology his profession.

He went on to add,

> "I have been working on a major project to put an undergraduate class on interactive, video-teleconferencing for over four months. It is a project that has tied me up days and nights, weekdays and weekends. Recently, I took some time off and went on a ski trip with some friends who also work in the field. Not only did I not know anything about some of the new things they were talking about but also, worse yet, it occurred to me that many of the things I am working on in this project appear to be on their way out. They are becoming passe in terms of professional standards. My friends could only agree."

Is it really possible for someone's core competence to become outdated in just four or five months? In the field of educational technology, the answer is a resounding yes. It is rather interesting, and probably most appropriate, that the teaching of technology and technological advances is an area hardest hit by new technologies.

Does this imply that if your discipline is some other area, such as management or the humanities, you do not have to worry? No, but it might mean you have more time to adapt to changes that will result from new technologies in your field. The most difficult feature of '**tech**knowledgey anxiety' is accepting the fact that you must change. After that, you will be able to find ways to overcome the fears that keep you from

making necessary changes; changes that will allow you to succeed with, rather than in spite of, educational technologies.

It helps a great deal to examine this issue in a historical context. This is not the first time academia has been turned upside down by major advances in educational technology. Certainly it will not be the last. When our society changed from being primarily agricultural to industrial, it was technological developments that brought about the change. Some of the new technology brought changes into the classroom. Not all teachers welcomed the changes.

A simple example is the introduction of audio-visual equipment into the classroom. Well- intentioned administrators had the educational foresight to permit innovative faculty the creative use of stereoscopic viewers and hand-wound phonographs in the classroom. The eyes and ears of students were excited as they never had been before. Impressions were made on the mind that previously had been impossible. Concepts and ideas were presented that would not soon be forgotten.

However, not everyone agreed with this introduction of technology into the learning environment. There were those who questioned the academic rigor of this fanciful approach to the educational process. There were those who took strong exception to the bringing of parlor games to the classroom. 'How dare they.' There were those who suggested if it was not difficult, it was not learning. 'Not learning that disciplined the mind and the spirit anyway!' What a risk and adventure it must have been for those intrepid teachers!!

Decades later, many of us can recall the first time a fellow student, or we, dared to bring a hand-held calculator into the mathematics classroom. The verbal and non-verbal reactions were akin to the response one might have observed when that first student dared to enter the parochial school classroom wearing a pink shirt, instead of the traditional white, and sporting a 'DA' hairstyle; and with about as much substance to the concern. How could one go on to grasp the higher levels of mathematics without having first memorized the multiplication tables and having gone through the tedious, manual process of finding the square root of a five-digit number? Could there have been a thought that if a student could perform so many mathematical manipulations without the guidance of a math teacher, one might not need the teacher? The serious shortage of math teachers in this country is testimony enough to the needlessness of that concern. But, that is hindsight, isn't it?

Through those times, there were teachers who could not, or would not, embrace technologies that had the potential to expand greatly what they could bring to, and present in, the classroom. Additionally, some faculty did not see themselves using technologies in the classroom that would be used extensively by their charges when they left the classroom. Some chose to leave their teaching positions and some were asked to leave. The advancement of educational technology has prevailed over their lack of effort, or desire to embrace it. As could be expected, technological advances in the learning environment created anxiety among educators just as they did for many in industry.

If change in the educational environment is such a constant, why does it seem that educational changes brought on by the technological advances of today are so much more severe than those of the past? At least part of the answer lies in the speed, constancy, scope, and complexity of today's educational changes. With the hyperbole surrounding today's technological advances, it is understandable that some will become unsettled and anxious when they convince themselves that new technological developments might lead to their own obsolescence. This is particularly true given the potential outcomes of converging technologies.

Speed:

Currently, developments in educational technology occur at warp speed when compared to those of the past. As an example, Gutenberg invented movable type in the 1440s, but it was another 480 years before the mechanized typewriter made it possible to set whole lines of type. However, after type produced on machines similar to typewriters became commonplace in the 1950s, it was only twenty years before the development of affordable computers made possible nearly instantaneous typesetting. Here we are less than twenty years after that with desktop publishing making possible the publication of an incredible range of printed matter without even going to a print shop. Today, typesetting is no more than the equivalent of typing. Anything can be done from design to page layout right in the office. There are even those who have predicted that books as we now know them will disappear. While an interesting issue, whether books survive or not should not detract from the meteoric change in how they are published. Authors are quickly becoming their own typesetters. And, their texts can be in our classrooms in weeks, not months or years.

Constancy:

Through the 1980s, many of us were astonished by the increasing speed of changes in educational technology. The very essence of the educational process was changing. Faculty had to work hard to get up to speed and even harder to stay there. Some had to learn to run with technology just to keep their place. Others had to push themselves to what they felt were intolerable limits. New educational technologies were installed and put into motion. Those who stayed around knew they would catch up and then the pace would slow back down and they could sit back, adjust to, and enjoy their re-engineered learning environment. This just has not been the case and it probably is not going to be in the foreseeable future.

New products that make the educational process more effective and efficient are introduced on a continual basis and at an increasing rate. The faculty member who does not make the rapidly advancing technology part of his or her classroom activity will find students abandoning their classroom for one that does. This may well include getting an education 'on-line' should this better suit the students' needs and expectations. Change in educational technology is not going to stop. It is the faculty member's responsibility to be there with the changes in hand.

Scope:

Advances in communication technologies have forever changed the means by which both faculty and student research will be conducted in the educational setting. They have created the potential for an 'as of yet unknown' number of new ways to deliver the curriculum to the student. Universities have access to educational markets they could never have dreamed possible. The educational process is set to become a global affair. As of yet, the educational leaders of no other country have assigned the international perspective to the process as have the educational visionaries of this nation who are espousing what is truly distance learning.

Complexity:

Today's instructional technologies involve a great array of mysterious possibilities—data repositories, data base management, mathematical manipulators, graphics' illustrators, computer-aided design and manufacturing, Internet, Intranet, and Ethernet. When one's day-to-day use of technology has been limited to word processing and an e-mail system, all of the features displayed on a menu can make even the most intrepid educator feel that he or she will never be able to conquer this monster known as instructional and communication technology. The anxiety of using new instructional technologies is real. There is no need for it to be any greater than the anxiety that accompanies learning anything new, such as learning how to use the new instructional technologies and how to make them effective and efficient tools in the repertoire of a capable educator. Our students have not learned the fear and anxiety of taking on the monster. In many cases, they have turned the monster into a toy.

Obsolescence:

Another reason for educator anxiety is that each time something new comes along, something else seems to become obsolete and soon disappears. If it is the work that you (the personal you) are doing that is being displaced by instructional technology, brushing up on an existing skill or adding a new skill to an existing repertoire is not going to be enough. Educators must replace all of the old skills that are becoming useless; 'becoming useless' in the eyes of someone other than their self. The manual manipulation of an equation in a linear programming course on the chalkboard should be replaced with the presentation of a computer program that will accept student input, manipulate the numerical data, and provide students with an answer to the problem. The role of the faculty member is to guide the student through the process. The guide at the side has replaced the sage on the stage.

Who does not know someone who has lost a job, and cannot find another simply because the work itself disappeared. Machines that produce blueprints with much greater speed and precision have replaced draftsmen. The world of bank tellers, once a sought-after career path, has become a province of ATM machines. Tickets ordered electronically through the home PC are replacing travel agents. It is not the faculty member who is going to be replaced. It is the educational process, as that faculty member has known it, which is to be replaced. It is the faculty member who will decide what part he or she will play in the changing process.

Hyperbole:

The seemingly constant exaggeration of those who report on educational technology has made some educators phobic about the impact of technology. Many educators have seen technological changes that are taking place today destroy another person's sense of job security; security which had developed from extensive education, job training, and practical experiences.

Some reports have indicated books will disappear within the next five years—for the last fifteen years. Futurists are predicting a world in which we will 'cocoon' and with our home PC: learn; earn; spend; and play. The remarkable increases in the number of people who work at home today does not make the disappearance of the office building seem imminent or even real. The home shopping networks available via television and on-line do not indicate the shopping mall will vanish, not in our lifetimes. People go to malls to see and to be seen. They go to touch and try on products. Sales clerks are not going to lose their jobs because of electronic retail commerce; though they will if they do not embrace upcoming changes. Students go to the campus and to the classroom to interact in person with the faculty and other students. The benefits of the social experience on campus and in the classroom are well documented in the educational literature (Astin, 1987).

The hype and advertising surrounding each new advancement in educational technology can be intimidating, even overwhelming, at times. As an example, the growth of the Internet in the 90s is usually described as exponential. However, the growth is only exponential because it started at such a low point and because it has only been widely available for such a short period of time. A recent Gallup Poll indicates that slightly less than 25% of the American people use the Internet at all (USA Today, 1998). Maybe the monster is not such a monster after all.

Convergence:

What is conceivably the most unsettling of educational developments is the convergence of technologies. The merger of communication and information technologies gave us teleconferencing. Communication and information technologies combined with multi-media technology to give us real-time, interactive video-conferencing. The possibilities that might result from merging technologies, though mind boggling in nature are not immediate.

Many, if not each, of these scenarios may make educators feel uncertain about their future and it is this uncertainty that creates anxiety. The problem of educational and instructional technology getting ahead of the faculty is very real. And, the answer is not, 'Oh well. It's not all that bad. Everyone else is in the same boat.' They are not. Technology poor faculty must seek out ways to cope with their anxiety and undergo personal and personal development programs that will expedite their entrance into the new educational world.

Educators must accept that change is inevitable and that it is constant.

After one has just learned to do something new or to do a significant something differently, it is a typical behavior to sit back, relax, and enjoy the sense of achievement. Some change agents have strongly encouraged just such behavior in the organizational setting. They would have administrators 'unfreeze' the organizational culture; introduce the new technology or process; ensure it was adopted; and then 'refreeze' the culture. The point being that enough time would be allowed to pass between changes to afford some 'time out' while awaiting the next change. With our rapidly evolving educational/instructional technology, that model simply will not work. The educational technology one learns today might not even be the building block for what he or she will need to learn tomorrow. There is no time for academic deans to unfreeze and refreeze the organizational culture. Faculty must suspend disbelief and get on with the change. They must embrace the learning of new educational technology and processes as a dynamic and on-going progression. Faculty who keep themselves abreast of advancing technologies will minimize their discomfort when the new buzzword (technology) comes on the scene because they will not be dealing with a complete unknown. This responsibility should be subsumed in faculty development. Educators can take comfort in the suggestion of several historians of educational technology that it usually takes five to seven years longer than anticipated for a new technology to become commonplace, if it ever does (Goldberg, 1998).

Prepare for skills displacement and job reengineering.

Several labor economists and futurists have predicted that at least eighty percent of all workers will see their job redefined at some point in their career (Goldberg, 1998). The field of academia is not excluded. Educators must discontinue assigning such a narrow definition to what it is they do. The sage on the stage job concept has been replaced by one requiring both subject matter and educating expertise. The faculty who have the most difficulty with the introduction of changing educational technologies are often those who have thought of themselves in narrow terms delineated by the specific use to which they have applied their skills, i.e. their field of study. Current research has shown teaching skills

requisite to being an effective teacher encompass more than subject matter expertise (Gusky, 1988). Additionally, those instructional factors that are under faculty control have a direct impact on student learning (Levinson-Rose and Menges, 1981). As a result of this research, faculty development has grown to include pedagogical and andragogical skills. Now the process must wholly embrace the use of technology as it impacts student learning.

The faculty development process needs to introduce and nurture hidden or immature skills with applicability to new technology and processes. In addition, educators must do some 'disaster planning'. If truly convinced they are to be replaced with advancing developments in educational technology, they must be prepared to take advantage of professional development programs that will present them with new technologies and instructional skills. Educational institutions on the forefront of faculty development have long provided the training needed by technology poor faculty to develop the skills for using and understanding technology within the classroom. Unfortunately, the bulk of professional development programs have been less encompassing; employing 'hit-and-miss' programs that inevitably 'hit' those who are already technologically advanced and 'miss' those who believe an ATM card is the cutting edge. The result of these disorganized development programs has left a marked inconsistency in the use of current instructional technology for student learning. Those responsible for professional development have allowed themselves to fall into the undesirable position of being reactive rather than proactive. It is past time for them to develop and implement an effective plan for the complete transition to current educational technologies.

Accountability and accessibility:

When educators accept the fact that advancing developments in educational technology have a half-life the length of today's clothing fashions, accountability becomes a vital issue. Just as the faculty development process has a responsibility to the faculty member so does the faculty member to the educational institution. He or she must buy into the opportunities provided. The institution, on the other hand, must ensure the appropriate professional development opportunities are readily available. As with any adult learning, needs assessments should be used to determine the format, time, and location that will induce the most productive training (Knowles, 1980). The futility of offering an on-line professional development course to the faculty member whom is not computer comfortable should be apparent. Similarly, a professional development course for adjunct faculty scheduled during the traditional workday or at a distant site is likely to result in minimal attendance.

Anticipate the next change in the educational process.

Faculty must not let an absorption in the immediate effort to master the current change blind them as to what is on the horizon of educational change. There are always signs when change is about to occur. If one is vigilant to what is going on in one's environment, he or she will get a sense of what lies ahead. An essential part of the faculty development process has to be for colleagues to deliberate on any changes they foresee and, much more importantly, to plan for the accommodation of those changes. Several techniques exist to effectively forecast educational change. The use of such practices to proactively address reengineering and technological change is a paramount responsibility of faculty developers. The use of such practices is to be a prime responsibility of faculty developers. Educational institutions providing anything less are guilty of nonfeasance.

Build networks.

Educators cannot wait until trouble arrives to build a network of colleagues. In addition to sharing information about coping mechanisms and technology trends in the educational field, they can learn the instructional skills needed to maintain their value to the student and, thus, to the organization. Networks of colleagues are built slowly and carefully over a period of time as persons come together to exchange information, and learn to trust and help one another. The faculty development process is an appropriate venue for building these networks. The process should, by its very definition, promote the sharing of information, the building of collegiality and trust, and present the opportunity to help each other evolve as educators. An effective professional development program results in a lasting support network that provides continuous growth while presenting the opportunity to help each other develop as educators and instructional technologists.

Train, evaluate, retrench, and train some more.

Faculty can never afford to pass on the opportunity to learn just a little more about instructional technologies or any other educational skills. They should ask mentors and colleagues to teach them something new. They should insist on faculty development that presents innovative and creative thought, promotes critical thinking, does not get taken over by 'group think', and identifies changes on the horizon as early as possible. A vital goal of faculty development is to prepare faculty adequately for educational change. With the current rate of change in educational technology, this cannot be a 'hit-and-miss' operation. If this development is presented appropriately, faculty can approach the necessary learning and/or retraining without the sickening fear that accompanies the unknown, promotes anxiety, and makes it so difficult to learn. If it is not accomplished successfully faculty will retreat to the safe, narrow world of teaching ability defined solely by subject matter expertise; at least, until such time as they are forced from the system or, preferably, induced into a user-friendly, constructive development program.

Understanding the objectives of effective faculty development, knowing how, and why, specific outcome measures were set, and using clearly defined criteria for evaluation will provide the opportunity to assess objectively the effectiveness of development programs in educational technology. Specifically, programs resulting in decreased anxiety by the technology poor faculty and increased adoption of current instructional technology into the educational process will be affirmed. Programs resulting in only a topical understanding of new technology and continued, or perhaps increased, anxiety should be redesigned to meet the needs of the faculty.

Now, let's start it all over again.

Okay, you have done it. A new technology or educational process was introduced and you mastered it. And, it was not so bad after all, was it? Now, for the well deserved rest... Wrong! The next wave of change is just around the corner. There is not enough time to relax. Start figuring out the change. Spread the word throughout your networks. Get it on the agenda for the next faculty development meeting. I think you get the point. Think of it like driving on ice. You do not fight the skid: you go with the flow.

We live in an educational world where technology brings constant and perplexing changes to our professional lives. The toughest ones to handle are those that affect our livelihood, our hopes and means of providing a future for our families and ourselves. Technology is not going to disappear. The educational process is not going to remain the same. We need a faculty development program that will help us deal with our fears and anxieties and that will present us with the opportunities to master the change and to use the technology to excel as educators.□

Wm. Francis Herlehy III earned his Ph.D. in Educational Administration at Kent State University. He is an Associate Professor in Business Administration with Embry-Riddle Aeronautical University.

Merodie A. Hancock holds a Ph.D. in Urban Services with a concentration in Education from Old Dominion University and a MBA from Claremont Graduate University. She is a Resident Center Director and adjunct faculty member for Embry-Riddle Aeronautical University.

REFERENCES

Astin, J.E., (1987). Socialization on the college campus. Garth, Australia: Innsbruck.

Goldberg, B., (1998, February). Change anxiety. Educational Review.

Gusky,T.R., (1988). Improving student learning in college classrooms. Springfield, IL: Thomas.

Knowles, M.S., (1980). The modern practice of adult education. Englewood Cliffs, NJ: Prentice Hall Regents.

Levinson-Rose, J., and Menges, R.J. (1981,Fall). Improving college teaching: A critical review of the research. Review of educational research, 51, No. 3 403-434.

USA Today, (1998). Internet; Intranet; Ethernet. www.usatoday.com