

Facing the Future: Challenges to our professions over the next 10 years  
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When we anticipate the next 10 years of the development of our professions of Speech-Language Pathology and Audiology, it is helpful to gain perspective from a quick look to the past. Ten years ago e-mail was viewed with great expectations for shortening the work days and creating paperless offices! We were in the early years of cell phone use, and “.com” mania, and had minimal use of PDA devices and wireless technology. The term “nanotechnology” had not been invented; there was no evidence of hair cell regeneration in mammals. Baby Boomers were truly “middle aged”! In this presentation we will examine significant challenges to our professions over the next 10 years. These include: 1.) embracing technology and new professional team members with a simultaneous call for a professional “cultural” shift, 2.) changing client demographics and external pressures on clinical education, 3.) need for a new continua of service providers with new educational models to support them, 4.) imperative to capitalize on redistributed client service needs in creating new models for clinical externship sites, 5.) global shifts and their effect effects on our professions.

**Embracing technology and new team members: a call for a professional cultural shift**

Manuel Castells is a noted social scientist and professor at the University of California Berkley and Professor of the Information Society at the Open Catalan University in Barcelona, Spain. Castells has contributed significant research on the effects of technology and the Internet on societies. In *Conversations with Manuel*

*Castells* (Castells and Ince, 2003), Castells describes the current social environment as it applies to Audiology and Speech-Language Pathology and our universities. “...on the one hand, networks of instrumentality, powered by new information technologies...on the other hand, the power of identity, anchoring people’s minds in their history, geography, and cultures...in between lies the crisis of institutions and the painful process of their reconstruction”. For our professions to advance with the benefit of the technological tools of the 21<sup>st</sup> century, we must continuously seek members with specific characteristics. Josefowitz (1980) succinctly frames the timeless traits of desirable personnel. “Pioneers needed: terrain uncharted environment frequently hostile, sustenance meager or nonexistent, climate adverse, results uncertain and end of journey not in sight”.

Technology is changing our global and professional cultures. In this regard, Castells and Ince (2003) bring sharp global focus to the value of the effective use of technology in our current world culture. “The intelligent, strenuous effort of farmers in Mexico for the whole year cannot compete in value creation in our economy with one hour of cutting edge software programming for the mobile internet in Helsinki.....the world will be increasingly networked, so competition and collaboration is no longer between nations but between firms and individuals...”

It is clear, that cultural identities create powerful economic and scientific identities. Examples of these culturally-bound relationships include the Chinese business networks constructed on “identity based on trust not paper” (Castells and Ince, 2003), the India-Silicone Valley connection formed in the early 60s which is now creating new high tech businesses in India, and the entrepreneurial, early post-Vietnam War Vietnamese

immigrants who have been very successful in new businesses in the U.S. and are now reaching back to Vietnam via the Internet “creating significant economic development” in that country (Castells and Ince, 2003). There are also lessons from broader cultural insularity that can be applied to the evolution of our professional cultures. According to Castells and Ince (2003), Japan invented the term “information society,” but is now doing little fundamental innovation. Castells observes that its homogeneous/nationalistic culture is not open to other cultures or innovation. As a result, it is now the “least information-oriented society of any advanced economy”. The clear message from these global examples of technology-cultural dynamism is that our professional cultures will also dramatically change over the next 10 years.

The challenges to our professions will be to incorporate new members (e.g. engineers and bio-scientists) and redefine our relationships with existing members of our professional culture (patients and their families, physicians, nurses and teachers). We must also maximize the connectedness among the members of our cultural group, build new professional paradigms with the help of rapidly evolving Information and Communication Technology (ICT) and incorporate new technology to effect desired changes in educational programs, legislative policy and professional practice patterns.

Audiology has suffered from “cultural” insularity over the past decade. The profession has experienced *exclusion* (Ph.D. students not allowed equal membership in the National Association of Future Doctors of Audiology (NAFDA), *insulation* (alienation from the otolaryngology community), *demands for conformity* (the Au.D. as the sole designator of the practice doctoral degree) and “*nationalism*” (turf battles between ASHA-AAA-AFA-ADA). The result has been a reduced ability of the

profession to develop a “professional culture” that is inclusive, innovative, outcomes-focused and proactive in preparing for the future. Audiology must change its culture if it is to survive and flourish as a profession.

Our universities have been and will continue to be a source of great potential power in support of the development of programs needed to retool our professions. Castells concludes that the source of U.S. structural superiority is the American University System (over 4,000 universities). It draws talent from all over the world, with many of the students and faculty ultimately elect to stay in the United States. This has created what has become “the most important imbalance between the U.S. and the rest of the world”. Castells and Ince (2003) report that 50% of the Ph.D.s in science and engineering in the U.S. are foreigners who come to the U.S. and stay. In contrast less than 5% of the Ph.D. students in Japanese universities are from countries other than Japan. The result of the U.S. university system’s global inclusiveness has been the evolution of “superpower status” for the U.S. derived largely from the university superiority and absolute technological leadership (Castells and Ince, 2003). This is the engine that stands ready to power our professional evolution.

Although our collective U.S. university community is strong, it is also true that not all universities are equal. In fact, those that have become innovative and entrepreneurial are gaining the edge in areas of discovery, learning and engagement. Specifically, as we examine our own universities and the diminishing resources supplied by state and federal dollars, it appears that those with the greatest creative and technological edge are those with rapidly developing “research parks”. These “parks” enable and create synergistic relationships between universities, businesses and their

states. These synergies are win-win for both their faculty and students, and they result in significant financial resources coming to the universities. Concurrently, outflow of technological infrastructure in the way of new products, personnel and overall economic development boost state and national economies.

As we look to change our professional cultures with the benefit of ever evolving technologies, the global disparities in technology capacity risk becoming permanent and irreconcilable inequities. Castells and Ince (2003) conclude, "...while the Internet cannot be eaten, countries cannot eat without the Internet in a global, networked information economy." As is now happening, Castells predicted that "leaders of major ICT companies will join together with universities to develop ICT and the human resources to support it to take it to South Africa and later Africa. Unfortunately when this finally happens, South Africa and Africa will be in even deeper social deterioration and economic decline." The challenge to us in the U.S. as we look forward to the technology-enabled evolution of our professions and our universities is how to bridge the ever widening and deepening chasm between the technology of the "First World" with Second, Third and Fourth world countries. As an example of an attempt to breach this great technological divide, MIT recently announced that the MIT Media Lab (Nicholas and Elaine Negroponte) has created a \$100 laptop for children in a Cambodian village without electricity. They report that, if nothing else, it is the brightest light source in the huts of these people. These computers are Internet/multimedia-capable and mass-produced in orders of 1 million units. The intent is that they will be purchased in mass by countries. MIT is now dealing with the challenge of controlling the monitor display to maximize battery life. This computer uses the Linux operating system, has hand-crank

re-chargeable batteries, uses rear projected image, and Wireless fidelity (Wi-Fi) access to wireless local area networks (WLAN). In this project, MIT has been able to eliminate the concepts of “profit”, “sales costs” and “marketing costs”, but they conclude that even if laptops are free, Internet access and electricity are huge problems as well as service care for the electronic devices.

As we look toward the evolution of our professions, with the explosion of cross-disciplinary communication and collaboration in the use and development of new technology, we also see a progressive blurring of the identity of professional disciplines. In the new frontier of microelectronics work is now being done on genetic material with electric current being replaced by chemical reactions. In addition, DNA-based chips and the rapid evolution of the cross-disciplinary field of Nanotechnology are now with us, with a merging of microelectronics and biotechnology into new materials. The result: the application of information processing to living matter. There is also a merging of physics, biology, chemistry and engineering, with tremendous potential for application to the disciplines of speech, language and hearing science. We can now envision nano-bio-electric sensors being injected into the body to migrate to various target locations and via wireless computer interfaces, provide information that will form the basis of medical decisions, or replace the function of cells and systems such as auditory hair cell sensory transducers.

Soon our concepts of “chip technology” in the context of the semi-conductor industry will be ancient history. Intel has recently announced that they have broken the 100 nanometers (nanometer = billionth of a meter) barrier forcing top-down circuit structure to pattern below 100 nanometers. There is now a confluence of top-down and

bottom-up nano-scale organization which will result in the end of the “scaling era” in micro-circuit technology. Dr Sands, Materials Science and Engineering, Purdue University, predicts that this will have significant and potentially negative economic ramifications on the chip industry as it currently exists. He also reports that the way is being paved for guided bottom-up self-assembly of cellular networks as occurs in nature, e.g. crystal formation. The challenges in the development of this technology will be to control the self-assembly process, the accuracy of the process and the containment of costs related to the implementation of this new technology (Timothy Sands, Ph.D, personal communication, April 12, 2005).

Our professions will also face a future of advanced regenerative biology and medicine, likely a dominating biomedical revolution of the 21<sup>st</sup> century. This technology will reproduce organs and appendages with bio-artificial alternatives made possible by the ability to guide the repair process along a regenerative pathway, rather than a pathway leading to scar tissue formation. The result: an ability to turn on mammals’ hidden regenerative capacity that is now suppressed. The current success in using this technology to treat some conditions using cell therapy, bio-artificial tissues, and molecular agents suggests that within a decade or two, “regeneration” will be a viable alternative in medical treatment.

We have recently witnessed the application of this technology to mammalian hair cell regeneration. Izumikawa and colleagues (Pobojewski, 2005) have reported the phenotypic transdifferentiation of nonsensory cells that remain in the deafened adult guinea pig cochlea using the *Atoh1* or *Math1* gene carried by an adenovirus and injected into the guinea pig cochlea. This resulted in the regeneration of hair cells and

substantially improved hearing thresholds in a mature deafened inner ear. This is the first report of the demonstration of cellular and functional repair in the Organ of Corti of a mature deafened mammal, paving the way for a new therapeutic approach for cellular and functional restoration in the damaged auditory epithelium and other sensory systems.

In other arenas, we are also now seeing the application of robotic technology to surgery. The Center for Computer Integrated Surgical systems and Technology at Johns Hopkins has developed surgeon-guided robots, which have the potential to do precise procedures with greater accuracy and reliability than the human surgeon alone. The implication is that robots will change surgical practice as profoundly as they have changed manufacturing. What will robotics assist or replace in our professions? Automated interactive hearing test protocols with diagnostic summary and written reports, automated interactive swallowing/voice/speech/language evaluation immediately come to mind.

What are the imperatives of this brief technology overview? Our professions and our university programs must maintain and enhance the flexibility that will be necessary to adopt rapidly changing technology in support of our missions of discovery, learning and engagement. We must prepare to continuously modify our practices and refine our professional cultural identities based on technological advances affecting and determining the characteristics of the people we serve.

There are of course negatives associated with our technology dependence. These include: 1.) the protection of intellectual property in the thoroughfares of Cyberspace, 2.) the Cyber-flight of non-peer reviewed “truths”, 3.) the contamination of the knowledge base of our professions, 4.) the protection of the integrity of data bases from advanced

hacking and Cyber-terrorism, and 5.) lack of reward of faculty for when they pursue collaborative research facilitated by ICT technology for purposes of promotion and tenure, if indeed these concepts exist in 10 years. There will also be constantly evolving incompatibilities between every-changing computer hardware/software and the functions we require as end-users, e.g., changes in input ports and the resultant incompatibilities of our peripheral devices, such as those used for programming hearing aids or analyzing acoustic characteristics of speech. What will be the cost to university programs to maintain the technology “cutting edge”? Will it result in the survival of the financially “fittest” among our university programs? For example, Duke University in 2004 provided a free \$300 iPod to each of that year’s entering freshman. Was this the best use of their funds? Did it give them a competitive advantage in the short and long terms?

Castells and Ince (2003) reflect that technology per se does not do bad or good to societies, but it is not indifferent. It enhances existing or potential trends, possesses great freedom for communication and global interaction, which makes it ideal for building networks. In other words, Castells concludes that “the more intelligent an organization, the better it uses the Internet, which in turn, makes it more intelligent in a productive spiral.”

To this end, we in the professions of communication sciences and disorders may want to add a new annual meeting to our “must attend” list. This is the International Conference on Technology, Knowledge and Society. The 2005 conference program states that the conference is a “cross disciplinary approach to technology in society...digital information and communications technology, human usability, technologies for citizenship and global community participation.”

## **Changing demographics and external pressures on clinical education**

What will be the context for the evolution of our clinical of audiology and speech-language pathology? We will see shortages of most health care professionals with the mandate to do increasingly more with less! There will be increased inadequacy of third party payer resources. There will be the well-documented shortage of doctorally-prepared clinicians and researchers in our professions to maintain the professoriate. It will be commonplace for premature infants less than 23 weeks gestation to survive with increasingly inadequate long-term follow-up resources.

As we look to the future of our clinical education and clinical services, what will be the status of our pediatric clinical populations? In contrast to the advances in technology associated with the “information age,” hundreds of millions of children will continue to live in poverty around the world. In the U.S., although 13% of all Americans live in poverty, 17% of U.S. children live in poverty with a lack of appropriate child care or health care. We say children as our most important resource, but we do not take care of them. There is a 10 to 20 year lag between demographic realities e.g., 70% of mothers in the workforce, and their access to safe, good-quality child care programs (Novak, 2005). Forty three million Americans are uninsured. The Child Health Insurance Plan (CHIP) was signed into law but there are significant barriers to enrollment that are limiting its effectiveness.

What about our older adults? In 10 years, 30% of the U.S. population will be over 65 years of age with an average life span well in excess of 70 years. In contrast to our children, most will expect a good quality of life. What are the implications of this shift in demographics for our fields? There will be increasingly heated ethical debates in the

U.S. entrepreneurial health care system related to distribution of limited resources (children versus older adults,) and in addition, we will see mounting and heated religious and moral debates regarding the application of cellular and genetic engineering with striking parallels to the eugenics (science dealing with the improvement (as by control of human mating) of hereditary qualities of a race or breed) movement of the early 20<sup>th</sup> century.

Will the past be prologue regarding clinical education in Audiology and Speech-Language Pathology and the evolution of our scopes of practice? The history of our professions has shown that external pressures have resulted in the expansion/reduction of our scopes of practice, e.g., swallowing (dysphagia), use of endoscopy, cerumen removal, intra-operative monitoring, vestibular assessment /rehabilitation, cochlear implantation...tongue thrust! What will be the scientific and health care system pressures in the next 10 years?

Based on the availability of rapidly advancing technology, it is possible to predict areas of expansion and retrenchment. Areas of expansion may include: the assessment/treatment of genetically engineered reconstructed tissue (laryngeal re-growth, reconstructed neural networks for stroke, auditory/vestibular hair cell re-growth, and speech prosthetics) all with a geriatric emphasis. We will also be increasingly participating in “tailored portals” (Novak, 2005) for cross-disciplinary patient education and treatment via the Internet with increased emphasis on early intervention with difficult cost-related decisions regarding distribution and extent of services to our various clinical population cohorts. These “tailored portals” will be unique combinations of assessment/treatment/referral resources automatically assembled via the Internet upon the

entry of a particular patient's unique combination of symptoms and diagnoses. Areas of retrenchment may include the reduction of clinical populations through cellular engineering and nano-neurological rehabilitation including patients with Parkinson's disease, Alzheimer Disease, Dementia, Down syndrome, birth defects, laryngectomy and stroke. There will be an increased imperative for interdisciplinary team management and linkages of services through ICT.

Our speech-language pathology and audiology students of today have different concerns from those of their predecessors. At the top of the list, they have rising student school loan indebtedness with a growing imbalance between debt/income ratio upon graduation. There is a related loss of men entering the fields. To add to the distress of the educational cost/benefit analysis, a significant curricular component of the current 6-year (SLP) and 8-year(AuD) college education is not related to knowledge/skills necessary for the current and future practice of the professions.

On the positive side, there is a high demand for our graduates, as we face the current and future reality of inadequate numbers of speech-language pathologists and audiologists to serve the populations with communication disorders. There is also the reality that the professional service needs of the populations we serve vary in complexity, from complex diagnoses and treatment to routine screenings....and hearing aid trouble shooting. Not all clients' needs demand service by a master's or doctorally-prepared SLPs or audiologist. We must also recognize the reality that our high schools are introducing critical thinking and decision making into their curricula and their graduates are Internet and ICT savvy. This suggests that contrary to their predecessors, our future

high school graduates may be better equipped to manage basic science and professional content courses earlier in their post-12<sup>th</sup> grade college curricula.

### **New continua of service providers and related educational models**

With these realities in mind, the imperative for our professions and academic programs is to create new educational tracks that acknowledge that different levels of preparation must be matched with the demand for different levels of clinical service, e.g., assistants/technicians to doctorally-prepared SLPs/audiologists. The imperative is for increased efficiency and relevancy of educational preparation for all providers and increased rigor and prescription of the undergraduate curriculum leading to clinical education. In other words new basic science tools will be required for SLPS and audiologists and their professional education has to begin earlier in their college experience.

Our challenge as academic educators is to envision the future and the best model for the “communication disorders service personnel continuum,” identify the most appropriate educational preparation for the “scope of practice” of each team member and in so doing, maximize our community college and 4-year university resources to create it! Audiology would have been well served to have followed this approach.

Such a model for speech-language pathology would be:

*assistant/associate/aide/technician (settle on one as all currently exist causing great confusion for the consumer)-master’s level SLP, doctorally-prepared “SlpD” plus optional PhD (the added research training required for individuals pursuing academic teaching/research positions).*

For audiology a model could be:

*audiometric technician, non-audiologist hearing aid dispenser (they currently are licensed with no educational requirements), doctorally-prepared AuD plus optional PhD (the added research training required for individuals pursuing academic teaching/research position).* What will be the best models and how can they be implemented?

A better model for speech-language pathology and audiology preparation would recognize the previously cited current clinical education realities, and might transition from post-graduate Master's degree SLP and post-graduate AuD degree in audiology to a "seamless" (12+)"first professional degree" educational model that addresses both the shortage of clinicians and researchers, similar to the Pharmacy doctorate (PharmD) model. This model could include:

High school plus 2-3-year pre-professional education plus 4-year professional education = 6-7 year clinical doctoral degree plus 2 years (optional) for the Ph.D. = 8-9 years. The same outcome currently takes 10 years minimum in SLP and 10-11 years minimum in audiology.

Enactment of this model would require knowledge about and "passion" for the professions among high school graduates accompanied by focused and ongoing outreach by our universities and professional organizations to the middle and high schools. For this alternative 12+ model to be possible (similar to the Pharm D), the current ASHA certification and state licensure language would have to be modified to include a "first professional degree" rather than only a post graduate (graduate) degree (e.g. master's in SLP and AuD or similar post-graduate doctoral degree in audiology). Currently the ASHA certification language for audiology stipulates 75 post graduate semester credit hours and for speech-language pathology 75 total semester credit hours with at least 36 credit hours at the graduate level.

In the new educational models it will be important to provide our SLP and audiology graduates (now majority female) with new tools to create “paths to power” (Josefowitz, 1980) in the workplace. Such curricular content might include organizational leadership, policy development and grantsmanship to name a few. These new skills theoretically should translate to new value-added in the workplace and higher salaries. Higher salaries should in turn create an increased interest in our professions among men. The challenge will be to change how some women among future cohorts of SLP and audiology students view their careers. In other words, in order to achieve higher positions and salaries in the future, a cognitive shift must occur among these women from viewing their profession as a part-time/secondary/fall back job to a primary, long-term, full-time career.

As we look to the future of the practice of our professions there will be imperatives for coordinated, multidisciplinary patient management, with the application of ICT and other forms of technology and development of new knowledge/skills that address changes in patient populations. One example of a new educational program partnership development is the inclusion of engineering. The Regenstrief Foundation in 2004 awarded Purdue University 3 million dollars to develop a “Regenstrief Center” that would improve access to and service delivery by the U.S. health care system. The new center will apply process engineering, management, science and information technology to improve the delivery of health care. The current partners include engineering, nursing, pharmacy, health sciences, communications, with our hope of including speech, language and hearing sciences in the future. This center will apply “supply chain management” and “just-in-time manufacturing” to health care, following the flow of information, funds

and materials through the system to achieve better results and efficiency. The focus is to improve safety and efficiency of patient care, access to and effectiveness of patient care, efficiency of deployment of health care personnel and coordination of inpatient/outpatient care across settings, e.g., hospitals, community-based clinics, school-based clinics.

Departments of speech, language and hearing science across universities must facilitate partnerships with such interdisciplinary innovative projects on their campuses. How might we integrate students in SLP and audiology with engineers in their pre-service education programs? Again, one example at Purdue University is the Engineering Projects in Community Service (EPICS) Program. In the EPICS program SLP and audiology students work together with engineering students to address the need for new adaptive technology to meet the needs of their community partners, e.g. school special education programs, adult learning programs, speech-language-audiology clinic. EPICS provides SLP and audiology students with the experience of working with engineers in front-end product development. The goal: develop a comfort among SLP and audiology students with and desire to partner with engineers in the future.

It helps to have incentives for faculty and students to develop these partnerships. Again, at Purdue, the EPICS program is required for all AuD students and optional for speech, language and hearing science undergraduates. The university through its Burton Morgan Entrepreneurship Programs has created the “idea-to-product (I2P) competition” with cash awards of \$15,000, \$10,000 and \$5,000 for first, second and third prizes respectively and the automatic entry of the first two place award winners in the \$100,000 Burton Morgan Entrepreneurship Business Plan Competition. One of the speech-language-audiology clinic EPICS projects took the 2005 \$5,000 prize demonstrating the

shorter term economic (and hopefully long term professional) incentives for audiologist and SLPS to partner with engineers.

**Imperative to capitalize on client service needs in creating new models for clinical externship sites**

Academic programs are experiencing a reduced access to health care externship sites, particularly to managed care clinical sites, caused by concern among these organizations about their financial “bottom lines”. Participation in our clinical education programs does not enhance their business balance sheets. Increasingly universities will be expected to “pay to play”, e.g., cash and infrastructure in the way of facilities and personnel, in those arenas to compensate them for “lost revenue”. How will this be managed? We are also increasingly seeing (particularly in audiology) the expectation by the clinical sites for “provisional licensure” of externs for the purpose of third-party billing. Third party payers are in fact now a significant driving force in our educational program policy decisions. This runs counter to the current AuD model in which all supervised clinical experiences are “pre-graduation” and counter to the future challenge to create more “seamless” and “relevant” post-12<sup>th</sup> grade educational programs in both SLP and audiology potentially resulting in the preparation for both disciplines being pre-graduation. There are those who strongly argue that these students are not finished with their degree programs, and therefore not ready to have any form of state licensure.

As stated earlier, many poor, uninsured children in the U.S. will increasingly receive their only primary health care, including SLP and audiology services, in the schools and community-based “free clinics”. Current state and federal mandates and advanced technologies are driving an ever increasing need for access of school

populations to school-based SLP and audiology services. These include: 1.) newborn hearing screening, 2.) early intervention (birth-to-three), 3.) most appropriate education in the least restrictive environment (more “sick” children and children with complex multiple disabilities in the classroom), 4.) “no child left behind” legislation, 5.) pediatric cochlear implantation and the presence of children using advanced signal processing hearing aids and assistive/augmentative communication devices in the classroom. Public schools have an inadequate supply of SLPs and a ballooning need for educational audiology services and adequately prepared audiologists. The mandate for expanded educational audiology services is however confounded by poor public school administrative awareness for the need for audiology services, poor adherence to special education laws pertaining to children with hearing loss and tight public education budgets. To make matters worse, there is inadequate inclusion of the curricular areas of educational audiology and pediatric aural rehabilitation in many current AuD programs.

With the increasing unavailability of managed-care health care externship sites contrasted with the desperate need for SLP and audiology services in the public schools, our SLP and audiology education programs must look to their neighboring public schools and free clinics to combine our professional education goals with their need for services. Schools, in the future can be sources of both “educational” and “health care” externships experiences in the presence of our shrinking access to more traditional health-care sites.

In addition to the school and free clinics, the imperative is for audiology and speech-language pathology programs to incorporate additional “new” multi-disciplinary clinical sites with win-win potential for accessing target populations, e.g, corporate wellness programs and multi-level-of-care retirement communities. Related to the search

for new clinical education partners is also the need to expand our definition of “qualified clinical instructors”, and the use of ICT technology for clinical instruction and access to new programs and populations. For example, it does not seem unreasonable that a licensed otolaryngologist experienced in nasal endoscopy, could supervise nasal endoscopy experiences for SLPs and have those hours count toward the SLPs’ clinical certification and state licensure. In the future we must also look at how we can expand the existing capacity of our SLP and audiology faculty through the use of Wi-Fi technology for purposes of distance instruction and clinical supervision. Dudding and Novak (1999) were among the first to use distance two-way audio/video computer-assisted supervision in their Virginia Department of Education-funded bachelors SLP-to-master’s SLP degree program. This technology allowed school-based bachelors-prepared “SLPs” enrolled in the UVA master’s program to obtain clinical experiences in their home communities using Polycom/computer-supported two-way audio/video interactive supervision. This technology allowed supervision of students in distant locations from the clinic in Charlottesville. This dramatically expanded capacity to meet on-site program needs at the University of Virginia as well as the needs for clinical supervision by those students enrolled in the distance program.

As we look to the future with the ever-expanding impact of technology on our professions and professional education programs, it is easy to forget that it is the people in our professions who will continue to be THE key ingredient. “Organizations don’t really accomplish anything. Plans don’t accomplish anything either. Theories of management don’t much matter. Endeavors succeed or fail because of the people

involved. Only by attracting the best people will you accomplish great deeds.” (former U.S. Secretary of State Colin Powell) (Harari, 2002).

### **Global shifts and our professions**

Covey (2004) describes “global seismic shifts” that have relevance to the future of our professions. 1.) There will be globalization of markets and technologies resulting in educational “markets” without borders. 2.) There will be an emergence of “Universal Connectivity: the glue that has held our economic (and educational) activities together is rapidly melting in the heat of universal connectivity” (Evans and Wurster, 1999). 3.) There will be democratization of information and expectations. In other words, no one will manage the Internet with the realization that information drives expectations and social “will” on a global scale. 4.) There will be an exponential increase in competition. Covey asserts that we will no longer be able to afford to benchmark against competitors or even so-called excellence, rather it must be “world class”! 5.) There also will be “free agency” with the educational market turning into a free agent market with students and faculty having more and more awareness of global choices. 6.) And finally Covey cautions that we must continuously reaffirm the guiding principles of our professions and educational programs as we will be in a state of “permanent white water...and can be lost in the roar, the immediacy and urgency of the dynamic challenges we will face.”

There is great potential for globalization of our professions and educational programs. We look forward to digital communication with no language barriers (real-time text-to-text, voice-to-text, and voice-to-voice language translation), participation in international seminars, colloquia, and grand rounds without leaving our offices, and participation of international students in U.S. educational programs: minimizing effects

of changing Visa policies on the viability of our educational programs. We also look forward to increased ability for collaborative international clinical trials and other research with the substitution of institutional “silos” (farming analogy of one grain silo serving one farm) of clinical best practice and research for international networks of collaboration. We also will see rapid advancements in the global knowledge base of our professions with delineation of previously unknown cross-cultural/racial “truisms” for human communication and its disorders. All of this will result in a progressive blurring of cultural difference among our future students and faculty. The Internet and advanced ICT technology will expand capacity for international professional networks to serve as resource for work with multicultural students and clients in the U.S. There also will be an increasingly greater potential for intercontinental portability of qualified SLPs and audiologists. The ASHA quadrilateral agreement between the U.S. England, Canada and Australia facilitating mutual certification of SLPs by participating country’s professional organizations, is a recent tangible step in this direction for SLP. This needs to be expanded to audiology and to other countries.

Our challenge, as we incorporate technology and new educational models to enhance global service delivery to our ever-changing student and patient populations: achieve the imperatives for change without abandoning those countries that are technologically disconnected and their populations with communication disorders.

**How can we possibly meet the challenges over the next 10 years?**

“When you are inspired by some great purpose, some extraordinary project, all your thoughts break their bounds. Your mind transcends limitations, your consciousness expands in every direction, and you find yourself in a new, great and wonderful world!”

(The Yoga Sutras of Patanjali, Covey, 2004). Alex (co-presenter Dr. Alex Johnson), what do you think? (Dr. Johnson's response was the second half of this key note address and is a separate proceedings document).

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