The Journal of the Association of Schools and Colleges of Optometry

OPTOMETRIC EDUCATION

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Optometry's Global Reach

Association of Schools and Colleges of Optometry

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2009

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INDUSTRY NEWS

The following companies support ASCO's national programs and activities benefiting the schools and colleges of optometry in the U.S. and Puerto Rico.*

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**As of April 1, 2009*

Essilor Celebrates Varilux's 50th Anniversary

World's first progressive lens continues to set standards in vision care

Essilor of America, Inc., is kicking off its celebration of the 50th anniversary of Varilux® lenses, the world's first and most prescribed progressive eyeglass lens in the world, with a year of exciting activities. The company will commence the celebrations with a new 3D movie "The Varilux Experience" and the revelation of a special anniversary logo. The name Varilux means "variable light" to denote the progressive, or variable, power of the lens. The introduction of Varilux lenses changed the lives of presbyopes by allowing wearers for the first time to see at all distances - near, far and everything in between.

Abbott Completes Acquisition of Advanced Medical Optics

Abbott has completed its acquisition of Advanced Medical Optics (AMO). AMO is now a wholly owned subsidiary of Abbott and has been renamed Abbott Medical Optics Inc. The acquisition of AMO enhances and strengthens Abbott's diverse mix of medical device businesses and gives it a leadership position in the large and growing eye care market. Abbott Medical Optics holds the number one position in LASIK surgical devices, the number two position in the cataract surgical device market and the number three position in contact lens care products.

Children's Self-Perceptions Improve More With Contact Lenses Vs. Glasses

Three-year study of children ages 8-11 years shows contact lens wearers feel better about their physical appearance, athletic competence, and social acceptance

Contact lenses provide value-added benefits to children beyond simply correcting their nearsightedness -- significantly improving how they feel about their physical appearance, acceptance among friends, and ability to play sports. Data from a three-year multi-site study assessing the effects of glasses and contact lenses on the self-perception of nearsighted children ages eight to 11 years, further reveals that for children who initially dislike wearing glasses, contact lenses also make them more confident about their academic performance. "Many studies have examined the effect of spectacle wear on self-perception and the perception of others, but the majority of this research has been conducted on adults," explains Jeffrey J. Walline, O.D, Ph.D., Ohio State University College of Optometry and leader of the Adolescent and Child Health Initiative to Encourage Vision Empowerment (ACHIEVE) Study, the largest randomized trial of its kind. Findings appear in the March issue of Optometry & Vision Science, the peer-reviewed journal of the American Academy of Optometry.

FERRIS STATE UNIVERSITY

DEAN, MICHIGAN COLLEGE OF OPTOMETRY

Ferris State University is seeking dynamic, highly motivated, and experienced candidates for Dean who will serve to further the mission of The Michigan College of Optometry. The Michigan College of Optometry (MCO) is located at the Ferris Big Rapids campus and has a student body of over 140 students and 22 full-time faculty. The Dean will serve as chief academic and executive officer of the College and will have the responsibility of ensuring that the academic and patient care missions of the College are accomplished consistent with available resources. The College is currently in the process of designing a new facility with construction scheduled to begin in the summer of 2009. The Dean will have a significant role in overseeing this process to completion (scheduled for August of 2010). MCO is firmly founded on the principle of providing excellence, leadership, and innovation in optometric education through outstanding didactic and clinical teaching, relevant clinical research, and community service.

Required Qualifications: A degree in Optometry and demonstrated leadership and administrative qualities and abilities to manage academic and clinical programs at the professional doctoral level.

Review of applications will begin immediately and continue until candidates are selected for interview. A letter of application outlining interest in the position and how his/her qualifications meet the desired characteristics, curriculum vitae, and the names and contact information (including telephone numbers and e-mail addresses) of at least four (4) professional references are required. All materials should be submitted electronically to the search committee at **mcodean@ferris.edu**. If you have questions, contact the search committee chair: **Roger D. Kamen, OD, MS, Professor of Optometry, Telephone: 231-591-2189, or email:kamenr@ferris.edu**.

Ferris State University is sincerely committed to being a truly diverse institution and actively seeks applications from women, minorities, and other underrepresented groups.

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NORTHEASTERN
STATE UNIVERSITY

OKLAHOMA COLLEGE OF OPTOMETRY

in Tahlequah, Oklahoma is seeking applicants for three faculty positions with an emphasis in primary care. Two positions are tenure track positions and will include classroom and clinical teaching duties. Opportunities exist in Anatomy and Physiology, Vision Therapy/Rehabilitative Optometry, Pediatric Optometry, and Community Health. The third position is a non-tenure track position with responsibilities for providing direct clinical care and clinical teaching.

Applicants' qualifications must include the O.D. degree and eligibility for licensure to practice the full scope of Optometry in **Oklahoma**. Preference will be given to applicants with advanced academic degrees, residency training, or teaching experience. Positions open until filled.

A current curriculum vitae, official transcripts of all college work completed, and three letters of reference should be submitted to:

DR. MARTHA ALBIN, DIRECTOR OF HUMAN RESOURCES
NORTHEASTERN STATE UNIVERSITY
600 NORTH GRAND AVENUE
TAHLEQUAH, OK 74464-2399

Questions concerning the position may be directed to:
Douglas K. Penisten, O.D., Ph.D.
Associate Dean (918) 444-4025
Ref: Position # EOOO2004, EOOO2014, PPCN2003

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EDITORIAL

Evidence-Based Education

Elizabeth Hoppe, OD, MPH, DrPH

As health care providers, we have become quite familiar with the push toward evidence-based medicine and evidence-based clinical decision making. In the clinical setting, we strive to implement evidence-based guidelines to provide the highest quality patient care and to be effective role models for our students. But what about our teaching practices? Can the same thing be said?

Evidence-based education has been defined as a process by which educational policy and practice are guided by the best evidence about what works. This philosophy advocates that educational strategies should be rigorously evaluated prior to their adoption. Proponents of evidence-based education assert that when prior evaluation is not possible, new techniques should be incorporated using an experimental model, in such a way that their ultimate impact can be properly evaluated.[1]

Evidence-based means that policies and practices are capable of being justified by sound evidence about their anticipated effects. Dr. Robert Coe advocates that educators need to change their culture, so that asking the question, "Where is the evidence?", is the first step prior to considering any changes in practice or policy.[2]

Critical to this process is the establishment of a solid foundation of evidence to support our teaching practices. It has been noted that much of the research that has been done in education utilizes surveys or correlational research, which involves looking for relationships between two or more variables of interest. Coe argues that this kind of research is useful for describing potentially complex relationships in the educational environment, but he also recognizes that there are significant limitations, making it impossible to tell the effects resulting from changes in educational processes.[2] Slavin quips that at the dawn of the 21st century, educational research is finally entering the 20th century. He notes that the use of randomized experiments that transformed medicine and technology in the 20th century is just now beginning to affect educational policy.[3] Other experts suggest that evidence-based education should encompass a full continuum of research designs to maximize timely, cost-effective, and efficient completion of research. Although randomized, controlled trials are recognized as the gold standard for all research, it is likely that this rigorous study design alone cannot meet all of the needs for educators to gain more immediate feedback.[4]

Slavin may be right, but some quick internet searching on Google yields these interesting results:

Search Terms	Search Results – Number of Links
Evidence-based education	34,200,000
Evidence-based health care	25,400,000
Evidence-based medicine	22,500,000
Evidence-based health professions education	15,400,000
Evidence-based optometry	75,900
Evidence-based optometric education	47,800

It is also interesting to visit some of the links found when searching for evidence-based education because much of the information presented relates to elementary school education, and many of the programs and projects described are from countries other than the United States.

Although solid educational research is critical, it is not the only element required to develop evidence-based processes. To help further define our understanding of evidence-based education, the Wing Institute has identified four key components of evidence-based education:

1. Promoting best-practices research and development;
2. Facilitating review and evaluation of scientific research;
3. Disseminating scientific research; and
4. Developing and supporting "evidence-based culture."[3]

The journal Optometric Education can certainly strive to play a role in each of these four areas, with the help of its authors and its readership. A key role of any peer-reviewed journal incorporates the review and evaluation of scientific research as part of the peer-review process. As optometric educators submit their work for consideration for publication, this component can be met. As articles and examples are published, the scientific research is disseminated. Now that the journal is available online, it is hoped and expected

EDITORIAL

(continued)

that the readership has broadened. The components describe above in Numbers 1 and 4 may prove to be more elusive in nature. But by continuing to be a source of information and an advocate for evidence-based decision making in education, hopefully these goals will also be reached.

This issue of the journal continues to support an evidence-based culture. Shinouda, Jones, and Spafford present evidence on an assessment of a new evaluation system.[5] They describe the design, development, and implementation of an innovative system that used both an evidence-based decision-making process and an evidence-based outcome assessment. Nowakowski and Fraser describe an evidence-based assessment of a new curricular element designed to support adherence to recommended standards for culturally and linguistically appropriate services.[6] Patel and Pang describe evidence gathered from a survey of schools and colleges of optometry. [7]

As you enjoy the articles in the journal, I would also like you to consider this personal challenge. I challenge each of you to:

- Make a commitment to evidence-based education with the same enthusiasm we have given to the concept of evidence based health care;
- Strive toward other types of educational research in addition to correlational research and surveys; and
- Remember to ask "where is the evidence?" in our conversations with our colleagues in optometric education.

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Think Tank ...

"How has the new perspective of a 'global village' impacted optometric education, and what further changes do you predict as the global economy grows over the next 20 years"

I see the future of optometry in the delivery of affordable eye care around the world. I believe there is a general understanding in the public health community that patient care provided by professionals from the same cultural background is the best solution assuming the level of training is the same. The next best solution is to expose or even immerse professionals in training in those cultures and acquire some measure of appropriate language skills to help that unique patient base. I would define this effort as our minimum responsibility in the "global village." This strategy and responsibility in countries that are wealthy enough to have partnerships with our schools and colleges are moving along significantly. In parallel to this approach, however, we must also consider sustainable programs for very poor countries. So far, there are much fewer examples of sustainable activities in poor countries. Hopefully, a growing global economy would facilitate broader optometric education in poverty-stricken developing countries.

Douglas G. Horner, OD, PhD, FAAO
Director of Clinical Administration
Indiana University College of Optometry

As the global economy grows, optometric education has been impacted as have many other things. I see the effect of the global village in the optometry world and the internationalization of optometric education. More international exchange programs have developed over the years, such as programs in teaching, clinical training, residency training, research, and so forth. New techniques make it easy to communicate and collaborate over long distances. However, significant disparities still exist in the world in optometric education, including the quality and length of the educational program, the limitations on practice, and the type of degree conferred. I expect the inequality will become smaller and optometric education will get more standardized among different countries as the global economy grows over the next 20 years.

Yi Pang, PhD, OD, FAAO
Assistant Professor
Director of Research
Illinois College of Optometry

Think Tank ...

The impact of globalization on optometric education is and will be ongoing. As it presents an ideal opportunity for optometry to entrench itself as a health provider in the developed world and prepare itself for this role in the developing world, a certain amount of understanding of the needs, designing of education and training models, and critical implementation of programs are required. To deliver the midtier worker so urgently needed in the developing world, optometric education cannot ignore its technical base, nor can it afford to add the medical model at a late stage. Careful articulation of these basic requirements will be easier to achieve within the structure of a vertical career path with horizontal exit and re-entry points. In other words, entry into the profession must be as wide as possible at the dispensing optician level, with ever-increasing levels of skills and competency as learners progress to the level of optometrist and optometric physician and/or specialist in fields such as advanced contact lenses, binocular vision, and so forth.

It goes without saying that certain primary care therapeutic procedures will also need to be taught at the optometrist level if the profession is to make a realistic impact in the prevention of blindness in the developing world. With the benefit of hindsight and the lack of medical care in the developing world, first-world optometry education can play a major role in developing the community-based optometrist who should ultimately form the backbone of the profession in the global village.

Stef Kriel
Dip Optom, CAS, MEd
Director, Graduate Institute of Optometry,
South Africa

In this aspect of technology, history has shown us that, as communication and globalization grows, the representation of the so-called "global village" goes into further introspective expansion. Although the term introspective expansion may sound like a dichotomy, the diversified use of evolving communication technology suggests a continuous internalization by the cybernetic population into finding ways of reaching what once was thought unreachable. As it turns out, the point of view that suggests that advances in communication technology are merely intended to serve political, economical, and social purposes is past its prime. The unremitting evolutionary conquest of technology over distance has also found new expanding ventures in education, optometry included. Most important, the rise in quality of communication and information technology has made the propagation of optometric education worldwide possible. Premier optometric institutions have been able to develop distance education programs that deliver advanced optometric education to more underdeveloped programs at countries where personal accessibility and traveling cost are impediments. In addition, these advancements have been key influences in the academic development of optometric educators. Progress in the access to educational resources, direct instruction thru Webinars, and peer-to-peer interaction via telepresence technology have enabled educators to improve their pedagogical expertise. From a practitioner's standpoint, it has helped ensure continued competence in the profession with relative ease through the availability of online continuing education courses and Webinars. Organizations dedicated to continuing education have taken this a step further by implementing advanced competence Web conferences in specialty areas of optometry internationally.

It is difficult to envision the extent of educational advances that communication and information technology hold for optometry over the next two decades. Upgrades in the speed of communication and multiplicity of information modalities racing to satisfy unimaginable global demands are being developed at a faster rate than the human mind is generally able to assimilate. An innovation in education that I anticipate, however, is the development of an internetwork curriculum among optometric institutions, a technology that enables the concomitant delivery of concepts contained in an optometric program collectively shared by optometric institutions. At this point, this futuristic idea may seem rather senseless and farfetched. Yet, propagation of equal competence in the profession, in some way, shape, or form, is what the majority of optometric institutions are seeking. In addition, aren't optometric institutions a part of the so-called "global village" concept undergoing introspective expansion to find ways of reaching what it seems unreachable? I think so.

José M. De Jesús OD, MA
Dean for Academic Affairs
Inter American University of Puerto Rico
School of Optometry

Two years ago, I had the opportunity to write an article for the Optometric Education titled "Optometrists for the 21st Century." In the article, I addressed what I considered to be the knowledge, skills, and attitudes that would define the successful practitioner as we enter the sphere of the global village. During most of the 20th century, America was a mirror image of Europe. However during the past few decades, African Americans, Latinos, Asians, and other groups have been the fastest growing segments of the population. They are part of a rainbow that represents the new face of the nation. They are a microcosm of the global village.

This new reality represents both a challenge and an opportunity. More than any other moment in history, we need culturally competent optometric professionals to serve the needs of these emerging populations. We need respectful minds that will celebrate diversity and multicultural values. We need empathic, understanding, and caring doctors who will be able to connect rationally and emotionally to their patients.

It turns out that cultural competency is the currency that will allow us to succeed in the global village. Optometry is a developing profession in most of the world. We need to reach out to the international optometric community to offer our support. Our institutions must look forward to establish ties with optometric institutions abroad. We must strive to offer alternatives to international applicants, especially those who will return to their countries to further optometric education. We must look for opportunities for collaborative research endeavors that will address global eye care needs. This implies that cultural competency should be a core value in our professional programs. It means that we must persevere in our effort to increase the diversity of our student body, faculty, and staff within our institutions. It means that we may need to provide the linguistic skills that will allow future professionals to succeed within their communities and communicate with the world community at large. It means that our clinical programs must get out of the traditional boundaries of our college clinics to outreach the underserved communities nationally and abroad.

I have no doubt that we will rise up to meet these challenges and become great neighbors of our global village.

Hector C. Santiago, OD, PhD, FAAO
Dean
Midwestern University
Arizona College of Optometry

Sharing of educational resources has been limited. With the global market expansion, the resources for educational programs will be prioritized, especially in developing countries. Optometric education does not exist in all countries, especially where there is a high incidence of blindness.

Bina Patel OD, FAAO
Associate Professor
Director, International Programs
New England College of Optometry

Think Tank ...

FEATURE

My Best Day in Optometric Education

Linda Casser, OD, FAAO

Like countless colleagues who have served in optometric education and administration, I have had many "best" days. Each provides an opportunity to serve, learn, teach, mentor, achieve, and, hopefully, make a difference. Although challenges in optometric education are not infrequent, the positives far outweigh the negatives.

In reflecting on the past 30+ years in optometric education, many positives come readily to mind. As I thought about these, the vision of a perfect day emerged. Even though each of the events listed below has actually occurred, even on multiple occasions, this composite "perfect day" is a collective reenactment of the events of innumerable in-office days:

7:45 a.m.: Breakfast meeting with a career-long mentor; thanked him for his most recent suggestions and support.

8:45 a.m.: Received a telephone call from a former student. We discussed a patient he is managing, similar to one we had seen together years earlier.

9:00 a.m.: Reviewing email. A former student informed me that she has been accepted into a PhD degree program and thanked me for providing a letter of recommendation.

10:00 a.m.: Conference call: planning committee for the 2009 ASCO Summer Institute for Faculty Development.

11:15 a.m.: Conducted a Webinar with students and faculty members to discuss the NBEO examination restructuring initiative.

12:30 p.m.: Lunch meeting with a longtime friend and colleague and his niece, who is a fourth-year optometry student. We discussed residency program opportunities.

1:30 p.m.: Took a walk on campus. Spring has brought great natural beauty as well as signs of the preparations for commencement next weekend.

2:00 p.m.: Reviewing mail: received notification that a grant proposal to upgrade a teaching laboratory (physical plant and equipment) has been funded.

2:30 p.m.: Telephone call: received notification that a former student made a large donation to our mutual alma mater in recognition of our shared emphasis on leadership and primary care optometry.

3:00 p.m.: Meeting with the Faculty Development Committee to review the faculty workload formula and explore innovative approaches to enhanced faculty support.

4:30 p.m.: Meeting with a student to discuss his academic performance. In a subsequent meeting, he shared with me that our discussion had been very helpful.

5:15 p.m.: Rehearsal with students and faculty members for the karaoke event at optometry's meeting.

6:30 p.m.: Dinner meeting with colleagues who served at the clinical facility in which I did my residency program over 30 years ago. We reminisced about our time together, our clinical experiences, changes in our profession, the future of optometric practice, and the paths we have each followed.

Dr. Casser is the dean at the Pennsylvania College of Optometry at Salus University. E-mail: lcasser@salus.edu

Wimba Voice for Teaching "Spanish for Eye Care" in a Blended Course Environment

Rod W. Nowakowski, OD, PhD
Marcela Frazier, OD, MPH

Abstract

The University of Alabama School of Optometry offers an elective course called "Spanish for Eye Care" designed to teach basic vocabulary related to eye care in response to the rapidly increasing Hispanic population in Alabama and the United States. The course has only 10 contact hours, which limits contact time as well as exposure to correctly spoken Spanish. The authors, therefore, created a blended format by adding an online component, with audio files, that was continuously available. Blackboard Vista was used for the online component, integrated with Wimba Voice to produce audio files of correctly spoken Spanish. The authors used a student survey to ascertain students' hardware capability for taking advantage of online access and used built-in functions within Blackboard Vista to track the frequency, duration, and peak timeframe of online access. There was frequent access to the online component and audio files.

Key Words: *Wimba Voice, Blackboard Vista, Hispanic, medical Spanish, audio file, blended course, online learning*

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Introduction

Hispanic individuals constitute the largest minority group in the United States, with 44.3 million people as of July 1, 2006, representing 14.8% of the total population.[1] Alabama and the Birmingham area have seen a significant and rapid increase in the numbers for Spanish-speaking inhabitants. In Alabama, the population of Hispanic individuals has increased from 24,629 in 1990[2] to an estimated 111,432 in 2006.[3] This has led to an expected increase in the numbers of Spanish-speaking patients seeking care through the University of Alabama's (UAB) Eye Care and its affiliated programs, which comprise the teaching clinic of the UAB School of Optometry (UABSO).

In a population-based study of Hispanics in the United States, the Los Angeles Latino Eye Study (LALES), it was found that Hispanic adults presented a high prevalence of glaucoma, cataracts, and diabetic retinopathy.[4-6] In a separate study of Hispanic children, the Hispanic children showed a high prevalence of strabismus and amblyopia.[7] The combination of the increase in the Hispanic population and the consequent increased need for eye care services for this population prompted the creation of a course that would provide the students with basic skills for communicating with Hispanic patients who have limited English-language ability.

Spanish for Eye Care is an elective course taught by one of the authors (M.F.), a native Spanish speaker. This course has been offered yearly as a 10-hour elective course for second-year optometry students at UABSO since 2005. At least half of the members of each class have taken it the three times it has been offered. The course covers vocabulary and language skills necessary to perform an eye exam, from medical history to explanation of eye conditions and treatments. The purpose of the course is to provide the students with the initial communication tools to perform an eye exam in Spanish and to encourage the students to further develop their language skills. For the first 3 years, the class was offered in a traditional classroom setting, without an audio component. Student feedback and subsequent observation of their interactions with Spanish-speaking

patients showed a persistent weakness in pronunciation and comprehension of the spoken language. This was not an unexpected finding, given the short duration of the course. We, therefore, felt that using audio files and facilitating increased exposure time outside of class would be beneficial since increased exposure time, listening, and especially listening comprehension play key roles in language acquisition.[8-10]

The purpose of this article is to demonstrate how we used Wimba Voice and a blended course environment with Blackboard Vista (Blackboard, Inc., Washington, DC) to incorporate audio files and to expand course access. We also report statistics about the frequency, duration, and peak timeframe of student access to the audio files and other online components.

Cultural and Linguistic Standards

The need for teaching basic Spanish communication skills to optometry students is evident from the demographics of the Hispanic population in the United States and, in our case in Alabama, coupled with the students' self-described conversational ability as "poor" (survey result, data not shown).

A set of recommended national standards for culturally and linguistically appropriate services (CLAS) in health care was developed under the auspices of the Office of Minority Health (OMH). The standards are available in summary form online at the website for OMH.[11] The standards are directed at health care organizations but individual providers are encouraged to adopt them. A number of the standards relate to language, and Standard 4 mandates the provision of language assistance services to each patient with limited English proficiency.

Jenkins proposed the EYECARE Model, "designed to give optometric institutions, organizations and practitioners a template for incorporating cultural competence into their prospective areas of eye care delivery."[12] The "C" in the EYECARE acronym stands for "communicate," and the point is made that part of cultural competence depends on knowing the patient's linguistic needs. Jenkins also makes the point that optometric institutions, students, and others need to "understand and respond with sensitivity to the needs, and preferences that culturally and linguistically different individuals bring to the eye care system, because culture and language are vital factors in how health services are rendered and received."[12]

Online Course Delivery

Two popular course models for online delivery of educational materials are blended courses and online courses. The learning environment for each is different. Blended courses combine the traditional classroom experience with course supplementation using a web-based course management system (CMS) to provide some course materials online. The use of a blended course at UABSO has been published previously.[13] Online courses also use a CMS but are given completely online with no classroom sessions. Popular CMSs and their URLs are shown in Table 1. UAB uses Blackboard Vista (Version 4), formerly WebCT Vista, which was acquired by Blackboard. Angel (Angel Learning, Indianapolis, IN) has similar functionality to Blackboard Vista. Moodle (Moodle, Perth, Western Australia) also has similar functionality but is open source and, hence, is available without charge.

Online learning at the UAB is supported by the Department of Information Technology through Instructional Technology (ITIT). Currently ITIT is supporting Blackboard Vista (Version 4) as the university's course management system. In addition, ITIT also supports Wimba Voice,[14] which is integrated with Blackboard Vista. Wimba Voice allows an instructor and students to easily embed vocal interactions into a Blackboard Vista course. Training courses are available for faculty members at UAB in Blackboard Vista and Wimba Voice.

Adding an online component to a traditional classroom course offers advantages such as the following:

1. Access to the online materials is worldwide, provided the student has a computer and access to the Internet.
2. Online collaboration and participation with other teachers, guest experts, and so forth, are possible without those collaborators having to leave their own location.
3. Course materials housed online are available 24/7 for student access in accordance with their own schedule.
4. Hosting course materials online is particularly useful for audio, movies, videos, color images, computer-based simulations, and other multimedia formats that cannot be conveniently provided as handouts; however, access is limited by the students' hardware and bandwidth capabilities.
5. All printed course materials can be housed within the CMS, obviating the need for delivery of hard copies.

Table 1
Course Management Systems and Their URLs

CMS	URL
Blackboard	www.blackboard.com/us/index.bbb
Blackboard Vista	www.blackboard.com/products/Academic_Suite/Learning_System/.htm
Angel	www.angellearning.com/
Moodle	www.moodle.org/

Wimba Voice

Wimba Voice comprises several tools that can be seamlessly integrated within Blackboard Vista, and the audio files produced can be added to course components via content links. The Wimba audio tools integrated with Blackboard Vista at UAB are described in Table 2.

Table 2
Wimba Voice Tools and Their Description

Wimba Tool	Description
Voice Recorder	Allows the instructor to make an original recording or a digital audio file from another source and insert it into the course. Students can listen to the files within Blackboard or download them as .wav files to a portable listening device.
Voice Board	Allows the instructor to create a threaded audio discussion board. The audio is recorded directly online and can be supplemented with typed comments. Access to the discussion board can be granted to the entire class or to individual students. For our application, this allows group or individual interaction with the instructor, teaching assistant, or other students to practice pronunciation, vocabulary, and comprehension. Threads can be exported in various audio formats including MP3, WVB, Speex, and WMV. The discussion is typically asynchronous (not real time) as opposed to the Voice Direct tool described below.
Voice Direct	Allows the instructor to create a chat room for live (synchronous), direct, online chatting. The conversation files can be archived or not. Archived files are available for future playback or distribution.
Voice Presentation	Allows the instructor to create a slide show by adding audio and text messages to a selection of URLs. Slides can be edited and reordered similar to PowerPoint. A Voice Presentation can be used as a platform for an asynchronous discussion by allowing students to respond with comments on any slide. Slides can be linked to multimedia content, like Flash or online videos, and annotated by voice.
Wimba Podcaster	Allows the instructor to create podcasts that anyone, not just the students, can subscribe to; however, it also allows the students to download the file directly to iTunes for subsequent synchronization to an iPod without subscribing. An excellent overview of podcasting has been written by Geoghegan and Klass.[15]

Course Design

The Spanish for Eye Care blended course was designed to offer 10 hours (5 sessions) of traditional classroom teaching using PowerPoint slides combined with online hosting of course materials. Blackboard Vista was used for the online component of the course. The students were required to attend each one of the classes and to complete all in-class and online assignments. The students were required to log on at least once every 48 hours to complete the unannounced online assessments ("pop quizzes"). In addition, students were required to attend one vision screening offered for the Hispanic community at a local church.

The online component was organized in five modules corresponding to the five class meetings. Digital copies of all the handouts, audio files, and other materials for the class were posted within those modules.

Audio Files

The instructor (M.F.) used the Voice Recorder tool to create a series of audio files for each weekly module of the Spanish words and phrases on the PowerPoint slides. Careful consideration was given to the production of audio files using Wimba Voice with regard to size and quality. We made an arbitrary decision to limit recording length to a maximum of around 2 minutes, which resulted in a file size of about 2 megabytes. Consistent quality was achieved by having all recordings made by the same person using a microphone/headset combination and by duplicating the same microphone position for each recording session.

Before making any recording in Wimba, a built-in set-up process is available to ensure appropriate functionality. The best audio quality is achieved with a headset/microphone combination in which the microphone can be located near the mouth in a consistent position. The audio quality must be selected from the following four choices; we used the standard quality selection.

1. Basic Quality (Telephone quality) - 8 kbit/s suitable for modem usage
2. Standard Quality - 12.8 kbit/s suitable for modem quality

3. Good Quality (FM radio quality) - 20.8 kbit/s suitable for Broadband usage
4. Superior Quality – 29.6 kbit/s suitable for Broadband usage

A maximum allowable message length is also set, and this would be important for limiting student postings in an audio discussion forum. The Voice Recorder interface with the recording settings is shown in Figure 1.

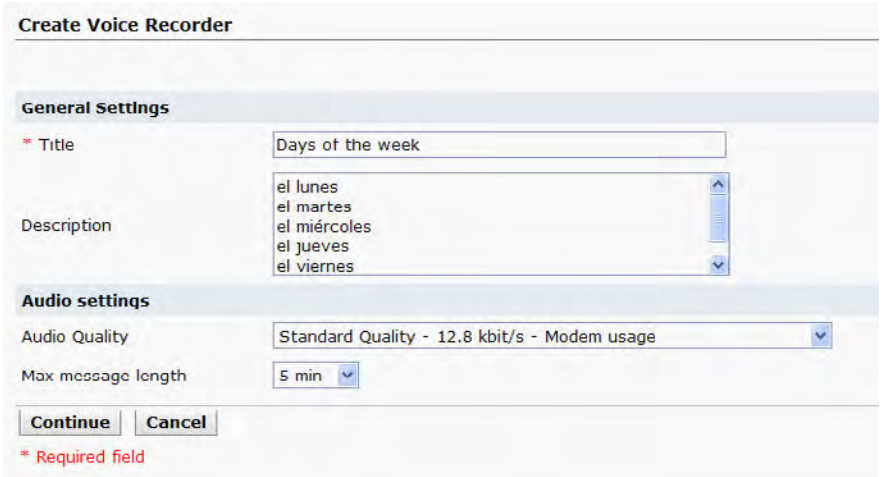
When the student clicks on the link to an audio file, it leads to a simple interface. Figure 2 shows the student view for the file described above. The file is heard by clicking the play button (green triangle), and it can be paused or stopped with the other two buttons. There is also a link below the recorder icon that allows the file to be saved.

Survey and Access Tracking

We used a survey, delivered online during the first week of class, to ask about the students' hardware capability at home with specific questions about their ability to listen to audio files. The survey was approved by the UAB Institutional Review Board for Human Use. Participation in the survey alone would indicate the ability to access the online component, although it would not be possible to tell if it was done from home since all students have access to computers with sound cards within the UABSO. Nevertheless, it was of interest to know the students' previous experience with online education and hardware capability at home since this would be related to the likelihood that they could and would take advantage of the online component and audio files.

Blackboard Vista includes comprehensive tracking capabilities, including monitoring student access to specific course components and when that access took place. Access statistics were gathered as an indicator of the students' ability and willingness to access course materials outside of the normal class meeting hours.

Figure 1
The Interface for the Voice Recorder Tool



Note. The interface for the Voice Recorder tool allows the instructor to give a name and description to the file. The description shown here is the written version of exactly what the listener will hear. Audio settings are for audio quality and maximum message length.

Figure 2
The Student View of the Audio File Interface Showing the Title, Description, and the Control Panel

Note. In this example, the description is exactly what is heard.

Survey and Access Results

Forty-seven students were enrolled in the class, of which 41 responded to the online anonymous survey given one week after the start of the term. The results are shown in Table 3, where the percentages are for those students responding to the survey.

Of those students who had tried to download audio files at the time of the survey, 78% rated the audio files' quality as *good* or *very good*, with *very good* being the highest possible rating.

We collected frequency, duration, and peak timeframe statistics for all course components for during the entire course. Those statistics are shown in Table 4.

Conclusions

The creation of a blended course provided the potential for increased exposure to course materials, including correctly spoken Spanish audio files. The audio files were made by a native speaker and were easy to incorporate into the online component using Wimba Voice. The student survey results showed that they had the requisite hardware at home to access both the online component and the audio files it contained. The access statistics show that the students did access the course components outside of the scheduled class meeting time and after hours.

Discussion

There are several concerns when making audio files, including size, format, and quality. As a general rule, smaller file sizes are preferred for files that students might wish to download. Some students may have low-bandwidth capacity and download times will be shorter for smaller files. When audio files are recorded, the use of a headset/microphone combination makes it easy to have a consistent microphone location relative to the mouth, and this helps achieve consistent quality. For our application, the Wimba Voice Recorder produced good-quality audio files with the "standard" audio quality setting that did not require postproduction processing; however, if such processing is needed, it is easily accomplished with Audacity[16] or similar programs. Audacity is a very robust, open source (free) program for creating and editing audio

Table 3
Student Survey Results

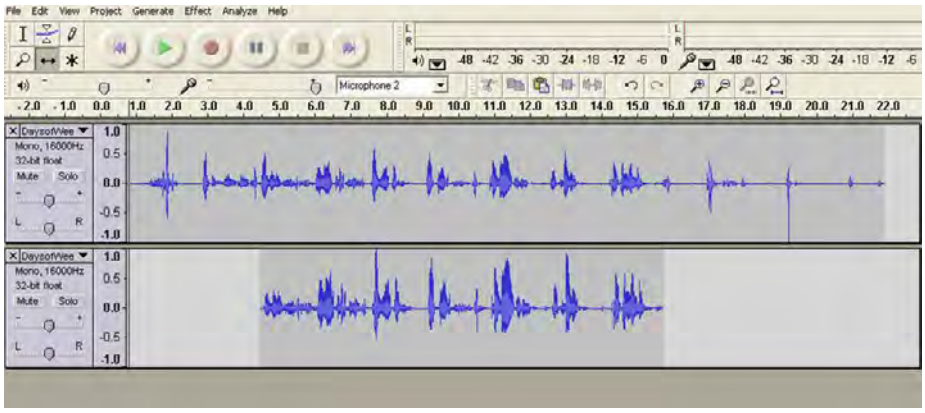
Survey Question	Percentage of Respondents
Have a computer at home	100
Computer has a sound card	100
Computer has a microphone	24
Have a microphone/headset combination	12
Have a portable listening device	60
Know how to save an audio file to a computer	93
Know how to save an audio file to a portable listening device	63
Subscribe to podcasts	0
Have previously taken a course completely online	37
Have taken a "blended" course that had an online supplement	81
Have not tried to download audio files yet	37

Table 4
Student Online Access Statistics

Statistic	Results
Total user sessions	1,295
Average user session length:	0:04:30
Average user sessions per day:	18
Average user sessions per day on weekdays:	21
Average user sessions per day on weekends:	11
Most active hour of the day	9:00 - 10:00 PM

files. One advantage to using an audio editing program like Audacity is that it has components for postproduction dynamics processing to achieve the best quality possible. Processing techniques include, among others, compression, equalization, fade-in, fade-out, noise removal, cutting out segments, adjustment of individual sound samples, and normalization. Processing techniques are beyond the scope of this article, but basic information about these terms is available with the Audacity online help files, and an example of a file that has been processed in Audacity is shown in Figure 3.

Figure 3
Example of a File That Has Been Processed in Audacity



Note. The same sound track is shown above and below. Miscellaneous lead-in and trailing sounds were trimmed from the top track, and the remainder was processed with equalization, normalization, and compression to give the result shown in the lower track.

Regardless of processing, files in Audacity can be resaved in another format, including MP3 and OGG from Ogg Vorbis,[17] which is an open source audio-encoding and -streaming technology. Converting file types is one way to reduce file size; for example, converting .wav files downloaded from Wimba to MP3 format without any other processing typically resulted in a 50% reduction in file size.

For the reader who may not have access to Blackboard and Wimba, it is still possible to create most of the functionality we have described. Moodle (Table 1) is an open source, course management system and Audacity is an open source audio processing program. Audio files could be embedded in any Website and can also be produced as podcasts to which student users could subscribe. Examples of medical Spanish podcasts can be found on the Medical Spanish and Spanish Grammar Review Website.[18]

A legitimate concern with a course similar to the one presented here is that there is not sufficient time to learn much more than basic phrases, and this could lead to lower quality health care if interpreters are subsequently not used appropriately. This concern was expressed by Flores and Mendoza[19] in an editorial response to an article by Mazor et al[20] about teaching Spanish to pediatric emergency room physicians. The course they referenced lasted 10 weeks and led to decreased use of interpreters by the physicians. We are very cognizant of the limitations imposed by a short course, and the intent was not to make the students functionally competent in Spanish but to provide them with the initial communication tools to provide an eye exam in Spanish and to encourage them to further develop their language skills.

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User Perceptions of a Paperless Clinical Evaluation System for Optometry Students and Instructors

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Abstract

Optometry students and clinical instructors routinely evaluate each other's performance in teaching clinics. A Web-based Electronic Student Evaluation System (ESES) was developed in 2006 at the University of Waterloo School of Optometry to replace paper-based evaluation forms that were time intensive to administer. The authors describe their experience in developing and implementing the paperless tool and evaluate user perceptions. Overall, the ESES was perceived positively by its users and clearly preferred to the previous paper-based system. The majority of users favorably viewed the ESES for its ease of use, timeliness of feedback, preservation of confidentiality, and facilitation of learning and teaching.

Key Words: *Optometric education, clinical evaluation, student evaluation, instructor evaluation, Web-based technology*

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Introduction

Clinical instructors evaluate health care students to facilitate their professional development and allow programs to make academic decisions regarding whether students have met predetermined performance objectives.[1,2] Likewise, clinical instructors receive student feedback that can help inform their professional development and enable administrators to make performance decisions related to salary, promotion, and/or tenure.[3,4] Historically, these types of evaluations have been paper based. Paper evaluations present inherent challenges: staff administration of forms, copy and distribution time, delays in submitting student and supervisor evaluations, storage, costs, and limitations to confidentiality.[5,6] In addition, paper evaluation data can be difficult to retrieve and analyze.

The emergence of the Internet and related Web technologies has provided opportunities for educational innovations.[7,8] Information Technology (IT) is increasingly playing an important role in optometric education.[9] While many optometry schools have increased the use of IT in their teaching programs, little information is known about user perceptions on the use of these tools.[10]

In this article, we describe the design, development, and implementation of an innovative, Web-based, clinical evaluation system for students and clinical instructors and present findings of a survey to evaluate user perceptions and attitudes about the system.

Development and Implementation of the ESES

At the University of Waterloo School of Optometry (UWSO), third- and fourth-year optometry students are scheduled into various optometry clinics during their onsite rotations.*

During their clinical rotations, students provide direct patient care while receiving clinical instruction and supervision

*Note: In our program, students also attend offsite locations for their externship rotations, mostly in Canada and the United States (fourth-year students spend two thirds of their 45 weeks offsite.) At this time, the offsite evaluations are done on paper and then transcribed onto the ESES system. We are planning to add electronic access to the externship evaluators.

from optometrists. Supervising optometrists assess the clinical and behavioral skills of students while students evaluate instructional and professional skills of their clinical instructors. This model is typical of many optometric, medical, and dental schools.[5]

In September 2005, the UWSO administration decided to work toward replacing the paper-based student and instructor evaluation systems with a Web-based electronic system. The problems with the current paper-based system were identified (Table 1) so that target improvements could be set for the electronic system. Preliminary system design and user-interface issues were discussed. It was agreed that the main requirements of the electronic system to ensure its success were simplicity and ease of use.

Over a series of planning meetings, the ESES developer (M.S.) and the Clinic Director (D.A.J.) discussed existing systems' requirements and reviewed design models and mock-ups of the new system. The guiding design principles evolved with the user as the central component. In the spring of 2006, the first version of the ESES was implemented; anecdotal comments were favorable from staff, clinical instructors, and students. A second version of the ESES was implemented in the fall of 2007 in response to the initial feedback. To date, more than 21,000 clinical teaching evaluations have been completed using the ESES. Table 2 summarizes some of the intended features of the ESES.

Technical Specifications

The ESES was developed using open source technologies: Apache 2.0 (Apache Software Foundation, Los Angeles, CA) Web server (software that stores and exchanges data and delivers web pages upon request), MySQL (Sun Microsystems, Santa Clara, CA; a relational database management system) and PHP (The PHP Group; a server-side scripting language suitable for dynamic Web development). The design of the ESES is made up of two major components, as shown in Figure 1: the first being the client, including a computer with an Internet connection and a Web browser such as Netscape or Internet Explorer. The second component is the Apache Web server with PHP and MySQL installations. The ESES user connects to the system through a secure login page

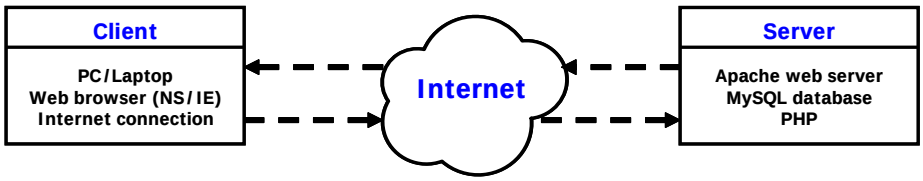
Table 1
Issues of Paper-Based Evaluation System

• Legibility of hand-written comments/feedback.
• Possibility of losing or misplacing paper evaluation forms.
• Difficulty in maintaining confidentiality of information.
• Time delay in submitting paper evaluations by students and instructors.
• Difficulty in tracking down unsubmitted or overdue evaluations.
• Administrative workload: submitting, copying, distributing, and filing forms.

Table 2
Design Features of the ESES

• Instant access to submitted grades and feedback.
• Quick, easy, and continuous access to the evaluation system from any Internet-connected computer.
• Student progress assessable through the clinic director's access to all student evaluations and the instructors' access to those they have submitted.
• Data entry error reductions with online spell-checkers.
• Automated e-mail reminders of scheduled and overdue evaluations.
• Student identity aid (student photo) included on student evaluation forms.
• Poor clinical behavioral performance by students flagged instantly with an automatic notification to the clinic director to facilitate remediation.
• Built-in e-mail facility to enhance communication among students, instructors, and staff.
• Enhanced teaching by instructors through ability to incorporate links to Web-sites and teaching resources for students.
• Security, integrity, and confidentiality of information maintained through the use of 128-bit encryption (the most secure and strongest form of encryption on the Internet).
• Preservation of privacy, with only authorized users having access to the electronic evaluation through a secure Website.
• Ongoing access to previous terms so that students and instructors can review their own evaluations.
• Unique access login to allow different stakeholders (e.g., instructors, students, clinic director, and administrators) to view specific screens tailored to their needs.

Figure 1
Client-Server Architecture



via an HTTPS (a secure protocol for Web-based data transfer). A secure data transmission is established using a 128-bit secure socket layer (SSL) certificate to encrypt data between the server and the client computer over the Internet.

The Apache Web server allows for the interaction between server-side components (PHP scripts and MySQL database) and dynamically generates Web pages in HTML (a Web-page formatting language that describes how data is displayed on the Web) for display on the client side.

Paperless Clinical Evaluations

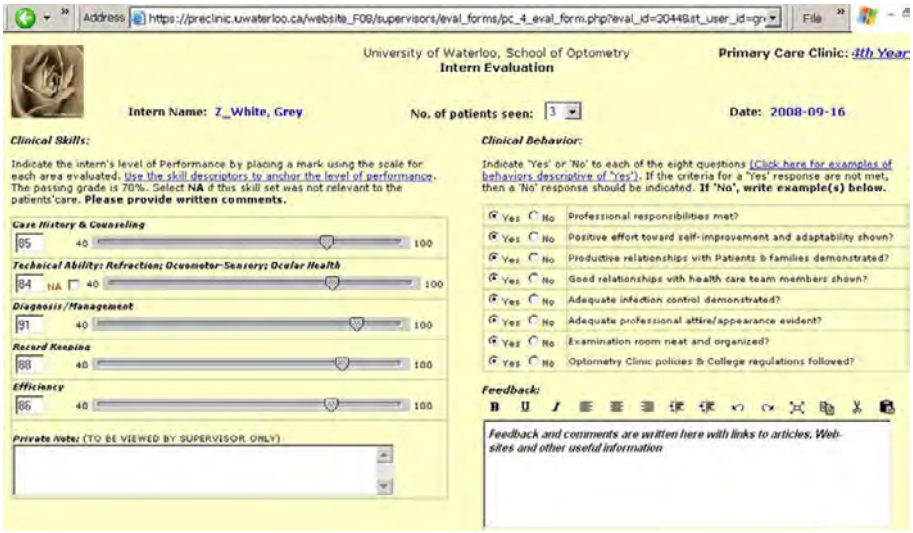
At the beginning of each academic term, the ESES administrators (i.e., clinic receptionists) initiate the evaluation process by entering several parameters into the database: student names, dates, clinical area, and clinical instructor names. An evaluation report is automatically generated showing the evaluation parameters, with an option to delete an evaluation entry or change any parameter.

To facilitate ontime evaluation submissions, an automatic e-mail reminder is generated daily and sent to instructors who are scheduled to evaluate students the following day. The reminder includes a direct link to the evaluation login page and identifies the student(s) to be evaluated.

On the evaluation date, supervisors can access student evaluation forms to complete and submit in one or multiple sittings. Figure 2 shows an example of a screen shot of the page that instructors use to evaluate students.

Instructors assign students grades to five clinical skills (case history and counseling, technical ability, diagnosis/management, record keeping, efficiency) and identify if expectations regarding eight clinical behaviors are met (professional responsibilities, self-improvement attitudes, relationships with patients/family, relationships with health care team, infection control, professional appearance/attire, organization, policy adherence). In addition to entering formative comments, instructors can include links to clinical and educational resources that may assist student development. The clinic director is notified by automatic e-mail when students obtain skill grades below a passing grade (70%) or a predetermined number of reported negative behavior instances (e.g., remediation begins at 4 negative behavior instances; failure occurs at 10). Students assign instructors grades on seven clinical teaching skills (clarity and organization, enthusiasm for teaching, knowledge, demonstration of skills, accessibility, role modeling, evaluation) and they can enter feedback comments.

Figure 2
Student Evaluation Form



Students have instant access to submitted evaluations, allowing them to easily monitor their learning. At 2-week intervals, the system identifies which students and supervisors have worked together and generates evaluations for the students to submit for their clinical instructors. The students are sent automatic e-mails identifying those instructors who should be evaluated by them. Student evaluations of their supervisors are submitted anonymously. The system keeps track of the submissions (both student and instructor) and sends automatic reminders regarding non-submitted or overdue evaluations. The clinic director is electronically advised of delinquent evaluators.

The system dynamically generates a number of reports on various aspects of clinical evaluations and performance measurements that were not possible in the paper-based system. All clinical teaching evaluations are reviewed by the clinic director before they can be viewed by the instructors. Additionally, the clinic director is notified automatically of negative student evaluations, thereby facilitating early remediation of student performance issues. The system provides an e-mail facility that allows students, instructors, and ESES administrators to easily communicate with each other.

User Perception Online Survey

A Web-based questionnaire was administered in April 2007 to assess user perceptions of the ESES regarding its accessibility, functionality, and impact on the learning and teaching environment. The survey focused on the following issues: (1) the ESES overall design and ease of use, (2) the level of student learning enhancement due to access to online resources, (3) the timeliness of feedback, (4) the confidentiality of information, and (5) the instructors' ability to use received student feedback constructively. Five-level, Likert-type scales reflected opinions from strongly agree (1) to strongly disagree (5). This

study received institutional ethics clearance.

Data were collected anonymously from instructors, students, and ESES administrators at the UWSO. Questionnaires were submitted by 33 of 67 instructors (49%), 42 of 147 students (29%), and 6 of 13 staff (46%).

Data Analysis

User perception frequencies were calculated for each questionnaire item. Data analysis was performed using SYSTAT software. Mean group responses across each scale were calculated for questionnaire items. One-way cross tabulations for the survey items and Pearson chi-square test were performed to test the statistical significance with $p \leq 0.05$.

Results

The overall experience with the ESES was positive for 69 respondents (85.2%). A detailed analysis of the survey results is described below.

Overall ESES Design and Ease of Use

The ESES has been adopted favorably by instructors and students as a simple, user-friendly tool (Table 3). Nearly 90% of instructors and 95% of students agreed or strongly agreed that the system design was simple and easy to use: instructors, $M = 1.7$, $\chi^2 = 21.3$, $p = .00$; students, $M = 1.6$, $\chi^2 = 19.0$, $p = .00$.

The Level of Student Learning Enhancement

There were indications that the ESES facilitates student learning through features such as the ability of instructors to add links to relevant Websites and online articles. Nearly 52% of instructors agreed or strongly agreed that the ESES enhanced student learning experience (Table 4), $M = 2.5$, $\chi^2 = 18.8$, $p = .001$.

Nearly 74% of student respondents agreed that the ESES improved their learning because they could easily access additional useful information and links to Websites or articles in the feedback section (Table 4), $M = 2.0$, $\chi^2 = 10.0$, $p = .019$.

Timeliness of Feedback

Instructors and students indicated that the ESES provided them with quick access to their evaluations. Nearly 71% of instructors and 90% of students indicated that the system improved

Table 3
Simple design, intuitive and easy to use

	Instructors No. (%)	*p*-value	Students No. (%)	*p*-value
ESES: simple design and easy to use		.00		.00
Strongly agree	15 (46.9)		18 (42.9)	
Agree	14 (43.8)		23 (54.8)	
Neither agree nor disagree	2 (6.3)		1 (2.4)	
Disagree	1 (3.1)		0	
Strongly disagree	0		0	

Table 4
Enhances student learning

	Instructors No. (%)	*p*-value	Students No. (%)	*p*-value
ESES enhances students learning		.001		.019
Strongly agree	4 (12.9)		15 (35.7)	
Agree	12 (38.7)		16 (38.1)	
Neither agree nor disagree	12 (38.7)		7 (16.7)	
Disagree	2 (6.5)		4 (9.5)	
Strongly disagree	1 (3.2)		0	

Table 5
Timeliness of feedback

	Instructors No. (%)	*p*-value	Students No. (%)	*p*-value
ESES: timeliness of feedback		.012		.00
Strongly agree	8 (25.8)		21 (50.0)	
Agree	14 (45.2)		17 (40.5)	
Neither agree nor disagree	8 (25.8)		2 (4.8)	
Disagree	1 (3.2)		2 (4.8)	
Strongly disagree	0		0	

students' learning through the instant access to written feedback (Table 5): Instructors, $M = 2.1$, $\chi^2 = 10.9$, $p = .012$; Students, $M = 1.6$, $\chi^2 = 28.3$, $p = .00$. The following positive comments were typical of instructors (I) and students (S) using the ESES:

I: It is nice to be able to submit your comments with a quick push of a key instead of working with the envelopes with writing, licking, inserting, sealing, and making sure it gets to the correct person.

S: I like it. It's a good way for us to evaluate our supervisors while it is still fresh in our heads. It is also useful for us to get immediate feedback.

Privacy of Information

Only authorized users have access to the ESES via a secure Website. Ninety-five percent of students and 74% of instructors indicated that the system improved privacy because of the security features (Table 6): Instructors, $M = 1.9$, $\chi^2 = 18.5$, $p = .001$; Students, $M = 1.6$, $\chi^2 = 15.4$, $p = .00$.

Enhance Instructor Teaching

Instructors were asked about their ability to use feedback constructively; about 61% of respondents agreed or strongly agreed that they were able to use the feedback provided by the students to improve their teaching (Table 7), $M = 2.3$, $\chi^2 = 10.5$, $p = .033$.

Almost 79% of students reported that they were more likely to submit evaluations of their clinical instructors electronically than on paper (Table 8), $M = 1.7$, $\chi^2 = 42.1$, $p = .00$.

Table 6
Privacy of information

	Instructors No. (%)	*p*-value	Students No. (%)	*p*-value
ESES: privacy of information		.001		.00
Strongly agree	13 (41.9)		20 (47.6)	
Agree	10 (32.3)		20 (47.6)	
Neither agree nor disagree	6 (19.4)		2 (4.8)	
Disagree	1 (3.2)		0	
Strongly disagree	1 (3.2)		0	

Table 7
Enhance teaching

	Instructors No. (%)	*p*-value
ESES enhances teaching		.033
Strongly agree	8 (25.8)	
Agree	11 (35.5)	
Neither agree nor disagree	8 (25.8)	
Disagree	2 (6.5)	
Strongly disagree	2 (6.5)	

Table 8
Electronic submission of evaluations

	Instructors No. (%)	*p*-value
ESES: Electronic submission of evaluations		.00
Strongly agree	24 (58.5)	
Agree	8 (19.5)	
Neither agree nor disagree	6 (14.6)	
Disagree	2 (4.9)	
Strongly disagree	1 (2.4)	

Discussion and Conclusion

The evolution of information technology in recent years and the emergence of the Internet and the Web have facilitated teaching and learning experiences in health care education. The ESES was intended to enhance the learning experience of students and the teaching quality of instructors while improving workflow and reducing administrative workload. ESES user perceptions suggest that these improvements have occurred. Our findings are consistent with past studies,[6,11-15] of Web-based medical evaluation systems in that they improved compliance, confidentiality, and reduced administrative burden.

The survey results show that the simple design and ease of use of the ESES have contributed to the overall acceptance among its users. The opportunity for students and instructors to edit, review, and complete their evaluations in one or multiple settings allows for more thoughtful and accurate feedback. The opportunity to provide access to other educational resources (links to electronic articles, Websites, etc.) was well received by students and this facility points to a potentially helpful educational tool in clinical education that has not been described in previous studies of Web-based clinical evaluation tools.

The ESES automated e-mail reminder facility has contributed to the timely submission of evaluations, reduced the number of missing or unsubmitted evaluations for both students and instructors, and ultimately improved the overall evaluation experience. The automated features of the ESES have drastically reduced the administrative workload associated with clinical evaluation for the ESES administrators and the clinic director, who prepares the final reports.

The power and flexibility provided by the ESES system for clinical evaluation was a notable improvement over the paper-based system. Overall, the ESES has become a valuable educational and evaluation tool for both students and instructors at UWSO.

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U.S. College and Schools of Optometry's Involvement in International Education and Programs in 2007-2008

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Yi Pang, PhD, OD, FAAO

Abstract

The Association of Schools of Optometry (ASCO) has expanded its mission statement to include support of international development of optometric education. A survey was sent to U.S. optometry schools and colleges of optometry to assess the quantity and role of U.S. schools/colleges in international programs. The results of the survey will be presented. Some of the other international educational initiatives involved in the goal of reducing global blindness are discussed and provide some direction for ASCO's future involvement in international education.

Key Words: *Internationalization, optometry, education*

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Introduction

Recent statistics released from the World Health Organization (WHO) indicate that there are approximately 314 million visually impaired people in the world. One hundred and fifty-three million people are estimated to be visually impaired from uncorrected refractive errors and 161 million are visually impaired due to avoidable and unavoidable diseases. These statistics do not include figures on visual impairment of uncorrected presbyopes. In 2006, WHO's global estimates for the leading causes of visual impairment were cataracts (39%); uncorrected refractive errors (18%), glaucoma (10%), and age-related macular degeneration (7%). Some significant risk factors include age, gender, and socioeconomic status. WHO has stated that more than 90% of the world's population with visual impairment lives in developing countries.[1,2]

WHO has predicted that if aggressive measures are not taken to prevent blindness, the figures will double by the year 2020.[3] This organization, the International Agency for the Prevention of Blindness (IABP), and its member organizations launched a global initiative to eliminate blindness and visual impairment called "Vision 2020–The Right to Sight" in 1999.[4] The World Council of Optometry has been a Vision 2020 member since 2004, which demonstrates a recognition of optometry's support of the prevention of blindness.

The scope of optometric practice in each country is defined by education and legislation. Optometric practice is not uniform and varies from one country to another. Growth within the profession occurs in countries where there is governmental recognition of the field's importance. In the Vision 2020 plan, developing and strengthening eye care services in conjunction with the implementation of these services in health care and educational programs will have a long-term impact in providing sustained care to a country or region. Optometry is still evolving to its fullest potential in many countries. If the global profession adopted the educational and legislative principles of countries such as those in Australia, Canada, England, and the United

States, optometrists worldwide would have a greater impact by intervening in a timely manner to avoid or delay visual impairment and by detecting diseases.

U.S. schools and colleges of optometry have independently been involved in international optometric education and have been contributing to the Vision 2020 plan. With this growing trend, the Association of Schools and Colleges of Optometry (ASCO) Board of Directors has realized and identified a need to reach out globally to education within optometry. The International Optometric Education (IOE) Task Force was formed in 2007 to examine ASCO's proposal to expand ASCO's existing mission statement to include "supporting the international development of optometric education."

In 2008, an "International Optometric Education Survey" was developed by IOE to assess the type of involvement and role of U.S. schools/colleges of optometry in international optometric education. The purpose of this article is to present the survey results, to discuss the role of U.S. optometric institutions in international optometric education, and to discuss some of the international organizational efforts that are being made to decrease visual impairment globally.

Method

The survey was sent to the 17 schools and colleges of optometry in the United States that had students enrolled in the 2007-2008 academic year. At each institution, the president, dean, or a designated faculty member completed the survey. International activity information was collected specifically for the 2007-2008 academic year. Programs conducted outside the United States and Canada were identified as international. The three areas surveyed included international education, research, and collaboration. Responses to each question on the survey were tabulated and presented to the IOE. The response rate was 100%.

Results

General Results

The survey showed that 11 schools and colleges of optometry were involved with international activities (see Table 1). Seven colleges/schools of optometry responded positively to inclusion of international activity in their mission statement (see Table 2 and Appendix 2 for institutions participating in the survey).

A total of 49 different programs were identified. These programs were categorized in three areas: educational teaching programs, collaborative research, and consultation. Sixty percent of the 49 programs were in educational teaching, followed by 24% in collaborative research, and 16% in consultation (see Figure 1).

Table 1
Schools/Colleges Involved With International Activities

	Number of U.S. colleges/schools of optometry	
	Yes	No
Optometry schools/ colleges with some level of international/ global activities	11 ICO, IU, IAUPR,NECO, NOVA,PUCO, PCO,SCCO, UNY,SCO, UHCO	6 MCO- FSU, NSU-OSO, OSU, UCB,UAB, UMSL

Note. ICO, Illinois College of Optometry; IU, Indiana University; IAUPR, Inter American University of Puerto Rico; NECO, New England College of Optometry; NOVA, Nova Southeastern University; PUCO, Pacific University College of Optometry; PCO, Pennsylvania College of Optometry at Salus University; SCCO, Southern California College of Optometry; SUNY, State University of New York; SCO, Southern College of Optometry; UHCO, University of Houston College of Optometry; MCO-FSU, Michigan College of Optometry-Ferris State University; NSU-OSO, Northeastern State University-Oklahoma College Of Optometry; OSU, The Ohio State University; UCB, University of California, Berkeley; UAB, University of Alabama, Birmingham; UMSL, University of Missouri At St. Louis.

Table 2
Schools/Colleges With a Mission Statement Supporting International and/or Global Activities

	Number of U.S. colleges/schools of optometry	
	Yes	No
Mission statement included/ referred to international/global activities	7 IU, NECO, PUCO, PCO, SUNY, UAB, UHCO	10 ICO, IAUPR , MCO-FSU, NSU-OCO, NOVA, OSU, SCCO, SCO, UCB, UMSL

Note. See Table 1 for explanation of acronyms.

International Involvement: Educational Teaching

In the category of educational teaching programs, five different types of activities were identified and considered academically based: educational course delivery for degree and or postgraduate programs; exchange of U.S. and international optometry students at clinical externship; educational research programs; collaborative support in education; and international elective programs for U.S. students (see Figure 2).

For each of the subcategories under educational teaching programs, the data below summarize the survey results.

In the first subcategory listed, educational delivery toward degree and or postgraduate programs, six schools and colleges of optometry were involved with 10 different countries. The type of program, number of teaching faculty involved, and the final qualification differed for each program. PCO, PUCO, and NECO deliver educational programs to more than 1 country.

Table 3 summarizes the types of international educational programs of U.S. colleges/schools of optometry with the qualification and number of U.S. faculty involved in teaching abroad (see Table 3).

Figure 1
International Program Activities Outside U.S./Canada 2007-2008

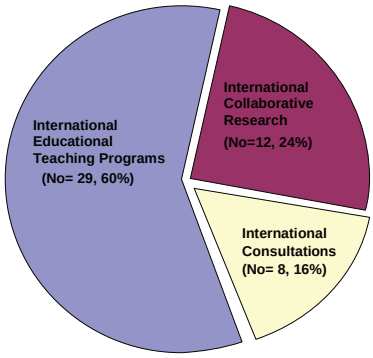


Figure 2
Distribution and Types of International Teaching Education Programs

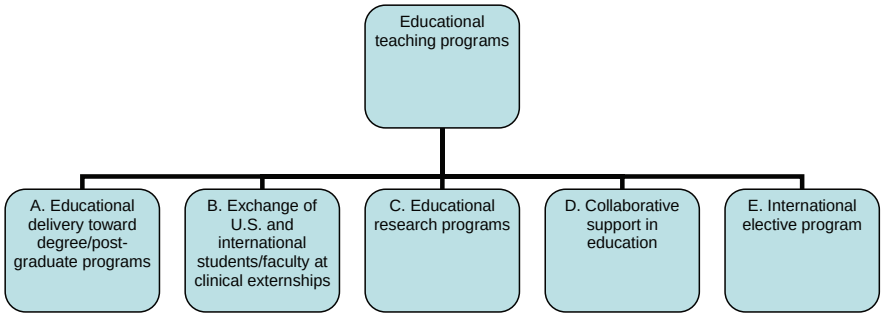


Table 3
International Programs Provided by U.S. Schools/Colleges of Optometry

Name of U.S. Institution	Name of International Institution	Type of Program	Country awarding degree	# of U.S. faculty teaching abroad
IU	Ramkhamhaeng University, Thailand	Doctor of Optometry	Thailand	6
IAUPR	University of La Salle, Colombia	Masters in Science	Colombia	3
NECO	University of La Salle, Colombia	Masters in Science	Colombia	1 to 2
NECO	Aalen University, Germany	Masters in Science in Vision Science & Business	Germany	9
PUCO	Aalen University, Germany	Masters in Science in Vision Science & Business	Germany	3 to 4
NECO	Graduate Institute of Optometry, South Africa	Certificate of Advanced Study	South Africa	6
PCO	Buskerud University College, Norway	Masters in Science in Clinical Optometry	U.S.	20
PCO	Singapore Optometric Association, Singapore	Bachelor of Science in Optometry	U.S.	12
NOVA	Polytechnic University of Catalonia, Spain	Diploma in Optics and Optometry	Spain	1

Two optometry schools and colleges (PCO and NECO) have created joint-degree programs between two institutions. One institution (PUCO) provides the opportunity for an internationally qualified optometrist to obtain a U.S. degree from their institution in the United States (see Table 4).

The second subcategory type in educational teaching programs is clinical externships for U.S. and international optometry students and/or faculty. This type of program allows one to gain experience in clinical patient care at a clinical externship site. Students typically completing these rotations are from Argentina, Australia, Colombia Netherlands, and Spain (see Table 5).

Four U.S. schools/colleges of optometry have internationally based rotation sites outside of the United States and Canada for U.S. optometry students. These sites are in Australia, Mexico, and China (see Table 6).

The third subcategory of educational teaching programs is research programs, allowing for exchange of students from the United States and from international institutions (see Table 7).

The fourth subcategory in educational teaching programs is collaborative educational programs. PUCO provides a collaborative educational program with Kwama Nkrumah University of Science and Technology (KNUST), Department of Optometry in Ghana. In addition, equipment donations are made by PUCO to KNUST. SCCO has a mutual support agreement with Tokyo Optometry College in Japan. Neither of these programs have an exchange of faculty or students.

The final subcategory in educational teaching programs is international elective programs. NECO has established an elective program in dispensing optics for second-year optometry students with Aalen University in Aalen, Germany. Courses and workshops are provided by faculty at Aalen University who are experts in the field.

A summary of which U.S. optometry schools/colleges provide international educational programs in each of the five subcategories discussed above and the number of programs in which each are involved is shown in Figure 3.

Table 4
Schools/Colleges Offering Degree Programs to Other International Institutions

U.S. institution	International Institution	Degree program
NECO	Wenzhou Medical College, China	MS/OD degree Joint degree program given by both institutions
PCO	Cardiff University, Wales	PhD in visual science Joint degree program given by both institutions
PUCO	Kikuchi College of Optometry, Japan	MS and OD degree given by PUCO
PUCO	Wenzhou Medical College, China	MS and OD degree given by PUCO

Table 5
International Optometry Institutions Sending Students to U.S.-Based Externship Sites

U.S. institution	Name of international institution	Rotation affiliation site
ICO	Australia Victorian College of Optometry University of Melbourne	Illinois Eye Institute
ICO	Spain Universidad Europa de Madrid	Illinois Eye Institute
IU	Australia Victorian College of Optometry University of Melbourne	DIF, Guanajuato, Mexico IU external clinic
IU	Netherlands Hogeschool Utrecht	DIF, Guanajuato, Mexico IU external clinic
IAUPR	Colombia University of La Salle	IAUPR clinics
IAUPR	Argentina Universidad de La Plata	IAUPR clinics

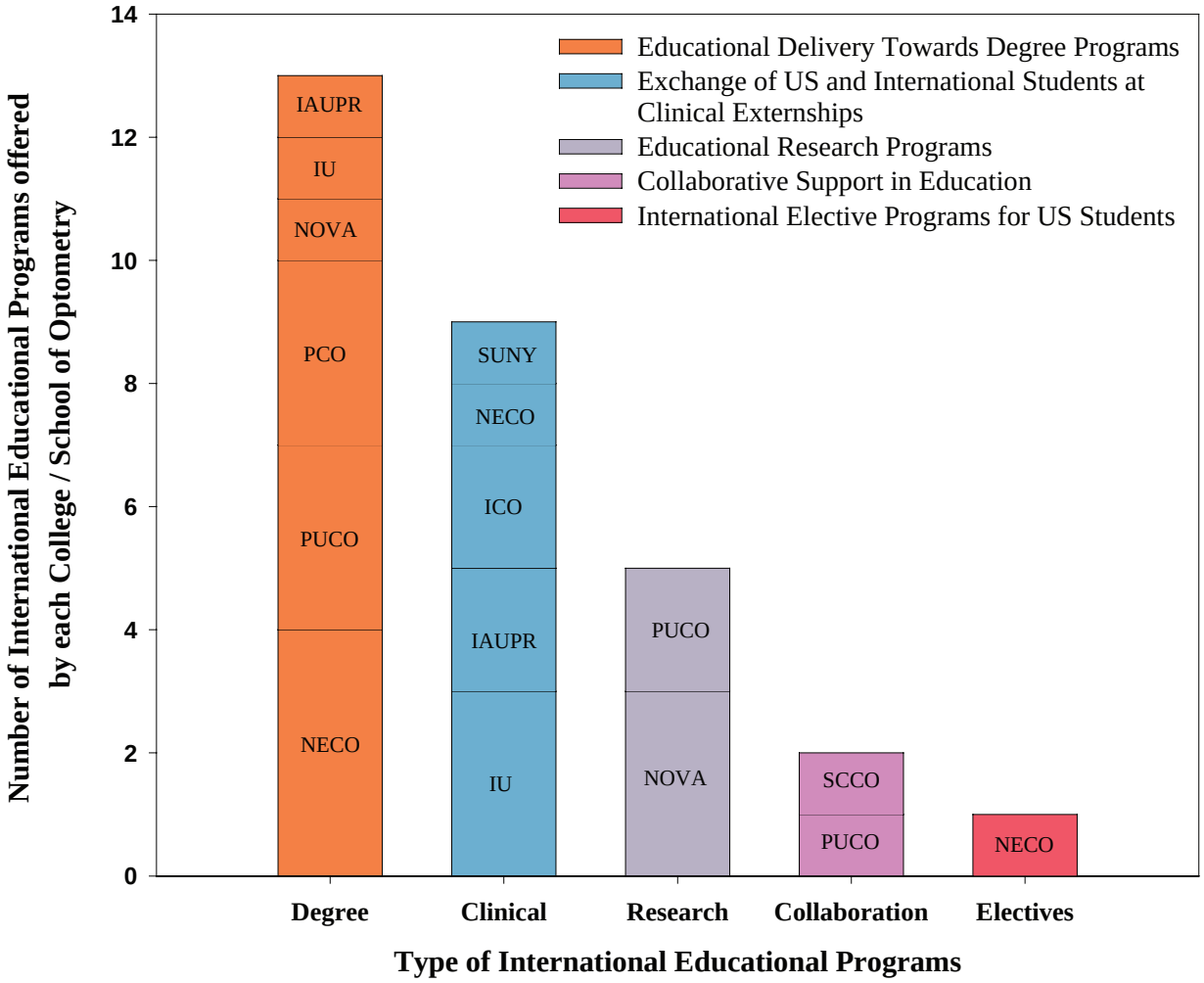
Table 6
International Externship Sites for U.S. Optometry Students

Students from U.S. schools/ colleges of optometry	Name of clinical externship	Country of location for clinical externship
ICO	Victorian College of Optometry, University of Melbourne	Australia
IU	DIF, Guanajuato	Mexico
IU	Honk Kong Polytechnic University and Guangzhou Eye Hospital	China
NECO	Wenzhou Medical College	China
SUNY	Wenzhou Medical College	China

Table 7
Exchange International and U.S. Students for Research Externships at U.S. and International Affiliated Sites

Institution in the U.S.	Exchange of students	International institution and country
NOVA, U.S.A	↔	Tianjin Medical University, China
NOVA, U.S.A	→	3S College of Optometry, China
NOVA, U.S.A	←	Nankia University, China
PUCO, U.S.A	←	Wenzhou Medical College, China
PUCO, U.S.A	←	Aalen University, Germany

Figure 3
Summary of Schools/Colleges Providing International Educational Programs



International Involvement: Collaborative Research

The second category surveyed on international activities was collaborative research. It is the second most popular international program activity in the survey. Four schools/colleges of optometry are involved in collaborative research programs with other international institutions. The popular areas of research include ophthalmic lenses, public health, and vision. Of the 12 different research projects, 9 projects are supported by grants. Table 8 summarizes the international institutional collaborations, separated by type of research.

International Involvement: Consultation

The final category surveyed is in the area of consultation programs outside the United States and Canada. Three institutions of optometry provide consultation services either to international associations or educational institutions. The majority are governed by a formal memorandum of understanding. The program activities vary from providing support to international organizations and the establishment of postgraduate programs to assessment of programs and public health projects.

The countries involved with educational and/or public health projects include the Dominican Republic, Israel, India, Spain, Malaysia, and Mexico. The international associations receiving support are the Latin American Association of Schools and Faculties of Optometry (ALDEFO) and the Latin American Association of Optometry and Optic (ALDOO). For most of the programs, financial support is not available (see Table 9).

Table 8
International Institutional Collaborations by Type of Research

U.S. institution	International research collaborator, country	Grant involvement	Type of research
UHCO	University of New South Wales, Australia	Yes	Antimyopia lens designs
UHCO	Sun Yat Sen University, China	Yes	Antimyopia lens designs
UHCO	University of Dublin Ireland	Yes	Ocular effects of UV radiation
UHCO	Karolinski Institute, Sweden	No	Ocular anatomy
UHCO	Osaka University, Osaka Japan	No	Cortical neurophysiology
NECO	Wenzhou Medical College, China	Yes for 1 and 2 No for 3	1. Retinal image quality in myopic and emmetropic eyes 2. Children's reading behavior in emmetropes and myopes 3. Overseeing projects on neonates and rapid serial visual presentations of Chinese and English text
NECO	Wenzhou Medical College, China	Yes	Measure of optical quality of ophthalmic lenses and find its application in optometry
NOVA	Polytechnic University of Catalonia, Spain	Yes	Monitoring visual health access around the world
NOVA	University of El Salvador Medical Faculty, El Salvador	Yes	Vision screening program
NOVA	Vision 2020 Commission of Ministry of Health Costa Rica	No	Vision screening program
NOVA	St Thomas University, Bucaramanga, Colombia	Yes	Situational analysis of visual health care in South America
SCO	Centro de Estudios Universitarios, Xochicalco Mexico	Yes	Effectiveness of visual therapy and visual development

Table 9
Summary of Consultation With International Affiliations From U.S.-Based Institutions

U.S. institution	International institution	Program activity
IUAPR	Autonomous University of Santo Domingo Dominican Republic	Consultation to help establish an optometry program
IUAPR	Latin American Association of Schools and Faculties of Optometry (ALDEFO)	Executive directorship and providing office space
IUAPR	American Association of Optometry and Optics (ALDOO)	Secretary/treasurer and providing office space
NECO	Haddasah College of Optometry Jerusalem, Israel	Assessment of curriculum Teaching in masters program
NECO	LV Prasad, Eye Institute , Hyderabad, India	Public health project
NECO	International University College of Technology Twintec, Kuala Lumpur, Malaysia	Postgraduate program consultation
NECO	Universitat Politenica of Catelonia Spain and the Catedra UNESCO	Public health project
SCO	Centro de Estudios Universitarios Xochicalco, Mexico	Effectiveness of vision therapy & visual development

Discussion

The survey demonstrates that over half the schools and colleges of optometry are active in international activities. The most popular activity is educational delivery followed by research and then collaboration. International activities have many benefits. For example, clinical externship programs demonstrate an institutional strategy in exposing students to other health care systems, teaching styles, and languages, along with deeper cultural understanding. Research between two institutions is of mutual benefit where there is cooperation and collaboration. This type of partnering strengthens research outcomes, innovations in research, and knowledge capacity, therein contributing to the international profile and reputation for an institution.

According to the International Association of Universities (IAU), which is under the umbrella of United Nations Educational Scientific and Cultural Organization (UNESCO), internationalization is becoming an important focus of attention in higher education. According to IAU, the definition of *internationalization* may mean international development of projects and agreements, adding an international dimension to the curriculum, international academic programs and research initiatives, and academic mobility of students and faculty.[5,6]

WHO and the International Agency in Prevention of Blindness have recently acknowledged the significant impact that the profession of optometry has on global visual outcomes. Therefore, it is not surprising that U.S. optometric educational institutions have progressively encompassed internationalization as part of their educational programs.

This trend also is reflected in the general international education of students studying in the United States. The number of U.S. students studying abroad continues to increase. The Institute of International Education Open Door reported in November 2007 that 90,000 students in 1995-1996 studied abroad and received academic credit.[7] The 2007 statistics show an increase of 150% over the past decade. Traditionally, European countries have been the most popular destination. England, Italy, and Spain are the top three most popular countries, with increasing number of students going to countries within Asia, Latin America, Africa, and the Middle East.[7]

In the 2006-2007 academic year, approximately half a million international students were studying in the United States. India, China, and Korea were the top three countries of international student origin. Health profession fields were listed as one of the top 10 most popular areas of study.[7]

In the 2005 IAU survey report, 73% of higher educational institutions identified internationalization as a high priority. According to the report, the top three benefits of internationalization are the increase in international knowledge and intercultural skills in university students and staff members, the strengthening of research capacity and production, and the creation of an international profile and reputation.[8]

Different organizations have made and continue to progress toward the goals of Vision 2020. For example, in 2007, the first World Congress on Refractive Error and Service Development was held in Durban, South Africa.[9] The Durban Declaration supported the IAPB and WHO efforts toward Vision 2020. Optometry Giving Sight (OGS) continues to raise and distribute funds for projects that address visual health that are sustainable.

In the past, information on the visual health of certain countries or regions around the world has been limited. If more information were available, it would facilitate organizations in planning and implementing educational projects and allocating resources. In 2004, an extensive report on visual health in Central America was developed between UNESCO and Universitat Politecnica de Catalunya. The report considered socioeconomic and political factors, analyzed the visual health situation in Central America, and included strategies for intervention. Such reports help governmental organizations understand the importance of visual

health and encourage future support of the development of eye care in countries of need.[10]

Educational trends in Europe are rapidly changing. The government has been the initiator for more internationalization of education in Europe. Under the Bologna Declaration, one of the aims is to increase the international competitiveness of the European system of higher education worldwide and to attract students from other parts of the world. The intent of the Bologna Declaration is to "adopt a system that is comparable and readable, adopt a system with two main cycles (undergraduate /graduate), establish the European credit transfer system, promote mobility by overcoming obstacles, promote European co-operation in quality assurance, promote European dimensions in higher education."[11] The European Council of Optometry and Optics (ECOO) represents the two professions in Europe. ECOO is supportive of the Bologna Declaration. This illustrates how globalization and internationalization are influencing education and creating a need for more uniformity in the educational programs.

In 2005, the World Council of Optometry adopted a global competency–based model of scope of practice for optometry. This provides a framework to allow optometrists from different countries to practice in others countries. It encourages optometric educational programs to attain a minimum standard in various aspects of their program.

Conclusion

These survey results were presented at the American Academy of Optometry meeting in Anaheim, California in October 2008. The survey information was used to direct a roundtable discussion consisting of designated faculty members from U.S. optometric institutions. Discussion centered around the following areas: the interest in a potential ASCO International Education Special Interest Group (SIG), the primary motivations for schools and colleges of optometry to become involved in international programming, the need for collaboration to identify goals for an ASCO SIG devoted to international optometric education, and specific objectives or activities of an ASCO SIG that would benefit our institutions.

The discussions were very strongly supportive of ASCO's newly acquired addition to the mission statement. There was a general consensus that consolidation of the ideas, talent, and expertise of faculty will be crucial to the future success of the potential ASCO SIG group. If the SIG group application is approved by ASCO, some of the guidelines will entail identifying and prioritizing select areas where education could have a short- and long-term impact in a particular country(ies) and/or region. The Vision 2020 plan identified the need for developing and strengthening eye care services internationally. Integration of these services in existing health care systems and training and retraining health care workers in visual health with educational programs would have a long term impact in providing sustained care to a country or region and would reduce the number of visually impaired individuals. ASCO would use these guidelines to develop programs. Replication of projects should be avoided by ensuring excellent communications and obtaining information from other international or global organizations such as the World Council of Optometry.

In 2004, the Association of Universities and Colleges of Canada (AUCC), the American Council on Education (ACE), the Council for Higher Education Accreditation (CHEA), and the International Association of Universities (IAU) issued a statement:

> "Sharing quality higher education across borders: A statement on behalf of higher education institutions worldwide". Some of their recommended outlined principles for cross border higher education include "meeting the same standards of academic and organizational quality of a high standard no matter where it is delivered; expand the opportunities for international mobility of faculty, researchers and students; higher education should be accessible not only to students who can afford to pay but also to qualified students with financial need; should be accountable to students, public and government and cross border education should strengthen developing countries' higher education capacity in order to promote global equity"[12]

ASCO should consider applying these principles for cross-border higher education.

The results of the authors' survey demonstrate the current interest and involvement of U.S. schools and colleges of optometry in international education, research, and collaboration. Pooling of intellectual capacity, sharing of expertise and experience through the active participation of all the schools and colleges of optometry within ASCO, and collaborating with global organizations will potentially impact and decrease vision impairment globally.

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Appendix 1

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APPENDIX 1

ASCO International Optometric Education Survey

Introduction:
This survey is to assess the level of international activity involving faculty, students, research collaborations and other services at your institution. This survey covers the 2007-2008 academic year.

Please complete and e-mail this survey to Joanne Zuckerman, ASCO's Data Manager, at Jzuckerman@opted.org, no later than February 22, 2008.

A. Information

1. Name of ASCO Institution: _____
2. Name of Person Completing Survey: _____
3. Does your institution have one or more member(s) dedicated to the development and monitoring of international partnership? If yes, provide name and title.
   _____
   _____
   _____
   _____
4. Does your institution's mission statement include/refer to international activity and or globalization? _____
5. Completion Date: _____

B. International Programs

1. Does your institution have Memoranda of Understanding/Formal Affiliation Agreements with schools in other countries outside the US or Canada in regards to **educational** programs currently?
☐ **Yes**
☐ **No**

If yes, please provide the following information for each program affiliation. In this section, include information on programs leading to the doctor of optometry degree and graduate degrees, continuing education, and student and faculty exchange programs.

	Program #1	Program #2	Program #3
Name of International Institution/Organization			
Is the program degree awarding? If yes, what degree is awarded? Which institution awards the degree?			
Is the program primarily clinical or research?			
Does the program involve students? If yes, how many U.S. students? How many international students?			
How many U.S. based faculty are involved in teaching abroad?			
List the name of the country where the program is delivered			
Describe the program activity briefly			

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APPENDIX 1

	Program #4	Program #5	Program #6
Name of International Institution/Organization			
Is the program degree awarding?If yes, what degree is awarded? Which institution awards the degree?			
Is the program primarily clinical or research?			
Does the program involve students? If yes, how many U.S. students? How many international students?			
How many U.S. based faculty are involved in teaching abroad?			
List the name of the country where the program is delivered			
Describe the program activity briefly			

2. Does your institution have collaborative **research** programs outside the US or Canada currently?
☐ **Yes**
☐ **No**

If yes, please provide the following information for each program affiliation

	Program #1	Program #2	Program #3
Name of institution/organization of affiliation, place, country			
For each of the affiliations are they governed by formal Memoranda of Understanding?			
How many faculty traveled overseas to participate in collaborative research?			
Is a grant involved in the program?			
Describe the program activity briefly			

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APPENDIX 1

	Program #4	Program #5	Program #6
Name of institution/organization of affiliation, place, country			
For each of the affiliations are they governed by formal Memoranda of Understanding?			
How many faculty traveled overseas to participate in collaborative research?			
Is a grant involved in the program?			
Describe the program activity briefly			

3. Does your institution have an agreement to provide Consultation service, outside the US or Canada?
☐ **Yes**
☐ **No**

If yes, please provide the following information

	Program #1	Program #2	Program #3
Name of institution/organization of affiliation, place, country			
For each of the affiliations are they governed by formal Memoranda of Understanding?			
Number of faculty involved?			
Is a grant involved in the program?			
Describe the program activity briefly			

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APPENDIX 1

	Program #4	Program #5	Program #6
Name of institution/organization of affiliation, place, country			
For each of the affiliations are they governed by formal Memoranda of Understanding?			
Number of faculty involved?			
Is a grant involved in the program?			
Describe the program activity briefly			

Please complete and e-mail this survey to Joanne Zuckerman, ASCO's Data Manager, at Jzuckerman@opted.org, no later than February 22, 2008. Thank you for your participation!

Appendix 2

Institutions That Participated in the 2007-2008 International Optometric Education Survey

- Illinois College of Optometry (ICO)
- Indiana University (IU)
- Inter-American University Puerto Rico (IAUPR)
- Michigan College of Optometry at Ferris State University (MCO-FSU)
- The New England College of Optometry (NECO)
- Northeastern State University –Oklahoma College of Optometry (NSU-OCO),
- NOVA Southeastern University (NOVA)
- The Ohio State University (OSU)
- Pacific University College of Optometry (PUCO)
- Pennsylvania College of Optometry (PCO)
- Southern California College of Optometry (SCCO)
- Southern College of Optometry (SCO)
- State University of New York (SUNY)
- University of Alabama, Birmingham (UAB)
- University of California, Berkeley (UCB)
- University of Houston College of Optometry (UHCO)
- University of Missouri at St. Louis (UMSL)