

The Journal of the Association of Schools and Colleges of Optometry

# OPTOMETRIC EDUCATION

Volume 38, Number 1

Fall 2012

## Scholarly Activity by Optometric Educators: Expectations, Barriers and Support

### Also Inside:

- The Effect of Participating in Continuing Optometric Education: a Pilot Study
- ASCOTech: 3D in the Optometric Classroom: Forward-Thinking or Fluff?
- ASCO's Janoff Award to be Presented in 2013

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VOL. 38  
NO. 1

## CONTENTS

FALL  
2012

## The Journal of the Association of Schools and Colleges of Optometry

## FEATURES AND DEPARTMENTS

- Industry News** 5
- Editorial**  
The Journey of Scholarship  
Aurora Denial, OD, FAAO 11
- The Dr. Lester Janoff Award for Writing Excellence**  
ASCO's Janoff Award to be presented in 2013 13
- Think Tank**  
How do you create, support and nurture a culture of scholarship at your institution? 14
- ASCOTech**  
3D in the Optometric Classroom:  
Forward-Thinking or Fluff?  
James Kundart, OD, MED, FAAO 18

## ARTICLES

**A Review of Faculty Perceptions, Barriers and Resources Related to Scholarly Productivity**

Aurora Denial, OD, FAAO

Elizabeth Hoppe, OD, MPH, DrPH

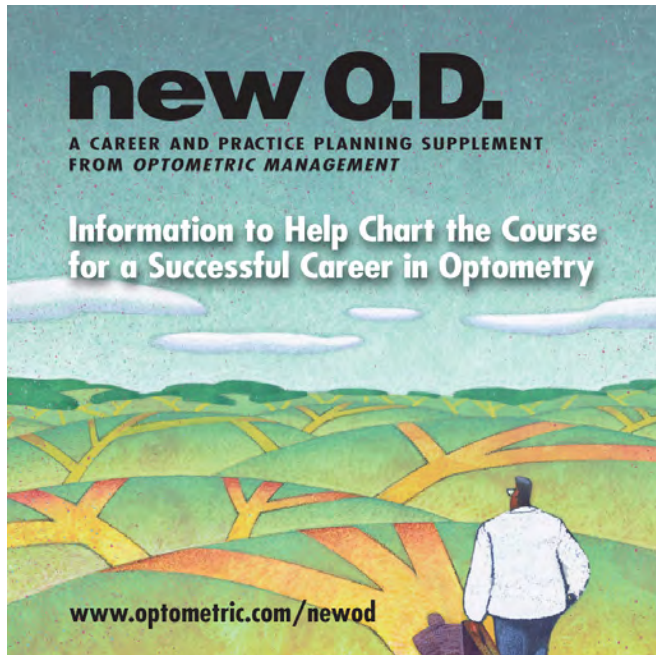
*In the profession of optometric education, there is a paucity of research into the topic of faculty and scholarship. This paper is based on the results of an online survey distributed to all faculty members listed in the Association of Schools and Colleges of Optometry directory of optometric institutions in the United States and Puerto Rico. The aim of the survey was to gain information on faculty members' perceptions of their institutions' expectations of scholarship, faculty members' own interests and perceptions related to scholarship, and perceived barriers and resources to scholarship. Faculty members perceived original research as most valued on an individual and institutional level. Only 7% of faculty responded that their primary scholarly interest was in education or educational theory. The most frequently perceived barriers to faculty scholarship were identified as clinical schedule (41%) and classroom/laboratory teaching schedule (23%). Faculty indicated that resources such as time allocated for scholarship (73%), financial support (37%) and mentorship (37%) would improve their ability to engage in productive scholarly activity. Conclusions drawn from the study results include that faculty members' expectations for their own scholarship and perceived institutional expectations can impact scholarly productivity.*

21

(Continued on page 4)

Past issues of Optometric Education are available on the ASCO Web site at <http://www.opted.org/i4a/pages/index.cfm?pageid=3404>. Funding for archiving was generously provided by Transitions Optical.

## The Journal of the Association of Schools and Colleges of Optometry



### The Effect of Participating in Continuing Optometric Education: a Pilot Study

Claire McDonnell, DipOpt

Martina Crehan, MA

*The purpose of this study was to determine whether participation in two different post-graduate optometry workshops resulted in a change in practice for the participants. Thirty-eight optometrists, who attended a continuing professional development (CPD) workshop on punctal plugs and lacrimal syringing, were surveyed by e-mail and telephone between 4 and 13 months after the workshop. A second group of 32 optometrists, who attended a continuing education and training (CET) workshop on binocular vision, were surveyed by e-mail, telephone and postal mail between 6 and 9 months after the workshop. After the CPD workshop, 29% of the practitioners had inserted punctal plugs, and 11% had syringed in their own practices. After the CET workshop, 37.5% had made a significant change in their own practice. Although the effectiveness of a workshop cannot be judged entirely on whether attendees subsequently make changes in their practices, attendance at post-graduate education events does not appear to effect a change in practice for most optometrists. This is not an uncommon finding in other healthcare professions.*

32

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## INDUSTRY NEWS

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*As of October 1, 2012*

### Online Quiz Gauges Diversity Awareness

## Transitions

As part of its Cultural Connections program, Transitions Optical introduced a new online interactive quiz that challenges eyecare professionals to find out whether they are prepared to meet the needs of their culturally diverse patients. The 10-question quiz (Are You Prepared?) focuses on specific eye health, cultural and linguistic considerations for the largest and fastest-growing ethnic groups in the United States. Throughout the quiz, eyecare professionals are armed with information and tips for better serving their culturally diverse patients. After receiving their quiz score, they are directed to MyMulticulturalToolkit.com, where they can download free education and resources.

Access the quiz free-of-charge at [MyMulticulturalToolkit.com/Quiz](http://MyMulticulturalToolkit.com/Quiz).

### Waggoner Color Test Added to Smart System



M&S Technologies has added the Waggoner automated color vision test to its 2012 Smart System Computerized Vision Testing System. The test, developed by Terry L. Waggoner, OD, and validated by the U.S. Navy, detects, classifies and quantifies the degree of color vision deficiencies. It has been shown to correlate 100% with the Nagel Anomaloscope, which is a greater correlation than the Ishihara plates. Also, the Waggoner color images eliminate the potential for providing high-frequency clues to the patient, which is a risk associated with computerized color cone tests.

Users can easily access and operate the test with the Smart System remote control or wireless tablet and perform it accurately on the Smart System All-in-One, or any LCD. For more information, visit [www.mstech-eyes.com](http://www.mstech-eyes.com).

### Omega 500 BIO with LED Illumination



Heine is offering a new illumination option for its Omega 500 binocular indirect ophthalmoscope, the LED HQ module. The LED HQ features a color rendering index of 90.0, a color temperature of 4,000 K and precise brightness control, which means it provides all of the clinical benefits of a standard Heine xenon bulb. However, it has more than double the operating time with an unplugged battery. In addition, according to Heine, the LED HQ has a virtually unlimited working life of up to 20,000 hours, which translates into well over 50 years of service.

All previously purchased Omega 500 BIOs can be easily converted to LED HQ illumination. For more information, visit <http://www.heine.com/Omega500LED>.

### Topography Plus Testing for Dry Eye Disorders



In addition to corneal topography and true keratometry, the Keratograph 5M from Oculus includes several new tools for evaluating dry eye disorders.

Its new color camera makes it possible to classify bulbar and limbal redness automatically and objectively, and its magnification changer allows a larger distance to the eye for performing meibography and examining the upper lid as optimally and comfortably as the lower lid. Meibo-Scan software reveals morphological changes in meibomian gland tissue. Objective measurements of noninvasive keratograph break-up time and tear meniscus height can be performed efficiently, and the interference color pattern and structure of the lipid layer of the tear film can be visualized.

Among its features for contact lens fitting, the Keratograph 5M provides fluo-images or videos, an eyelid angle measurement, contact lens database and an OxiMap representation of Dk/t values over the entire surface of a lens as a function of refractive power. Also, an optional pupillometry function enables testing of the pupillary reflex with and without glare. For more information, visit [www.oculus.de](http://www.oculus.de).

### Optometry Jumpstart Adds New Resource



Allergan has added a new resource to its Optometry Jumpstart program for recent optometry school graduates. Until July 13, 2013, the program is providing free access to a 3D Vision Simulator application by EyeMagination for iPad. The application simulates disease progression with anatomical views of eight common eye diseases to bring to life the corresponding patient point of view to help facilitate more impactful discussions between doctor and patient.

Optometry Jumpstart provides educational resources as well as the latest information on Allergan products, including access to product samples and patient savings programs. To enroll in the program, visit <http://www.allerganodjumpstart.com>.

### Partners Contribute More to Loan Program



Essilor of America Inc. and VSP Vision Care each committed an additional \$5 million in funding to the Vision Loans Program, which supports independent optometrists by providing loans for financing first-time practice purchases, partnership buy-ins and refinancing. Since its launch in 2003, the Vision Loans Program, a joint effort between Vision One Credit Union, Essilor and VSP, has distributed nearly \$58 million in financial support to optometrists who want to enter private practice or successfully transition out.

All loan payments are reinvested in the program to help ensure the continued success and growth of private practice optometry. For more information, call (800) 327-2628 or visit [www.visionone.org](http://www.visionone.org).

### Dinner, Grant Highlight Special Olympics Work



Essilor International Chairman and CEO Hubert Sagnieres was honored by Special Olympics Chairman and CEO Dr. Timothy P. Shriver at a Special Olympics dinner this fall in Washington, D.C. Sagnieres was recognized for his continued global leadership and advocacy with the

Essilor Vision Foundation. Since 2002, the Essilor Vision Foundation has been the exclusive global supplier of corrective lenses for the Special Olympics-Lions Club International Opening Eyes vision care program. As part of the Healthy Athletes program launched in 1997, Opening Eyes promotes healthy vision for Special Olympics athletes by providing vision screenings, corrective and sports protective eyewear for athletes in need and referrals for athletes requiring follow-up treatment and services.

Also this fall, both the Essilor Vision and Special Olympics foundations participated in the 2012 Clinton Global Initiative annual meeting in New York City. On the opening day of the meeting, President Bill Clinton announced a \$12 million grant from businessman and philanthropist Tom Golisano to the Special Olympics, which will allow for the launch of a new Healthy Communities initiative.

### Contact Lens Finder Among Site's Features



At a new Web site launched by Johnson & Johnson Vision Care Inc., doctors can take advantage of a variety of practice resources, including a contact lens finder that contains parameters, modalities and materials for the entire line of Acuvue brand lenses as well as products from other major manufacturers.

The site, designed to function on desktops, tablets and mobile devices, also contains educational videos for patients that doctors can embed in their practice Web sites. Visitors to the site will also have the opportunity to sign up for the free "Find a Doctor" interactive online map, which will be listed on the Acuvue consumer site. See [www.ACUVUEprofessional.com](http://www.ACUVUEprofessional.com).

## **AOSA Members Attend Leadership Retreat**



The Walmart/Sam's Club Talent Acquisitions team recently hosted its first AOSA Student Leadership Retreat at the company's home office in Bentonville, Ark. Twenty trustees-elect and three national officers of the American Optometric Student Association attended the retreat, during which they toured the Fayetteville Optical Lab, participated in Birkman leadership exercises and learned about the company's culture.

Walmart Health & Wellness experts spoke to the students on several topics, including leadership, the current and future face of corporate optometry, and access to health care. The event allowed AOSA to continue building relationships across the industry and to increase its understanding of the different modes of optometric practice.

## **New Panretinal Lens Improves Stability**



Volk Optical redesigned its H-R Wide Field panretinal lens with a new flanged contact element for greater stability. The new contact prevents patients from squeezing the lens off the eye during panretinal diagnostics. The lens magnifies 0.50X and is contained in a low-profile, reduced-size housing to simplify manipulation within the orbit.

According to Volk, the combination of patented double aspheric glass design with low dispersion glass ensures the highest possible resolution and distortion-free imaging across the entire viewing field. Call (800) 345-8655 or visit [www.volk.com](http://www.volk.com).

## **New Daily Disposable Contact Lens Debuts**

### **BAUSCH + LOMB**

Earlier this year, Bausch + Lomb received FDA approval for Biotrue ONEday, a new daily disposable contact lens. The new lens is made from HyperGel material, which is designed to provide the best features of conventional hydrogels and silicone hydrogels. It offers high water content and delivers more oxygen than a traditional hydrogel, without the need for silicone, while maintaining the comfort of conventional hydrogels. The company says Biotrue ONEday lenses provide consistent, clear, comfortable vision throughout the day because the innovative, bio-inspired material helps them to retain moisture and optical shape. The outer surface of the lens is designed to mimic the lipid layer of tear film to prevent dehydration. For more information, visit [www.bausch.com](http://www.bausch.com).

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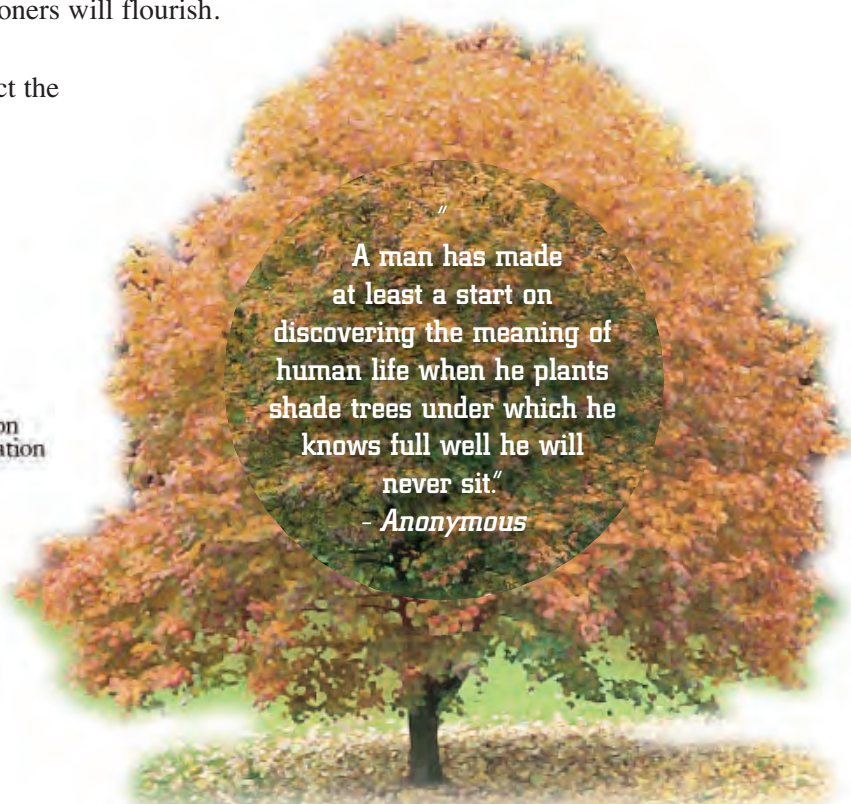
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shade trees under which he  
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never sit.”  
- Anonymous

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# EDITORIAL

## The Journey of Scholarship

Aurora Denial, OD, FAAO



**A**s journal editor, my responsibilities include encouraging and supporting faculty in their scholarly efforts and helping to sustain a culture of scholarship. Teaching, service and scholarship are closely linked activities for most university faculty. Scholarly activity is usually required for advancement in academic rank or tenure. Engaging in scholarship pro-

vides faculty the opportunity to be leaders in their specialty areas. However, the expectation of service and scholarship was not always present in the history of the American faculty member.

Early American colleges were modeled after British institutions. These colleges focused on “building character and preparing new generations for civic and religious leadership.”<sup>1</sup> The focus for faculty was on teaching, not on scholarly achievement. Charles W. Eliot, who served as president of Harvard University from 1869 to 1909, said “the prime business of the American professors must be regular and assiduous teaching.”<sup>2</sup>

As the country evolved in the 19th century so did the focus of higher education. The industrial and agricultural revolutions created a need for individuals who would transfer knowledge from the classroom to the farm or factory.<sup>3</sup> Americans wanted to send their male children to college to learn something useful.<sup>1</sup> This concept made it necessary for college curricula and faculty to reflect the more practical aspect of education. The land grant program that allowed states to develop universities helped to produce individuals and faculty who could support the needs of the community.<sup>3</sup> The focus for faculty shifted from purely teaching to a role that included service to the community. Science at this time took on

a new and important role. It was acknowledged that scientific discovery could enhance the productivity of farms and factories. Through applied research, educational institutions could impact industrial and agricultural productivity and provide a direct benefit to the community. These changes led to additional faculty responsibilities, which now included teaching, service and scholarship. Scholarship was reflected in both applied and basic science research. By 1895, William Rainey Harper, the renowned president of the University of Chicago, required that faculty promotion in rank and salary be dependent on scholarly productivity.<sup>3</sup>

### Scholarship in Optometric Education Today

The historical perspective provides an interesting backdrop. In the profession of optometric education, most faculty are selected because of a clinical or subject expertise and lack formal training in scholarly activities/research. Some optometric institutions do not require faculty to participate in scholarly activities. However, isn't the goal of generating, disseminating, interpreting and applying knowledge central to the role of a faculty member and academia? If that is the case, how do institutions support a culture of scholarship? In this edition of Think Tank (page 14), leaders in optometric education write about how a culture of scholarship is supported and nurtured at their institutions.

### Always More to Learn

In reflecting on my own journey from a private practitioner who read journal articles to a faculty member who contributes, I often think of the challenges and rewards involved in the learning process. As a private practitioner, I read clinically relevant information, which helped me to provide a high level of patient care. I did not engage in research or scholarship, as working and taking care of a young family

consumed most of my time. When I joined the New England College of Optometry, I quickly realized that the role and responsibility of a faculty member involved scholarship. I appreciated the importance of scholarship and was excited to get started on this journey.

Although enthusiastic, I was at a loss as to how to get started. My entry into scholarship was to write cases for fellowship at the American Academy of Optometry. Patient care was familiar to me, and the cases enabled me to obtain my fellowship. At that point, I was approached by a colleague who invited me to join his project. I will always be indebted to him for this invitation. I immediately accepted the invitation and soon realized that although we were both ambitious and motivated, we lacked skill and expertise in the area of research. I can honestly say, during that time self-directed learning took on a new meaning. We attended research seminars, sought the advice of more experienced researchers and undertook many revisions and rewrites to our project. Our initial submission for publication met with revisions that seemed endless. We persevered and were rewarded by our first published manuscript.

The struggle was worth it, and I excitedly pursued another project. The second project was a result of a student's experience in the ocular disease lab, which I was supervising. As time went on, I undertook more projects. At first, I used my teaching experiences as the origin of research questions. I started with posters for the Academy and then developed the posters into publishable articles. I learned on the job and the more projects I completed the more I learned about research design, writing and publication. The rewards also

increased. The literature searches and data analysis provided an opportunity for learning. I looked forward to the time I spent writing. Writing was concrete and creative, and I had control over the progress or lack of progress. Scholarship became part of my identity and something I enjoyed.

I often look at this journey and feel proud of the accomplishment. Seeing your name in print is an intrinsic reward, as is the feeling of accomplishment after designing a research project and seeing it through to publication. Most rewarding is to know that I have contributed to the optometric educational literature. I will always be grateful to my colleague who provided me an initial opportunity and to our mentors, who provided unlimited patience and expertise. Participating in scholarship is a continuous process. Although my journey started many years ago, it is far from complete. There will always be more to learn, a new idea, a new project, and ultimately helping others in their journey.

### References

1. Boyer EL. Scholarship reconsidered: priorities of the professoriate. The Carnegie Foundation for the Advancement of Teaching. Princeton, NJ. 1990.
2. Eliot CW. Educational reform: essays and addresses. In: Metzger WP. The academic profession in the United States. In: The academic profession: national, disciplinary, and institutional settings, ed. Clark BR, Berkeley, CA.: The University of California Press, 1987, p.135.
3. Kennedy RH, Gubbins PO, Luer M, et al. Developing and sustaining a culture of scholarship. Am J Phar Educ. 2003;67(3):Article 92.



## ASCO'S JANOFF AWARD TO BE PRESENTED IN 2013

The Dr. Lester Janoff Award for Writing Excellence recognizes the outstanding writing of a research article published in *Optometric Education*, the journal of the Association of Schools and Colleges of Optometry. The award, to be presented next in June 2013, is named in honor of the late Lester E. Janoff, OD, MSED, FAAO. Dr. Janoff was editor of the journal from 2002 to 2005 and a longtime member of its editorial review board. He was known for his mentoring of young writers.

A committee of the journal's editorial review board selects the winner of the award. The judges rate all the research articles that appeared in the journal in the previous two years. Writing excellence is judged on significance of the topic chosen, quality of the article and potential impact. Authors of the winning paper receive a cash award.

The first Dr. Lester Janoff Award for Writing Excellence was presented to Barbara McGinley, MA, and Nancy B. Carlson, OD, FAAO, of the New England College of Optometry, and Elizabeth Hoppe, OD, MPH, DrPH, of the Western University of Health Sciences College of Optometry, for their article "Instilling Ethics and Professionalism in Today's Optometry Students." The paper appeared in the Winter 2007 issue of the journal.

The 2010 award was presented to Aurora Denial, OD, FAAO, of the New England College of Optometry, for her article "Association of Critical Thinking Skills With Clinical Performance in Fourth-Year Optometry Students." The paper appeared in the Summer 2008 issue of the journal.

## *How do you create, support and nurture a culture of scholarship at your institution?*

### *Optometric Educators Respond*

**David Heath, OD, EdM**  
*President*  
State University of New York, State  
College of Optometry

*President*  
Association of Schools and Colleges  
of Optometry

**As President of ASCO, Dr. Heath  
has concentrated his efforts on the  
initiative “Finding ASCO’s Voice.”**

**T**his issue has been in strategic plans and self-studies and on the agendas of faculty and administrations for decades. The answer is not simple, and results are elusive. I will focus my comments on clinical faculty, who are so crucial to the mission of our schools and colleges. They are faculty who are educated as clinical care providers but have chosen an academic career path. For those who have earned PhDs, research, and more broadly scholarship, is a central component of their training and a part of their value system linked to success. It is something they want to do and have chosen to do. For this discussion, I will also assume we are talking about full-time faculty.

Let’s start with a basic premise: The reputation of our educational programs and indeed our profession depends heavily upon the intellectual leadership of our faculty and the expression of that leadership through research and scholarship. With this in mind, every time we hire a new full-time faculty member, we as administrators have high hopes and expecta-

tions that he or she will develop and emerge as a leader for our institution and our profession. Unfortunately, conflicts between institutional expectations and those of prospective clinical faculty members frequently occur at the point of hire due to a lack of clear communication and mixed messages. It is important that the nature of a full-time commitment as an academic clinician is clearly understood during the hiring process. The hiring of clinical faculty is too often expedited to fill gaps in clinical coverage, and as a result the use of a thorough faculty-run search process may be compromised. This may undermine the clear communication of both the short-term and long-term expectations for an academic career path. This leads me to my first point: A successful program should have a strong faculty recruitment and hiring process run by individuals who understand the scholarly expectations so they are clearly defined and communicated to prospective faculty.

The experience and motivation of the candidates are also critical for success. Young clinical faculty, hired directly after completing a residency, have rarely received the training that provides them with a true understanding of the academic culture of scholarship. They may have given a continuing education lecture or presented a poster at a national conference, but this is often done only because their programs required it. For a faculty member to develop as a scholar, a sincere motivation to do so and an enjoyment of the pro-

cess is crucial. It’s important that everyone involved in the hiring process also understand and endorse scholarly expectations. While a member of a search committee may communicate that the pursuit of scholarship is important, another member of the community may be telling candidates not to worry because it’s not that critical.

If we have hired well, new faculty will understand the expectations and embrace the role of scholarship in their careers. However, they may not have the requisite skill for independent scholarship. This leads me to my second point: New faculty need help and sufficient mentorship from supervisors and senior faculty in order to establish reasonable scholarship goals and develop as scholars. Too often, supervision is simply thought of as management of assignments. Faculty success must be important to supervisors, e.g., department chairs and service chiefs, and faculty development should be one of their most important responsibilities. Our academic and clinical programs by their very nature are team-based, and the success or failure of one member of the team impacts the others. At SUNY, we expect faculty to be proactive in their own development and to have periodic meetings with their supervisors that focus on facilitating their success as teachers, scholars and patient care providers.

My third point is that institutions must invest in the formation of an intellectual community. This means investment in facilities, personnel and

support systems. In the current economic climate, the general refrain, rightfully so, is “resources are limited.” While new resources may be limited, we do have the ability to strategically direct or redirect what resources are available to create an environment in which those who have the most interest and motivation can develop. Furthermore, clinical faculty cannot be mentored without mentors who are experienced in clinical research and can help them navigate the bureaucracy of IRBs, grant proposals, clinical trial agreements and contracts. At SUNY, to develop the expertise and infrastructure that will support the development of scholars, we recently established the Center for Clinical Vision Research. Dr. Troilo, our VP for Academic Affairs, directed faculty-led searches that resulted in the hiring of several key faculty and staff. As a consequence, we hired several OD/PhD faculty with clinical research experience when vacancies arose, built out clinical research space in the center of our clinical care facility (the University Eye Center) and hired staff, beginning with a Clinical Studies Manager. All serve as resources for faculty. Without high-quality clinical research occurring on our campuses led by well qualified faculty, it is difficult to provide new faculty coming right out of residency programs with an environment in which they can develop as scholars.

Finally, my fourth point concerns institutional values relative to scholarship. The pursuit of scholarship will always vary among our faculty. However, if our programs are to intellectually lead the profession, a commitment to the value of research and discovery needs to be (or become) universal. An embrace of the value of discovery needs to be consistent and occur at every level of the organization. Notably, while we highly value the scholarly activity of clinical faculty, it is important to emphasize that not all faculty wish to do clinical research or pursue scholarship even in a more general sense. But the presence of a strong and mature clinical research program will allow faculty and staff to participate and contribute at several different levels,

which match their level of interest and skills, while taking part in the creation of new knowledge.

While I would like to say we have it all figured out at SUNY, in reality it is a work in progress. However, I do think the four principles highlighted above are key to making progress toward creating the necessary culture of scholarship.

**David S. Loshin, OD, PhD**  
*Dean*

**Nova Southeastern University**  
**College of Optometry**

**T**he following are some of the initiatives Nova Southeastern University College of Optometry has put into place to foster a culture of scholarship:

- Every faculty member receives a development/travel fund for travel to professional meetings.
- We support the university grant process with matching funds up to \$5,000.
- Our process for contract continuation and promotion includes faculty-driven criteria for scholarship/research.
- We provide 10%-20% workload to every member of the full-time faculty for scholarship.
- Faculty members can apply for an “assignment modification” for time beyond 20% for pursuing a research project or scholarship. The request is reviewed and decided upon by the department chairs and deans as a group rather than one individual.
- We acknowledge faculty members who pursue scholarship by nominating them for awards.
- We provide a full tuition waiver to all full-time faculty members who pursue an MS degree in Clinical Vision Research. (The university also provides tuition reduction for faculty members pursuing graduate degrees in other colleges within the university.)
- We have a clinical research coordinator on staff.

- We provide discretionary time and financial support to allow faculty members to attend the Association of Schools and Colleges of Optometry’s Summer Institute for Faculty Development.
- We provide space (clinic or lab) for research.

**Elizabeth Hoppe, OD, MPH, DrPH**  
*Dean*

**Western University of Health**  
**Sciences College of Optometry**

**A**s a new institution, Western University of Health Sciences College of Optometry has had the opportunity to engage in many discussions regarding the support of scholarly activity. Members of the college administration and faculty body have learned from past experiences, other schools and colleges of optometry, and interprofessional colleagues engaged in health professions education on the university campus. While we are still in the early days of developing our culture of scholarship, here is a brief description of the activities to date.

**Mission and goals:** In establishing its vision statement, mission statement and core values, the college included words such as “innovation,” “research” and “collaboration.” The goals that have been derived from the mission articulate three specific areas related to scholarship: 1) research aligned with the program emphases; 2) developing, implementing, evaluating and disseminating aspects of healthcare education, research and patient care; and 3) conducting interprofessional, collaborative and community-based projects in healthcare education, research and patient care. Including these specific elements of scholarly activity within the context of the mission and goals supports the college’s decision-making processes and priorities.

**Tracking outcomes:** The goals described above are translated into objectives and outcomes related to scholarly activity. The college is committed to a regular cycle of review to assess its progress toward attaining benchmarks and targets, both short- and long-term.

**Providing resources:** The college and the university strive to provide faculty members with resources to support scholarly activity, including time, funds and access to technical support. Beginning in this academic year, each faculty member has been allocated 0.10 FTE for scholarly activity. Some members of the faculty body also receive FTE allocation for research, and some members of the faculty are able to gain additional research time through external grant funding. All members of the faculty body receive designated funds in each academic year for their professional development, and if a faculty member chooses to utilize the funds for support in the area of research and scholarly activity, those expenditures are made on an individual basis. Some faculty members also receive start-up funds to establish a research agenda and to secure research infrastructure needed for their areas of emphasis. The university also established an incentive program whereby a portion of external funding indirect costs can be reallocated in support of research programs and can be used for financial support directly to the faculty principal investigator. Through the university's Center for Academic and Professional Excellence (CAPE), training programs and seminars are offered throughout the year and frequently include topics related to research and scholarship.

**Recognizing accomplishments:** The college recognizes that the attainment of its goals for scholarship and research activities are only realized through the efforts of its faculty members. Administrators and faculty supervisors seek to acknowledge successful efforts through public announcements, acknowledgment in newsletters and small celebrations, which recently included signing a bottle of champagne and then popping the cork!

**Linda Casser, OD, FAAO**  
*Dean*

**Pennsylvania College of Optometry**  
**at Salus University**

I view this as a very important question because it is central to our roles as administrators at the schools and colleges of optometry. In addition, it is an aspect of our roles that brings inherent and long-lasting rewards by virtue of its positive impact on individual faculty members, including their perceptions about their assignments and responsibilities, as well as its positive impact on the program/institution. Creation of a culture of scholarship includes:

- clearly stating the goals and importance of scholarship for faculty members, including the impact on development, promotion, tenure (or equivalent/alternative), granting opportunities, contribution to the body of knowledge and credibility of the institution
- providing appropriate resources and support via internal and/or facilitated external funding sources, such as quality time, space and equipment
- facilitating mentoring opportunities, both internal and external
- supporting appropriate development opportunities, such as grant-writing workshops, both on and off campus
- establishing reasonable and well-articulated expectations
- announcing and celebrating successes
- creating a perpetuation of the culture of scholarship.

While this formula is relatively simple to articulate, it can carry with it challenges with regard to resources, ongoing commitment and consistent implementation. That is one of many reasons why creation of an embedded and sustained culture of scholarship is such an important goal to which we must commit as a profession and as individual institutions.

**Joseph Bonanno, OD, PhD, FAAO**  
*Dean*

**Indiana University School of Optometry**

For our tenure-track faculty, promotion and tenure, i.e., continued employment, is contingent on excellence in either research, teaching or service and at least satisfactory performance in the other two areas. Typically, research is the chosen area of focus. We provide research space, start-up funds and, sometimes, research personnel. We also appoint a mentor for each assistant professor. The university provides the research infrastructure support and grant programs for junior faculty.

For clinical ranks, we encourage scholarly activities. We recently made available additional development time for clinical rank faculty to write case reports, collaborate on larger research projects, contribute to Academy special interest groups and continuing education, etc. Promotion to associate or full clinical professor is typically based on teaching excellence; however, these scholarly activities enhance that mission. Individuals who do not take advantage of the development time lose it.

**Kent M. Daum, OD, PhD**  
*Professor of Optometry*  
*Dean*

**Massachusetts College of Pharmacy**  
**and Health Sciences School of Optometry**

The School of Optometry at MCPHS accepted its first class of students this fall. As a new program, we are in-process establishing our culture of scholarship as well as many other facets of our community. In all areas of our program, we strive to reflect these values:

**A sense of excellence:** Our standard response to a challenge is to complete it with the highest level of ability, care and responsibility.

**A sense of humanity:** Our shared identity reminds us that being human includes lots of varying and sometimes conflicting responsibilities, and our wish is to do our best to identify the

best path for individuals as well as our community.

**A sense of privilege:** Our approach includes recognition that we have a special gift of scholarship that allows us to use our whole self in the creative process in our service to our fellow humans.

Our mutual commitment is to call each other along, reminding each other of these senses. We have instituted brown bag sessions for faculty. These noontime meetings provide a space for discussing the issues of the day and the challenges of scholarship and for helping us to build a sense of collegiality. We are in the process of completing space that will support our faculty in their research and scholarship activities. We are equipping these spaces to support faculty needs in research and scholarship.

In addition, we have reviewed our faculty manual with each of the faculty and discussed the significance of scholarship in the promotion and tenure process. We are working on creating dual degree opportunities for our students with faculty support. We have instituted a course, Learning, Information and Independent Study, designed to teach students about the scholarly process and to assist faculty in their scholarly work.

Outside of our institution, we are visiting scholars across the state and region and taking the opportunity to discuss mutually beneficial scholarly pursuits. The challenge of creating, supporting and nurturing a culture of scholarship is worthy of our time and effort. Our success in this endeavor is a significant aspect of building a program of excellence and one that we are approaching with great vigor!

**Barry Fisch, OD**  
*Dean of Academic Affairs*  
*Professor of Biomedical Sciences and Disease*

#### **New England College of Optometry**

One of our goals is to establish the college as a leader in important selected areas of research and scholarship, particularly in the areas of vision and health care. We do this by recruiting and retaining faculty who have demonstrated scholarly excellence and by empowering them to follow their area of interest. The college provides encouragement, support and professional development opportunities for faculty in an environment of collaboration within the college and with leading local, regional, national and international institutions. Our graduate programs and our systematic collaborative ongoing curriculum assessment and use of professional instructional designers demonstrate our commitment to research and education.

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### **Send Us Your Comments**

*Do you have any thoughts or insights related to the support of scholarship at our schools and colleges of optometry? Send your comments to Dr. Aurora Denial at [deniala@neco.edu](mailto:deniala@neco.edu), and we will print them in the next edition of the journal.*

# 3D in the Optometric Classroom: Forward-Thinking or Fluff?

James Kundart OD, MEd, FAAO

*Dr. Kundart is the Chairman of the Educational Technology Special Interest Group for the Association of Schools and Colleges of Optometry. He is a researcher and author and an Associate Professor at the Pacific University College of Optometry. He can be contacted at (503) 352-2759 or kundart@pacificu.edu.*

What's the big deal about three-dimensional (3D) technology? Cynics contend it is just a fad that drives sales of 3D Blu-ray content, increases the price of televisions, smartphones and going to the movies, and decreases the quality of the content we watch. However, 3D is gaining support from some in the field of education, who point to emerging evidence that, although the technology is still in its nascency, it may have significant educational value when properly used.

I have some experience teaching with 3D assistance. Pacific University was the first to open a 3D Vision Clinic just more than a year ago.<sup>1</sup> In that time, we've discovered that digital 3D projection technology holds great attraction to students and normally sighted patients alike. Surprisingly, I've also discovered that the average patient experiencing one of the so-called "Three Ds of 3D" (dizziness, discomfort, or lack of depth) is most concerned with a fourth "D" (diplopia).

At Pacific, we will soon have a 3D drop-in teaching laboratory to allow students to complete assignments with simulations of basic science experiments and virtual patients. We are not the first, and will not be the last, to do so. If the 3D content can keep pace with the demand, I imagine labs like this will be a model for all of our didactic facilities in the near future. Just like many consumers are purchasing televisions with

3D capability when they upgrade their home entertainment systems, so it will be in the classroom. I believe it would benefit us and our students if our classrooms are 3D-capable in the future. Here's why.

## 3D and Attention

Competition for our students' attention has never been fiercer. Anyone who has been teaching in front of a sea of laptops for the past decade or more knows this. It would be fair to say that students love this change, while teachers are generally less fond of it. Yet the advantages of the wired classroom to the instructor are often forgotten. For example, many can attest that it makes us better teachers to have fact-checkers among our students. Also, the competition of the Internet is incentive to make sure we keep lectures lively and interactive — as best we can with 2D presentations, that is.

If you'd like to lift the eyes of your students from their laptops, you're not alone. Many are concerned that split attention during lecture is handicapping us in the lecture hall. There is evidence that this is true. A study from Ohio State has shown that multitasking makes us feel good, but we're not nearly as good at it as we think we are.<sup>2</sup> Split attention affects performance.

Some optometric educators require students to close their laptops and drop back to paper notes during their

classes. After all, we all want the doctors of tomorrow to listen to us so they know all they can in order to best treat patients. Our students might say that closing their laptops during class is not conducive to this goal. One simple reason is that they often can type notes faster than they can write them. Others engage better when they can interact, albeit not verbally.

Yet for all of the concerns about laptop use in the classroom, it's not the offline world that concerns us. It's the Internet. It's not just the students' attention in the classroom for which we are competing, but the myriad of digital entertainment available when they study at home. So if we can't beat the competition, can we join it? A major challenge to education at all levels in the wired world is to ride the wave of educational technology rather than becoming overwhelmed by it.

Enter 3D at the podium. With the aid of a digital light processing (DLP) or similar 3D projector and electronic 3D glasses that flicker, attention comes up off the students' laptops and back to the front of the room. The active 3D glasses they must wear flicker in synch with the frame refresh rate of the projector and faster than our critical flicker fusion (CFF) frequency, providing very high-definition resolution compared with circular polarization, the typical 3D technology used in movie theaters.

If we accept that a 3D presentation can

command attention, does it follow that students can learn more with it? One of the assertions made at the November 2011 Monterey Symposium by the American Optometric Association (AOA) and 3D@Home Consortium was that “Individuals can learn faster and retain more information in an immersive stereoscopic 3D presentation than in a traditional 2D presentation.”<sup>3</sup> Let’s examine these two somewhat sweeping claims.

### 3D and Efficiency

Despite its shortcomings, the efficiencies of the traditional lecture format in higher education have to be recognized. Efficiency is why optometric education is largely still following the classic “sage on the stage” model, which has permeated Western classrooms for generations. This model is relatively independent of class size, and has been used in larger universities for class sizes of 1,000 or more students at a time. On the other hand, this extreme economy of scale often leaves something to be desired for both students and their teachers.

In the schools and colleges of optometry, much of the typical student’s didactic first three years are spent in auditoriums. Yet the difficulty in retaining and mastering material based on passive listening alone is well-established. The word auditorium means “a place for hearing,” and is familiar to our students. But most have not been trained in the techniques of active listening, including following and reflecting skills and avoiding distractions. These skills become very useful in listening to patients in clinic later in their educations.<sup>4</sup>

The elegance of using 3D in the classroom is that it retains the efficiency of the traditional lecture format while encouraging a level of engagement not otherwise possible. This level of engagement includes optometric educators, who can create their own content using special software such as the XPAND 3D Plugin for PowerPoint. Some might argue that adding 3D by itself will not improve the content of the presentation any more than PowerPoint animations or transitions would. However, it has been shown that 3D can add depth to a class such that students become engaged. According to a white paper by Professor Anne Bamford, director of the International

Research Agency, describing a large European study, “During class observations, 33% of the pupils reached out or used body mirroring with the 3D, particularly when objects appeared to come towards them and where there was heightened depth.”<sup>5</sup>

### 3D and Retention

Even with audiovisuals, teaching in the 2D classroom is by definition a passive way to convey information. There is the advantage of efficiency, but the risk is that it may come at the expense of retention. An analogy many of us can relate to is that a classroom lecture is no more effective for retention than verbal patient education in clinic. Without written instructions on how to use their medicine, clean their contact lenses or perform home vision therapy, for example, much of what we tell patients is lost. Similarly, for our students, we all know that retention without active listening is typically less than is necessary for competency.

So why do we still use the “chalk and talk” method of teaching, if both retention and attention are less-than-ideal? Perhaps it is because heretofore, we have not had a viable alternative. But now, there is evidence that 3D software and presentations will increase retention. As stated concerning public school students in The 3D in Education White Paper: “86% of pupils improved from the pre-test to the post-test in the 3D classes, compared to only 52% who improved in the 2D classes. Within the individuals who improved, the rate of improvement was also much greater in the classes with the 3D. Individuals improved test scores by an average of 17% in the 3D classes, compared to only an 8% improvement in the 2D classes between pre-test and post-test.”<sup>5</sup>

These statistics make a convincing case for enhancing some of our lectures with quality 3D content. The numbers may be different for students in optometry school, who have the advantage of practicing what they have learned in teaching labs or clinics. But what to do when students would like to practice their lab or clinical skills even when teachers and patients are not available? Lab and clinic simulations are other potential applications of 3D, especially since the decline of print media and other ana-

log, noninteractive information.

### Optometric Content and the 3D Classroom

While graduate-level content is still lacking, optometric education is rife with subjects that would lend themselves perfectly to 3D education. These subjects include:

- histology
- microbiology
- ocular anatomy and physiology
- optics: geometric, physical and physiological
- optometric methods/procedures
- systemic and ocular disease.

### Is Analog 3D Just as Good?

Some of us (this author included) learned subjects like human anatomy and physiology by using plastic models of bones, muscles, nerves and organ systems. Some schools that offer anatomy and physiology through distance education have discovered that students still need hands-on time in the lab to be competent in the upper classes. The principle here is that 3D, albeit plastic analog models, is necessary for complete understanding of human anatomy. While neither 3D technology nor the plastic models come cheap, the former has the advantage of being highly portable and usable by larger numbers of students at a given time.

### Feedback from the Field

According to “3D in the Classroom, See Well, Learn Well, Public Health Report,” published by the AOA and 3D@Home Consortium, the response of public school students and teachers to 3D learning and teaching has been generally positive.<sup>6</sup> Comments from students quoted in the report include, “The information sticks with me a lot more” and “Using 3D has helped me look at what we are learning in a different way. It almost makes it look real — it’s fascinating ...” Comments from teachers include, “An accessible, yet powerful, way to convey difficult or abstract concepts” and “An engaging and attractive introduction to new material.”

Judging by what we know so far, the magic of 3D in the classroom seems to be that with a little extra content, the efficiencies of the lecture format can be combined with the interactive nature of 3D. When this is done right, it may very likely make for a better learning experience for students, as well as happier optometric educators.

## References

1. Graves B. Pacific University College of Optometry focuses on 3D vision in research and in new Beaverton clinic. The Oregonian [Internet]. 2011 Dec 23. Available from: [http://www.oregonlive.com/education/index.ssf/2011/12/pacific\\_university\\_college\\_of.html](http://www.oregonlive.com/education/index.ssf/2011/12/pacific_university_college_of.html). Accessed 2012 Sept 9.
2. Wang Z, Tcherev JM. The “myth” of media multitasking: reciprocal dynamics of media multitasking, personal needs, and gratifications. *Journal of Communication*. 2012;62(3):493-513.
3. Nov. 2011 Monterey Symposium [Internet]. AOAstudio. Posted 2012 March 1. Accessed: 2012 Sept 18. Available from: <http://www.youtube.com/watch?v=IJHoSPrb8nI&feature=youtu.be>.
4. Robertson K. Active listening - more than just paying attention. *Aust Fam Physician*. 2005;34(12):1053-5.
5. Bamford A. The 3D in Education White Paper [Internet]. Gaia Technologies. Accessed: 2012 Sept 19. Available from: <http://www.gaia3d.co.uk/news/the-3d-in-education-white-paper/>.
6. 3D in the Classroom, See Well, Learn Well, Public Health Report [Internet]. American Optometric Association and 3D@Home Consortium. Accessed: 2012 Sept 19. Available from: <http://viewer.zmags.com/publication/d0eb8af9#/d0eb8af9/1>.

# A Review of Faculty Perceptions, Barriers and Resources Related to Scholarly Productivity

Aurora Denial, OD, FAAO

Elizabeth Hoppe, OD, MPH, DrPH

## Abstract

**Purpose:** The purpose of this study was to gain information on faculty members' perceptions of their institutions' expectations of scholarship, faculty members' interests and perceptions of their own expectations of scholarship, and perceived barriers and resources to scholarship.

**Methods:** An online survey was developed and distributed to all faculty members listed in the Association of Schools and Colleges of Optometry directory of optometric institutions in the United States and Puerto Rico.

**Results:** Faculty members perceived original research as most valued on an individual and institutional level. The expectation from both institutions and faculty for dissemination of scholarly work was publication in a peer-reviewed journal. Only 7% of the faculty responded that their primary scholarly interest was in education or educational theory. The most frequently perceived barriers to faculty scholarship were identified as clinical schedule (41%) and classroom/laboratory teaching schedule (23%). Faculty indicated that resources such as time allocated for scholarship (73%), financial support (37%) and mentorship (37%) would improve their ability to engage in productive scholarly activity.

**Conclusion:** Faculty members' expectations for their own scholarship and perceived institutional expectations can impact scholarly productivity. In general, responses support an overall good fit between faculty members' personal and professional expectations and how they perceive the expectations of their colleges and universities.

**Key Words:** faculty, scholarship, optometry

## Introduction

In the late 19th century, American universities instructed teachers to not only teach but seek new knowledge.<sup>1</sup> Original research was the means of attaining new knowledge and became the traditional form of scholarship. In 1990, Ernest Boyer published in *Scholarship Reconsidered: Priorities of the Professoriate* a broader concept of scholarship.<sup>2</sup> Boyer's model included the scholarship of discovery (research), the scholarship of integration, the scholarship of application and the scholarship of teaching.<sup>2</sup> This model, while subject to interpretation, acknowledges a broader impact and more diverse roles for scholarship.

Boyer's model is applicable to the healthcare professions and health professions education. In healthcare professions educational settings, faculty members are often diverse in their responsibilities, schedules and assignments. Their responsibilities can include patient care, public health roles, teaching, scholarship and service to the college, profession and community. Based on the multifaceted roles and responsibilities of a healthcare faculty, Boyer's model provides a greater opportunity for meaningful contribution. Additionally, achievement in scholarly activity has become an integral component of most healthcare faculty members' academic career success within an institution.<sup>1</sup>

Webster's Ninth New Collegiate Dictionary defines the word faculty as the teaching and administrative staff having an academic rank at an institution.<sup>3</sup> In the profession of optometry, the criteria for the achievement of an academic rank can vary. The spectrum of contributions needed to achieve an academic rank usually includes teaching, scholarship, service and patient care. Understanding the habits, expectations, resources and barriers related to scholarship is essential in providing faculty development, institutional infrastructure, support and encouragement. Additionally, the growth and development of a profession, as well as the educational process for students, is dependent on the discovery or creation of new knowledge as well as the integration, implications and assessment of that knowledge. Scholarly activity is

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needed for the expansion and progress of optometric curricula and the development of new teaching pedagogies, activities and philosophies as well as outcome assessment. The Accreditation Council on Optometric Education has set as a standard that optometric programs must support, encourage and maintain research and scholarly activity.<sup>4</sup> In the absence of rigorous scholarship, the profession of optometry and optometric education risk stagnation.

In the profession of optometric education, there is a paucity of research into the topic of faculty and scholarship. A search of VisionCite, Educational Resources Information Center (ERIC) and PubMed using the terms scholarship, faculty and optometry revealed only a few articles regarding optometric faculty and scholarship. The purpose of this study was to gain information on faculty members' perceptions of their institutions' expectations of scholarship, faculty members' interests and perceptions of their own expectations of scholarship, and perceived barriers and resources to scholarship. Additionally, the authors sought to compare faculty members' responses regarding their own professional expectations with their reported perceptions of their institutions' values and expectations. The authors hypothesized that when faculty members' personal expectations for their professional goals align with their perceptions of institutional expectations, barriers to scholarly productivity would be reduced. The survey was used to gain a "snapshot" description of how well individual faculty members' beliefs and perceptions about scholarly activity are aligned with their perceptions of their institutional environments.

## Methods

The survey instrument used for this study was developed after a search of the relevant literature and a review of study objectives. The survey was first distributed to a small select group of administrators for the purpose of obtaining feedback and to clarify wording, survey construct and organization of the items used for comparison.

The authors recognize that different institutions may have differing definitions of scholarship, or may delineate the characteristics of scholarly activity

specific to their own institutional culture. To ensure a similar construct for purposes of the survey responses, the authors provided a brief description for four different types of scholarly activity. The survey defined scholarship based on Boyer's model of scholarship: the scholarship of discovery, integration, application and teaching.<sup>2</sup> Examples and elaboration of terms were provided to aid in the understanding. The scholarship of discovery was defined as original research; integration was defined as novel insights, interpreting themes in discovery, identifying connections between discoveries, e.g., literature synthesis; application was defined as building bridges between theory and practice, e.g., case reports; and teaching was defined as communication of one's knowledge, facilitating student learning. Additionally, the definition of scholarship included the criteria requiring materials to be shared, judged and disseminated in order to be considered scholarship.

The final survey consisted of 21 questions, covering faculty members' perceptions of their institutions' expectations of scholarship, their own expectations of scholarship, and perceived barriers to scholarship. Most questions were forced-choice with an option for "other responses" when appropriate. Some questions allowed for multiple responses.

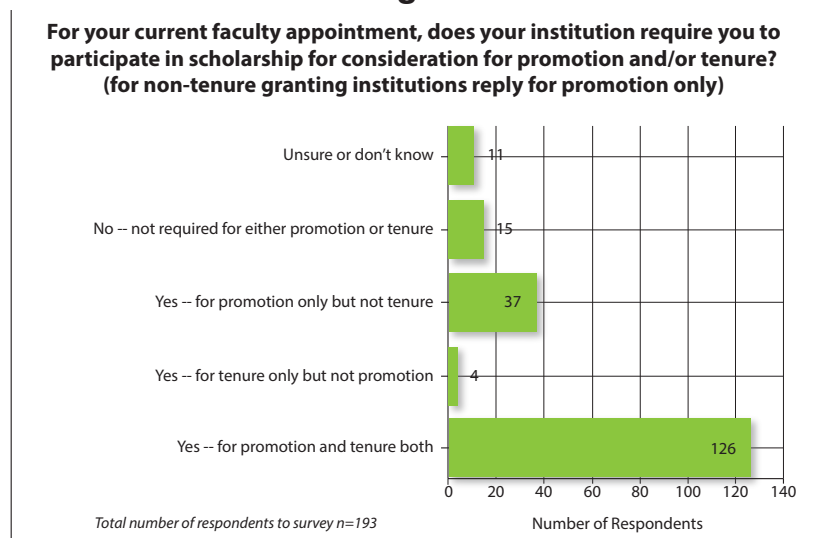
A Web-based survey was developed using the Zoomerang™ survey hosting system, and an e-mail invitation was sent to all faculty members who were listed as having a faculty appointment at one of the 20 optometric institutions

in the United States and Puerto Rico. The 2009-2010 Association of Schools and Colleges of Optometry (ASCO) Annual Faculty Survey Report provided a list of 646 full-time faculty members for survey distribution. A follow-up e-mail was sent to the Chief Academic Officers from the ASCO member institutions with the request that they encourage their faculty members to participate. Participation in the survey was voluntary and anonymous. The study was reviewed by the Institutional Review Board at the New England College of Optometry. Descriptive analysis was based on response frequency. The number and percentage distribution were calculated for each response option for each survey question. Additional statistical analyses were conducted for selected pairs of questions. Pearson chi-square, Pearson correlation and p-values were calculated to assess the level of concurrence between faculty members' perceptions regarding institutional values, expectations and rewards as compared with their own perceived values, expectations and rewards in the context of professional development.

## Results

The complete survey and raw data are available by request. (Contact corresponding author Dr. Aurora Denial.) One hundred and ninety-three surveys were received, which represents a 30% response rate. The respondent profile breaks down as follows: 90 (47%) from stand-alone optometry-only schools or colleges; 79 (41%) from state-support-

**Figure 1**



ed universities; 24 (12%) from private universities. A majority of respondents (65%) reported that their institutions required scholarship for both promotion and tenure decisions with an additional 21% reporting that scholarship was required for either promotion or tenure. **(Figure 1)** Sixty-seven percent of the respondents reported that expectations for advancement were communicated by faculty handbook. **(Figure**

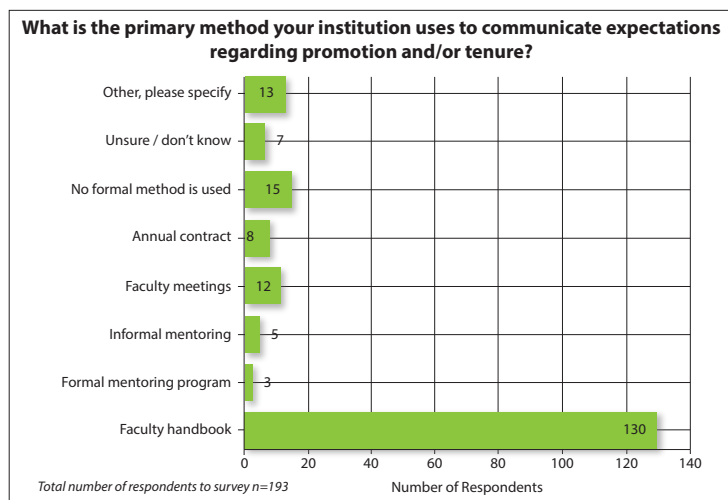
2)

### *Faculty Perceptions of Their Institutions' Expectations*

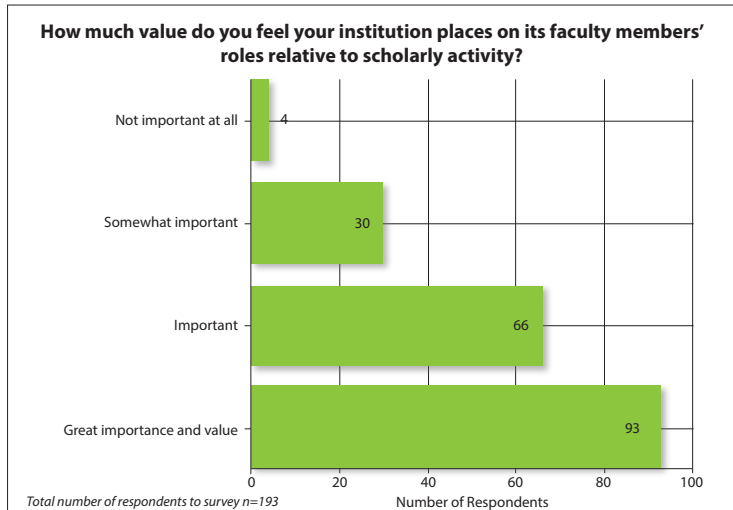
In the area of faculty members' perceptions of their institutions' expectations of scholarship, 67% of the respondents reported that original research was the area of scholarship most valued by their institution. The perceived expectation

from faculty for dissemination of scholarly work was publication in a peer-reviewed journal (97%). Eighty-two percent of the faculty felt their institution placed a great or important value on their role in scholarship. **(Figure 3)** Fifty-four percent of the respondents felt that scholarly activities were appropriately valued and rewarded by their institution with a 26% perception of undervalued/under-rewarded and

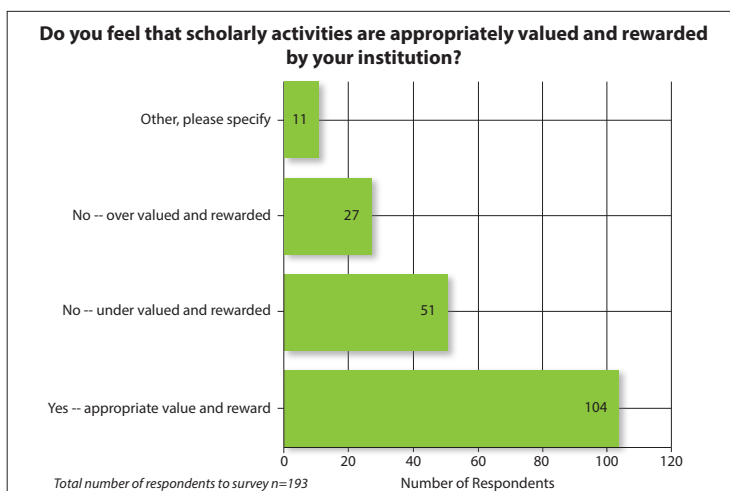
**Figure 2**



**Figure 3**



**Figure 4**



a 14% perception of overvalued/over-rewarded. (Figure 4)

*Faculty's Perceptions and Interests in Their Own Expectations of Scholarship*

A large majority of respondents (73%) indicated that they feel it is part of their role as a faculty member to contribute to optometric educational literature,

whether or not it is explicitly stated in their contract. Fifty-nine percent of the respondents spend at least 4 hours or more a week on scholarly activity with 27% spending greater than 8 hours per week and 36% spending less than 4 hours per week. Seventy-four percent perceive their role in scholarship to be important or very important. (Figure 5) Forty-seven percent of the respon-

dents value original research as the most important for their own professional development. Fifty-five percent felt that their own scholarly activities were appropriately valued by their institution. (Figure 6) The main expectation for dissemination was peer-reviewed journals (87% of faculty). (Figure 7) When deciding where to publish scholarly material, peer-reviewed journals

Figure 5

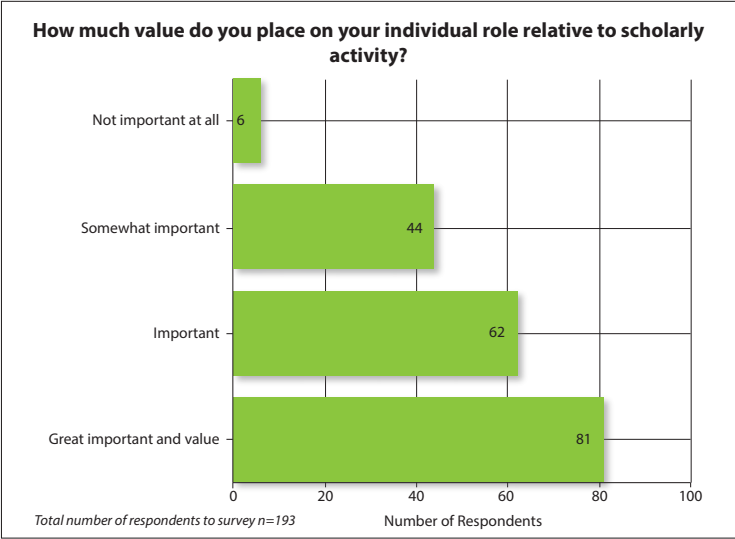


Figure 6

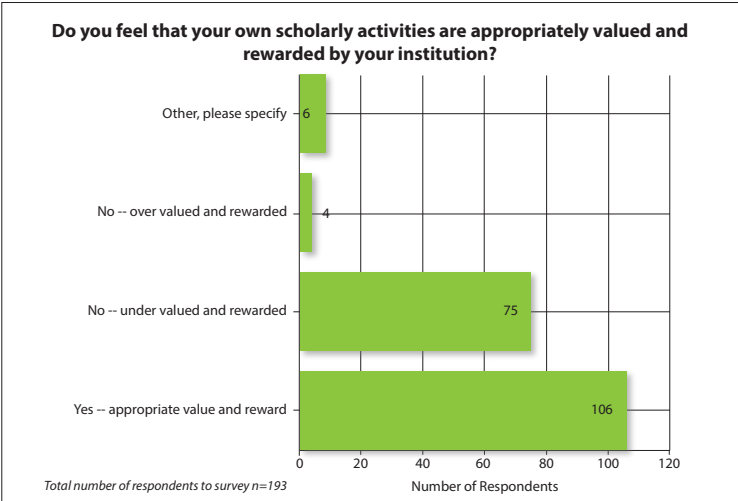
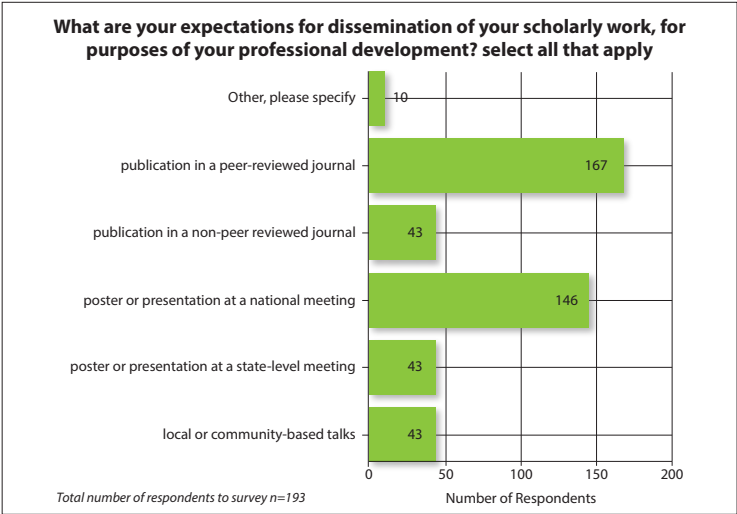
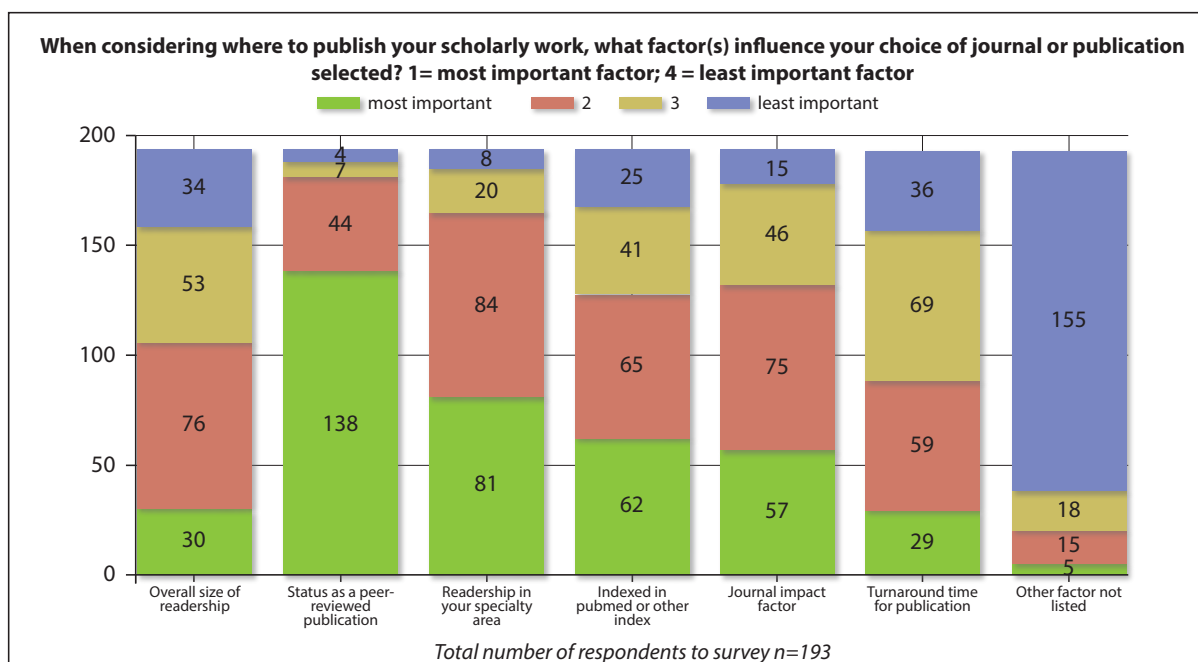


Figure 7



**Figure 8**



(72%) and journals with an appropriate readership (42%) were two of the most influential factors. (Figure 8)

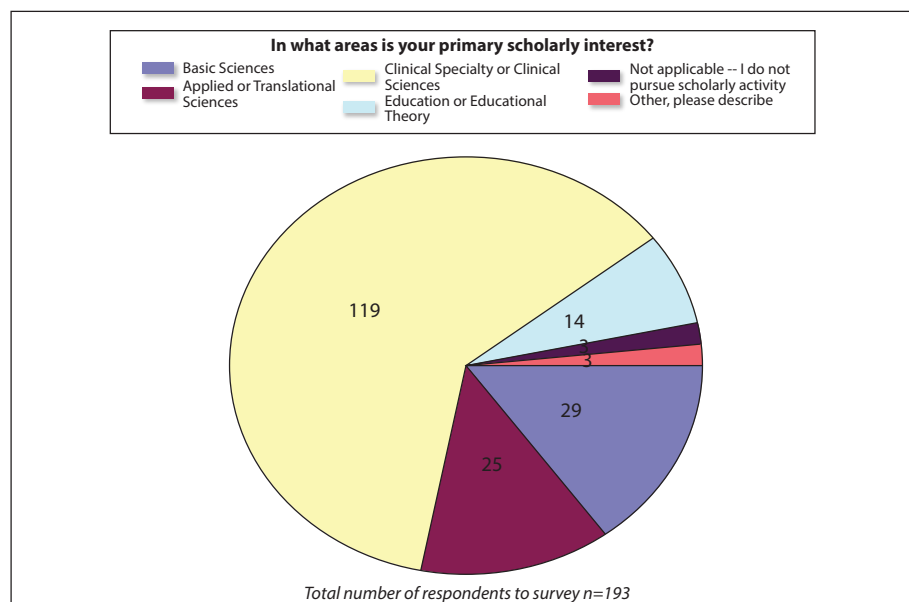
Clinical specialty or clinical science was reported as the primary scholarly interest by 62% of faculty respondents. Only 7% of faculty responded that their primary scholarly interest was in education or educational theory. (Figure 9) Of the 154 faculty members who engage in original research, most identified their main research area of interest as clinical science (61%), with applied or transitional science (28%), basic science (24%) and educational interest (13%) also reported.

Fifty-one percent of the respondents indicated they had not utilized their teaching responsibilities as an opportunity to conduct educational research. Among potential sources for educational research topics, the most commonly reported were clinical teaching (20%), a didactic course (17%) and student opinions of an educational experience (17%).

#### *Comparing Faculty Perception of Institutional and Personal Expectations*

Four question pairs were compared to evaluate similarities and differences between faculty members' perceptions regarding institutional values, expectations and rewards as compared with

**Figure 9**



their own perceived values, expectations and rewards in the context of professional development. The first question pair that was analyzed compared responses for “Rank the type of scholarship your institution values most from its faculty members” vs. “Rank the type of scholarship you value most for your own professional development.” Each

question provided the same options in the same order, consisting of: Discovery – original research; Integration – novel insights, interpreting themes in discoveries, identifying connections between discoveries (examples: literature synthesis, conceptual framework); Application – building bridges between theory and practice (examples: case reports);

and Teaching/Communicating One's Knowledge – facilitating students' learning, enhancing self-directed learning (examples: comparison of teaching methodologies, development of new pedagogy, writing of text books).

Statistical analysis revealed that the ratings in the category of "Teaching/Communicating One's Knowledge" were statistically significantly different (Pearson chi-square,  $p < 0.000$ ), indicating that faculty members tend to rate this type of scholarship more highly for their own professional development, with a perception of a lower value attributed to their institutions. For the other three response options, the results were inconclusive. Due to the small sample, chi-square tests showed that the statistical comparison is not valid due to a small value of expected cell size. The distribution of responses for the various response options did not differ greatly between the faculty members' perceptions about the types of scholarship valued by their institution and their own priorities for scholarship.

"Discovery" was perceived to be the most important type of scholarship valued by the institution by 66.8% (95% confidence interval 73.4% - 60.2%) of the respondents, compared with 46.6% (95% confidence interval 53.6% - 39.6%) of the respondents who selected "discovery" as the most important type of scholarship for their own professional development. "Integration" was perceived as more valuable to the individual (21.2% "most important"; 95% confidence interval 27.0% - 15.4%) compared with the value to the institution (14.0% "most important"; 95% confidence interval 18.9% - 9.1%). The response option for "application" had a slightly greater value on the level of the individual vs. the perceived value by the institution, with 30.6% (95% confidence interval 37.1% - 24.1%) responding "most important" for their own professional development vs. 13.5% (95% confidence interval 18.3% - 8.7%) responding "most important" for the type of scholarship valued by their institution.

The second question pair compared responses for "What is your institution's expectation for dissemination of your scholarly work, for purposes of merit,

promotion, and/or tenure" vs. "What are your expectations for dissemination of your scholarly work, for purposes of your professional development." Each question provided the same options in the same order, consisting of: local or community-based talks; poster or presentation at a state-level meeting; poster or presentation at a national meeting; publication in a non-peer-reviewed journal; and publication in a peer-reviewed journal.

Each of the five response options was analyzed as a dichotomous variable (either selected as "expected" or not selected as "expected") comparing responses for the perceived expectations of the institution vs. the individual faculty member. **Table 1** shows the responses for local or community-based

talks. As shown, the majority of respondents indicate that both they and their institution do not expect participation in this activity. Of the total responses, 69.9% are in agreement that this activity is not expected, 11.4% are in agreement that this activity is expected, and the remaining 18.7% are discordant in the expectations, showing a statistically significant difference between expectations (Pearson chi-square,  $p < 0.000$ ).

**Table 2** shows the responses for poster or presentation at a national meeting. As shown, the majority of respondents indicate that both they and their institution expect participation in this activity. Of the total responses, 68.4% are in agreement that this activity is expected, 13.5% are in agreement that this activity is not expected, and the remaining

**Table 1**  
**Expectations for Local or Community-Based Talks**

	Faculty member expects local or community-based talks	Faculty member does not expect local or community-based talks	Total
Institution <b>expects</b> local or community-based talks	22 (11.4%)	15 (7.8%)	37 (19.2%)
Institution <b>does not</b> expect local or community-based talks	21 (10.9%)	135 (69.9%)	156 (80.8%)
Total	43 (21.8%)	150 (77.7%)	193
Concordant Responses	Discordant Responses		

**Table 2**  
**Expectations for Poster or Presentation at a National Meeting**

	Faculty member expects poster or presentation at a national meeting	Faculty member does not expect poster or presentation at a national meeting	Total
Institution <b>expects</b> poster or presentation at a national meeting	132 (68.4%)	17 (8.8%)	149 (77.2%)
Institution <b>does not</b> expect poster or presentation at a national meeting	18 (9.3%)	26 (13.5%)	44 (22.8%)
Total	150 (77.7%)	43 (22.3%)	193
Concordant Responses	Discordant Responses		

18.1% are discordant in the expectations, showing a statistically significant difference between expectations (Pearson chi-square,  $p < 0.000$ ).

**Table 3** shows the responses for publication in a non-peer-reviewed journal. As shown, the majority of respondents indicate that neither they nor their institution expect participation in this activity. Of the total responses, 65.8% are in agreement that this activity is not expected, 16.1% are in agreement that this activity is expected, and the remaining 18.1% are discordant in the expectations, showing a statistically significant difference between expectations (Pearson chi-square,  $p < 0.000$ ).

**Table 4** shows the responses for publication in a peer-reviewed journal. More than two-thirds of respondents indicate that both they and their institution expect participation in this activity. Of the total responses, 68.4% are in agreement that this activity is expected, while only 10.4% are in agreement that this activity is not expected. Discordance in expectations was found for 21.2% of the responses, showing a statistically significant difference between expectations (Pearson chi-square,  $p < 0.000$ ).

The statistical analysis for poster or presentation at a state-level meeting showed that the results were inconclusive. Due to the small sample, the analysis is not valid due to small expected cell size. The majority of respondents were in concordance that neither the faculty member nor the institution expect this method for dissemination of scholarly work ( $n = 164$ , 85.0%, Pearson chi-square,  $p = 0.078$ , not significant).

The third question pair compared responses for “How much value do you feel your institution places on its faculty members’ roles relative to scholarly activity” vs. “How much value do you place on your individual role relative to scholarly activity.” Each question provided the same options in the same order, consisting of: great importance and value; important; somewhat important; or not at all important.

The correlation between responses was

**Table 3**  
**Expectations for Publication in a Non-Peer-Reviewed Journal**

	Faculty member expects publication in non-peer-reviewed journal	Faculty member does not expect publication in non-peer-reviewed journal	Total
Institution <b>expects</b> publication in non-peer-reviewed journal	20 (10.4%)	18 (9.3%)	38 (19.7%)
Institution <b>does not</b> expect publication in non-peer-reviewed journal	23 (11.9%)	132 (68.4%)	155 (80.3%)
Total	43 (22.3%)	150 (77.7%)	193 (100%)
Concordant Responses	Discordant Responses		

**Table 4**  
**Expectations for Publication in a Peer-Reviewed Journal**

	Faculty member expects publication in peer-reviewed journal	Faculty member does not expect publication in peer-reviewed journal	Total
Institution <b>expects</b> publication in peer-reviewed journal	164 (85.0%)	24 (12.4%)	188 (97.4%)
Institution <b>does not</b> expect publication in peer-reviewed journal	3 (1.6%)	2 (1.0%)	5 (2.6%)
Total	167 (86.5%)	26 (13.5%)	193 (100%)
Concordant Responses	Discordant Responses		

low (Pearson correlation 0.148) but statistically significant (significant at the 0.05 level; 2-tailed). The greatest proportion of respondents rated both the institutional value and personal value as “great importance and value” ( $n = 47$ , 24.4%). None of the respondents selected the option “not at all important” for both institutional and personal value of scholarly activity.

The fourth question pair compared responses for “Do you feel that scholarly activities are appropriately valued and rewarded by your institution” vs. “Do you feel that your own scholarly activities are

appropriately valued and rewarded by your institution.” Each question provided the same options in the same order, consisting of: yes – appropriate value and reward; no – undervalued and rewarded; or no – overvalued and rewarded.

The distribution of responses did not allow for a statistically valid comparison due to small expected cell size. Interestingly, no respondents selected both “no – overvalued and rewarded” for both their personal and institutional perceptions. The distribution of response options and the 95% confidence intervals are

shown in Table 5.

Table 6 shows the distribution of concordant and discordant responses. Eleven respondents did not complete this question pair. Of the remaining 182, 84% show concordance. The greatest area of discord indicated that respondents believe that their own activities are undervalued and rewarded, but overall, the institution overvalues and over-rewards scholarly activity.

Barriers and Resources

The most frequently perceived barriers to faculty scholarship were identified as clinical schedule (41%) and classroom/laboratory teaching schedule (23%). (Figure 10) Faculty members indicated that resources such as time allocated for scholarship (73%), financial support (37%) and mentorship (37%) would improve their ability to engage in productive scholarly activity. The types of journal resources that faculty members find the most important for their faculty roles and responsibilities are journals emphasizing patient care (47%) and basic science research (30%). The most important resource to assist faculty members in staying current about educational topics, theories and research was identified as professional meetings (47%).

Discussion

The ambiance of a culture of scholarship lends itself to many different interpretations. Kennedy, et al., describe it as “an environment of creativity and productivity that extends from an active investigation designed to create, advance or transform new knowledge.”<sup>5</sup> Assessment of scholarship usually involves peer review and dissemination. Sustaining a scholarly culture requires clear expectations of that culture, perceived value, appropriate evaluation, a reward system and a supportive infrastructure.<sup>5</sup>

Perceived Values Between Individual and Institution

Scholarly activity and publications are necessary to ensure that the practice of optometry and optometric education are based on peer-reviewed, shared evi-

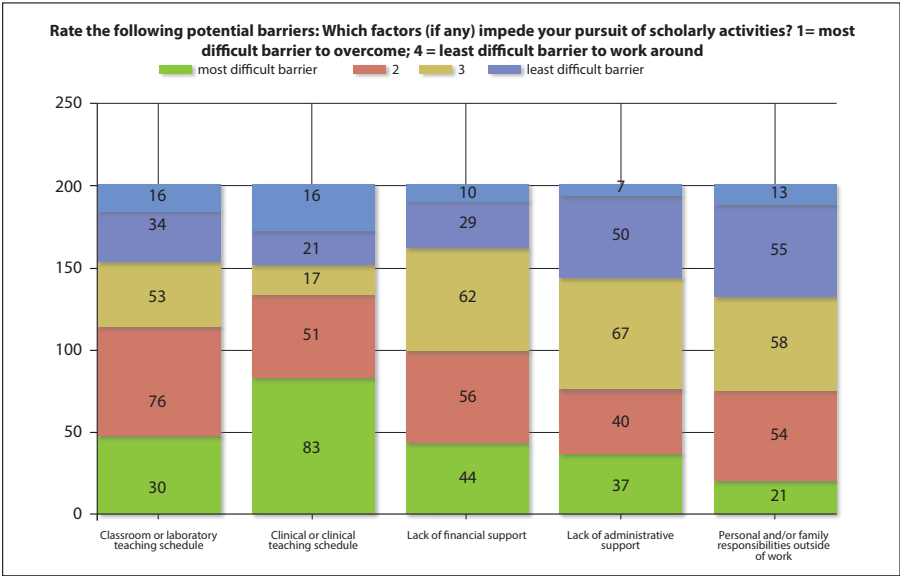
Table 5  
Value and Reward for Scholarly Activities  
(distribution of response options and 95% confidence intervals)

Response Choices	Perception for Institution	Perception for Your Own Activities
Yes – appropriate value and reward	104 53.9% (60.9% - 46.9%)	106 54.9% (61.9% - 47.9%)
No – undervalued and rewarded	51 26.4% (32.4% - 20.4%)	75 38.9% (45.9% - 31.9%)
No – overvalued and rewarded	27 14.0% (19.0% - 9.0%)	4 2.1% (4.1% - 0.1%)

Table 6  
Value and Reward for Scholarly Activities:  
Distribution of Concordant and Discordant Responses

		Perception for Your Own Activities		
		Yes – appropriate value and reward	No – under valued and rewarded	No – over valued and rewarded
Perception for Institution	Yes – appropriate value and reward	104 (57.1%)	0	0
	No – under valued and rewarded	0	49 (26.9%)	2 (1.1%)
	No – over valued and rewarded	1 (0.5%)	26 (14.3%)	0
Concordant Responses		Discordant Responses		

Figure 10



dence. In some instances, scholarly activity and publications are necessary for job retention and academic career advancement. Most faculty members do not receive formal training in the skills needed for scholarly activities. Additionally, the diversity of faculty responsibilities necessitates time commitments in other areas. These conditions, along with the significant time and cognitive commitment involved with scholarship, can lead to challenges in pursuing and successfully accomplishing scholarly activity. To ensure sufficient motivation for scholarly activity, faculty must perceive either an intrinsic or extrinsic value or reward to scholarship. Intrinsic value may be related to a desire for promotion or tenure opportunities, monetary gains, expanding a reputation and expertise or a sense of responsibility to contribute to the profession. Extrinsic value may reflect institutional expectations or mandated requirements. Ideally, to maximize efforts and support a culture of scholarship, institutional and individual expectations of scholarship should be communicated and perceived to be similar. Faculty perception of expectations and value of scholarly activities at an institutional level are important because of the potential to impact motivational levels.

How scholarship is rewarded will have an impact on the level and motivation of scholarly activity. Promotion and tenure requirements and monetary rewards are two of the most tangible rewards of accomplishments in scholarship. In the survey, the majority of faculty members reported that scholarship is a requirement for promotion and tenure at their institution. However, this study did not ask if promotion/tenure is mandated or if scholarship without promotion/tenure is monetarily rewarded. Utilizing the assumption that most faculty members are required or motivated to seek promotion, the potential impact of scholarly accomplishment on motivation may be significant.

To avoid inconsistencies between faculty expectations, institutional expectations and compensation for scholarly activity, the requirements must be communicated in a concrete, specific and clear manner. At most institutions, faculty reported that this goal was accomplished by a faculty handbook, which

represents a concrete method of communicating scholarly expectations to faculty. The contents of a faculty handbook should be as specific as possible so that both faculty and administration are in sync with expectations. Discrepancies between faculty and administration expectations have the potential to negatively impact productivity and morale.

Most faculty respondents in this study perceive an institutional culture that places a high value on its faculty members' roles relative to scholarly activity. Most respondents also placed a high value on their role in scholarship. Most faculty members indicated that scholarship in general, and their individual scholarship, was appropriately valued and rewarded.

It is interesting to note that none of the responses indicated that scholarly activity was "not at all important" for both themselves and for the institution, and only six respondents (3.1% of the total) reported that scholarly activity was not at all important for their own personal and professional goals. A total of four respondents (2.1% of the total) perceived that scholarly activity is not important at all to their institution. These small numbers support the assertion that faculty members in the schools and colleges of optometry embrace the value of scholarship as an important component of their career path.

However, some faculty members did feel that their institution undervalued scholarship, and an even greater number felt that their individual scholarship was undervalued. A culture perceived as undervaluing scholarship may lead to frustration, impact faculty motivation and not be a supportive environment.

Faculty members perceived original research to be the most valued both on an institutional and individual basis. Faculty members tended to rate the scholarly activity of teaching, communicating one's knowledge, facilitating students' learning, and enhancing self-directed learning more highly for their professional development, while indicating that this type of activity was less valued by their institutions. Perhaps this difference can be partially explained by the difficulty in distinguishing normal teaching responsibilities

from the development of a robust scholarly portfolio of teaching and learning engagement.

While the sampling did not permit the ability to draw a statistically valid conclusion, apparent differences in the data also indicate that the value of the scholarship of "application" may differ between faculty members and their perceptions about their institutions. This difference may highlight perceptions about normal faculty duties, roles and responsibilities vs. taking the next step to turn an application between theory and practice into a form of scholarly engagement.

Many authors emphasize that the true value of scholarly activity comes from the dissemination, citation and impact of the work done.<sup>1,6</sup> The expectation for the dissemination of scholarship was similar between institutions and faculty. Peer-reviewed publications represented the hallmark. Creation of knowledge may be a first, and crucial, step. However, the value of creating knowledge is significantly limited if that knowledge is not disseminated to a broader audience and ultimately has an impact in changing some element of clinical practice, scientific applications or educational applications. This agreement is important because of the potential impact on rewards for faculty and faculty motivation.

### *Faculty Scholarly Interests/Habits*

Faculty scholarship and productivity are often measured in publication outcomes. When considering where to publish, faculty respondents value the peer-review process and target readership in their area of focus. Indexing, impact factor, turnaround time and overall size of readership were less important factors. When striving to gain recognition and a reputation, it is important that faculty members have direct access and influence with their peer group or those that could benefit from their area of focus.

The majority of faculty members identified a clinical specialty as their primary interest for scholarly activity and original research. Faculty members also identified journals emphasizing patient care as the most important to read on a regular basis. This is not surprising because of the clinical nature of

the profession. However, only a small percentage of respondents are involved in education-related scholarship or research as a primary interest. This is surprising because most faculty members have in common teaching responsibilities and frequently set a goal to aspire to be effective teachers. Faculty members indicated that professional meetings, rather than education conferences or education journals, are resources that are most helpful for staying current about education topics. Therefore, it becomes important that professional optometric organizations, such as the American Academy of Optometry and the American Optometric Association include education-related faculty development at their annual meetings. The majority of respondents felt it was their role to contribute to the optometric education literature whether or not it was explicitly stated in their contract. This perception of faculty role is in contrast to the actual reported interest in education research or scholarship. Two explanations for this dichotomy are possible: 1) faculty members may acknowledge it is their role to contribute but in reality barriers prohibit the accomplishments; or 2) survey respondents misinterpreted the question to mean optometric literature in general. However, educators should ask themselves how does this lack of interest in education-related scholarship impact the profession of optometric education?

### *Barriers/Resources*

The most frequently perceived barriers to faculty scholarship were identified as clinical schedule and classroom/laboratory teaching schedule. These factors limit the time available to participate in scholarly activities. Lack of dedicated time is a well-documented and common barrier to scholarship in clinical professions such as medicine, nursing, pharmacy and dentistry.<sup>6,7,8,9</sup> The obvious solution to this barrier is to re-evaluate and reassign faculty time allotment on a regular basis to allow for adequate time to engage in scholarship. However, working within the framework of teaching as a mission of optometric education, the need for revenue from clinical practice and budgetary constraints, the reassignment of time or hiring of additional faculty may not be realistic. Some institutions, especially

those that place a high value on scholarship, may provide some dedicated time for scholarship. This dedicated time may or may not be sufficient for faculty needs. This study did not explore institutional allotted time for scholarship. A majority of faculty respondents devote at least 4 hours or more per week to scholarship, but we do not know how much time is allotted by the institution. Faculty may delay or assign a lower priority to scholarly activity to attend to other imminent responsibilities such as teaching or patient care. Faculty may need to realize that at different points in their career time spent on scholarly activity within or outside of scheduled working hours is a necessity and an investment in their future and the future of the profession.

The implementation of good time management skills is also essential. This may be particularly challenging for a faculty member who has transitioned from a clinical to academic environment. Traditionally, in a clinical environment, time management is determined by patient schedule. In the academic environment, faculty members are responsible for managing both long-term and short-term projects. Development of effective time management skills is ultimately the responsibility of the faculty member but can be expedited and enhanced by institutional support in the form of time management workshops, support help for non-essential faculty functions, such as photocopying and resources, and support for scholarly activity, such as access to statisticians and support help for accessing information via literature searches.

Faculty respondents indicated that financial support would be a helpful resource for scholarship. Faculty members must acknowledge responsibility for developing a successful track record of scholarly activity before being rewarded with additional dedicated scholarship time and increased opportunities for funding. The development of a track record can be facilitated by utilizing smaller local funding sources, the conversion of presentations/posters into publications, and dealing with the necessary manuscript revisions and rejection within the peer-review system.

Institutional support and infrastructure can be instrumental in providing re-

sources for scholarship. Survey respondents indicated that resources such as mentorship would improve their ability to engage in productive scholarly activity. Collaborative scholarly efforts can involve peer-to-peer collaborations or mentorship between junior and senior scholars. Studies have demonstrated that faculty members are more likely to publish if they are involved in a collaborative effort.<sup>10</sup> Mentors can facilitate scholarly accomplishments by offering networking opportunities, providing advice, offering research opportunities, offering practical suggestions for career development, and providing insight into the academic environment.

In addition to supporting and initiating collaborative activities, institutions can provide support with in-house faculty workshops on topics such as writing, research design and statistical analysis. They could also provide funding to attend workshops that develop these scholarly skills. Institutional support can also involve freeing up faculty time for scholarship by instituting innovative teaching techniques that decrease face-to-face classroom time and by appropriately rewarding scholarly activities.

The profession of optometry must also take responsibility for providing resources for scholarly activity. Although this was not specifically addressed in the survey, some possible contributions by the profession are centralized resources, grant opportunities, national collaborative efforts and instituting a professional culture that values scholarship.

### **Limitations**

The limitations of the study involved the response rate, distribution of respondents and nature of questions. The study was distributed to 20 optometric institutions. Of the 20 optometric institutions, 20% are stand-alone optometry-only colleges, 45% are within a state-supported university, and 35% are optometry schools within a private college/university. The respondent profile breaks down as follows: 90 (47%) from stand-alone optometry-only colleges; 79 (41%) from state-supported universities; 24 (12%) from private universities. The extent to which the study results can be generalized may be impacted by the lack of congruence be-

tween the types of institutions and the distribution of respondents.

The sample size represented a 30% response rate. The literature does not show agreement on an acceptable survey response rate.<sup>11</sup> Non-response error, which indicates non-respondents having a different opinion than the responders and/or response bias, which reflects the respondents being different and therefore not accurately reflecting the target audience, are always more of a risk the lower the response rate.<sup>11</sup> The non-response bias may also indicate a differential response rate based on the level of engagement in scholarly activity. It may be likely that faculty members who are less involved in scholarship would tend not to respond to a scholarship survey, whereas faculty members who are more involved in scholarship would be more likely to respond.

In hindsight, additional questions concerning criteria for promotion and tenure may have been beneficial. The question asking faculty if "it is part of their role as a faculty member to contribute to the optometric educational literature whether or not it is explicitly stated in their contract" may have been interpreted as contribution to the general optometric literature. More specificity in the question would have aided in the clarity. The authors also acknowledge that some institutions may not utilize faculty contracts at all, which in turn could bias the responses. One question was asked about time spent doing scholarly activities. An additional question(s) on time spent on other responsibilities such as teaching, service and clinical responsibilities would have yielded a clearer representation of potential barriers to scholarship.

Questions regarding academic rank or track (clinical, tenure or non-tenure) may also have been useful in providing more specific information on scholarship habits. Scholarship habits may change depending on academic rank, track or based on the number of years in an academic career.

## Conclusion

A perception of shared values between the individual faculty member and his or her home institution is an important foundation for a long and productive

academic career. In general, responses support an overall good fit between faculty members' personal and professional expectations and how they perceive the expectations of their colleges and universities. It is gratifying to note that more than half of the respondents believed that scholarly activity is appropriately valued and rewarded by themselves and by their home institution. This consistency bodes well for the profession of optometric education and for continued growth in scholarly activity by the nationwide faculty body. To support this sustained level of agreement, it will be important to recognize the existence of perceived barriers identified by this survey. Vigilance in identifying and eliminating potential barriers to scholarship will be critically important as more experienced optometric educators are nearing plans for retirement and the next generation of educators will be transitioning into key leadership roles.

## References

1. Smesny A, Williams J., et al. Barriers to scholarship in dentistry, medicine, nursing and pharmacy practice faculty. *Am J Pharm Educ.* 2007 Oct 15;71(5):91.
2. Boyer EL. Scholarship reconsidered: priorities of the professoriate. Princeton, NJ: Carnegie Foundation for the Advancement of Teaching; 1990.
3. Mish F. (Editor), Webster's Ninth New Collegiate Dictionary, Merriam-Webster Springfield, Massachusetts 1984, page 444.
4. Accreditation Manual: Professional Optometric Degree Programs. American Optometric Association, St. Louis, MO. Cited 2012 April 20. Available from: <http://www.aoa.org/x12707.xml>.
5. Kennedy RH, Gubbins PO, Luer M, et al. Developing and sustaining a culture of scholarship. *Am J Phar Educ.* 2003;67(3):Article 92.
6. Beattie DS. Expanding the view of scholarship: introduction. *Academic Med.* 2000;75:871-6.
7. Raehl CL. Changes in pharmacy practice faculty 1995-2001: implications for junior faculty development. *Pharmacotherapy.* 2002;22:445-462.
8. Howell TH, Karimbux NY. Academy: strengthening the educational

mission in academic health centers. *J Dent Educ.* 2004;68:845-50.

9. Denham SA. Managing scholarship in the faculty role. *J Cont Educ Nurs.* 2000;31:76-82.
10. Jacelon CS, Zucker DM, Staccarini J, Henneman E. Peer mentoring for tenure-track faculty. *Journal of Professional Nursing.* 2003;19(6):335-338.
11. Draugalis JR, Coons SJ, Plaza CM. Best practices for survey research reports: a synopsis for authors and reviewers. *Am J Pharm Educ.* 2008;72:Article 11.

# The Effect of Participating in Continuing Optometric Education: A Pilot Study

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Martina Crehan, MA

## Abstract

**Purpose:** To determine whether participation in two different post-graduate optometry workshops resulted in a change in practice for the participants.

**Methods:** Thirty-eight optometrists, who had attended a continuing professional development (CPD) workshop on punctal plugs and lacrimal syringing, were surveyed by e-mail and telephone between 4 and 13 months after the workshop to ascertain whether they had made a change in their subsequent practice. A second group of 32 optometrists, who had attended a continuing education and training (CET) workshop on binocular vision, were surveyed by e-mail, telephone and postal mail between 6 and 9 months after the workshop to ascertain whether their practice had changed.

**Results:** After the CPD workshop, 29% (11 of 38) of practitioners had inserted punctal plugs, and 11% (4 of 38) had syringed. After the CET workshop, 37.5% (12 of 32) had made a significant change to their practice.

**Conclusions:** In common with other healthcare professionals, attendance at post-graduate education events does not appear to effect a change in practice for most optometrists. The effectiveness of a workshop cannot, however, be judged entirely on whether or not those attending it subsequently make changes to their practice.

**Key Words:** optometry continuing professional development education workshop

## Introduction

In Ireland, the professional association for qualified optometrists, the Association of Optometrists Ireland (AOI), has required members to gain 30 continuing professional development (CPD) points across a 2-year period since 2009.<sup>1</sup> Similar requirements are common in almost all the healthcare professions in Europe and North America. While much research has been done on the effectiveness of, for example, continuing medical education (CME),<sup>2-4</sup> there appears to be significantly less research relating to continuing education training (CET) or CPD with respect to optometrists, presumably because this is a much more recent phenomenon.

Continuing education refers to education after qualification and registration and is designed to keep practitioners up to date in skills and practices. CPD is different. The Chartered Institute of Personnel and Development (CIPD) put forward one of the first definitions of CPD in 1997: "CPD is systematic, ongoing self-directed learning. It is an approach or process which should be a normal part of how you plan and manage your whole working life."<sup>5</sup> Therefore, CET can be thought of as maintenance of existing skills, whereas the emphasis of CPD is on developing new skills. A previous study on the effect of training on optometrists concluded that optometrists are likely to attend CET based on previous experience and interest, whereas the researchers felt optometrists should be encouraged to participate in CPD to gain confidence in new areas.<sup>6</sup> Although the AOI call their scheme a CPD scheme, it is in fact a mixture of CET and CPD. In analyzing post-graduate education in the medical and paramedical fields, most studies look for a change/improvement in practice and/or change/improvement in patient outcomes to determine the effectiveness of the education.<sup>2,4,7</sup> The purpose of this study was to examine two different workshops, one that would fall under the umbrella of CPD and one that could be classified as CET, to determine whether or not they changed the way the participants subsequently practiced.

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Methods

The workshops

Both workshops lasted 1 hour and were run several times over a 1-year period in the National Optometry Centre in the Dublin Institute of Technology. Several of the workshops were run as part of CPD days, which consisted of four workshops in total. One workshop was stand-alone, and three workshops were free of charge to practitioners who had agreed to take undergraduate optometry students on work placement. Apart from the latter three workshops, the other workshops were open to any qualified optometrist (whether a member of the AOI or not) for a payment of €50. Delegates were awarded two CPD points per workshop attended. All participants in the study signed a consent form, and the study complied with the Declaration of Helsinki and was approved by the Dublin Institute of Technology’s research ethics committee.

The CPD workshop was on punctal plugs and lacrimal syringing. In this workshop, participants were taught how to insert punctal plugs into a patient’s eyelid and how to syringe saline through a patient’s tear drainage system. The “patients” used were fellow workshop participants. This workshop can be defined as CPD rather than CET, as these are skills not previously taught to optometry undergraduates. They are not examined in the optometry professional examinations and they are not listed as core competencies for optometrists in Ireland. It is likely that there were less than five qualified optometrists in Ireland carrying out these procedures at the time the workshop ran. In total, 38 delegates attended the workshop.

The CET workshop was on binocular vision. In the course of the workshop, participants were told about and given the opportunity to practice five different techniques for assessing the eyes’ convergence and measuring heterophoria. Again, the “patients” used were fellow workshop participants. This workshop was defined as CET because all the techniques being taught are covered on a standard optometry undergraduate syllabus. A total of 35 practitioners completed the pre-workshop survey for

this workshop but only 32 completed the post-workshop survey.

The surveys

Those who attended the CPD workshop were surveyed by telephone and e-mail between 4 and 13 months post-workshop. Those who attended the CET workshop were surveyed on the day of the workshop and again by e-mail, telephone or postal mail 6 to 9 months after the workshop.

The questions the CPD delegates were asked were as follows:

- 1. Before attending the punctal plugs and lacrimal syringing workshop in DIT had you ever been taught how to insert plugs or carry out lacrimal syringing?
- 2a. Since attending that workshop have you inserted punctal plugs?
- 2b. Since attending that workshop have you carried out lacrimal syringing?

- 3. If you have not carried out either of these procedures, what has prevented you from doing so and/or why did you chose not to attempt either of these procedures?
- 4. What do you find most useful about CET and CPD workshops in general?

The CET delegates were asked to complete the same five-level Likert item<sup>8</sup> pre- and post-workshop. (Table 1)

Results

CPD

All 38 practitioners who attended the CPD workshop completed the survey. Seven respondents (18%) had previous training in the two procedures. Only one of these seven carried out the procedures on patients post-workshop, although two of them attempted the techniques on friends and colleagues. Twenty-nine percent (11 of 38) of the total number of participants have

Table 1  
Five-Level Likert Item Practitioners Attending the CET Workshop  
Were Asked to Complete

	Always	Fairly often	Sometimes	Infrequently	Never
I measure near point of convergence on patients					
I measure near point of convergence with red filter on patients					
I measure jump convergence					
I ask patients to fill out the convergence insufficiency survey					
I measure fusional reserves					
I measure heterophoria using Von Graefe’s technique					

inserted punctal plugs since the workshop. Eleven percent (4 of 38) have carried out lacrimal syringing. **Figure 1** illustrates the number of practitioners who inserted punctal plugs or syringed after attending the CPD workshop. Discounting those who were not in a position to attempt either procedure, these figures change to 34% (11 of 32) and 13% (4 of 32) for plugs and syringing respectively. Of the practitioners who did not attempt one or both of the procedures, 35% (12 of 34) said that they felt they had not had enough practice. **Table 2** shows all the reasons given. **Table 3** indicates what practitioners reported finding most useful about CET and CPD workshops.

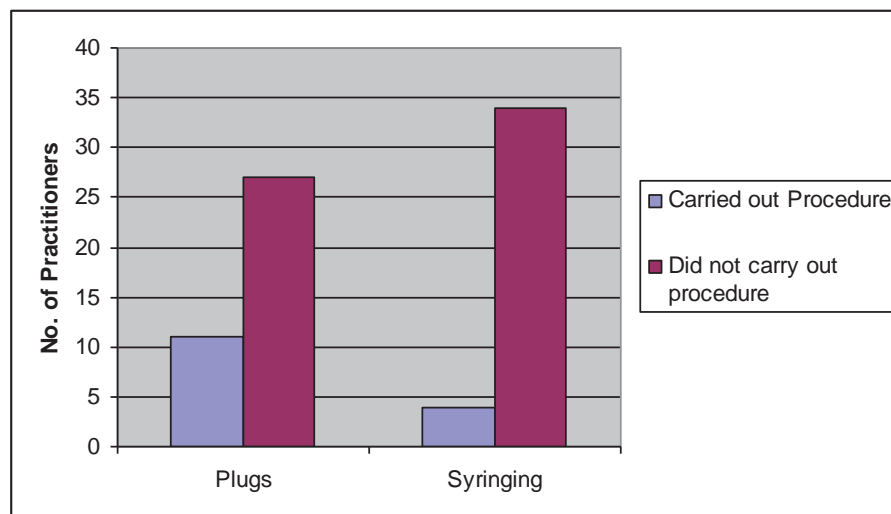
### CET

Thirty-five practitioners who attended the binocular vision workshop completed questionnaires at the time of the workshop. Thirty-two of those completed the same questionnaires 6 to 9 months after the workshop. A change (forward or backward) of one category on the Likert item may be spurious. Therefore, in this study a change in a minimum of two categories is considered significant. Using this criterion, 12 of 32 (37.5%) practitioners showed a significant change in practice after the workshop.

### Discussion

There was some difficulty deciding exactly how long after the workshops the practitioners should be surveyed. If they are surveyed too soon, they may not have the opportunity to change their practice (particularly if this change in practice requires the purchase of new equipment). Also it is likely that many practitioners would show an initial change in practice that was subsequently short-lived. Conversely, if the surveys are carried out too late after the workshops, then it would be difficult to claim that the workshops alone had influenced the change in practice, as the practitioners may have attended other education events in the meantime. Initially the intention was to survey all the practitioners between 4 and 6 months post-workshop. However, when the CPD group was surveyed first, it became obvious this was too soon. Eventually the entire CPD group (bar one who was on sick leave for an extended

**Figure 1**  
**Number of Practitioners Who Inserted Punctal Plugs or Syringed After Attending the CPD Workshop (n = 38)**



**Table 2**  
**Practitioners' Reasons for Not Attempting Punctal Plugs or Lacrimal Syringing After the Workshop (n = 38)**  
(Practitioners could give more than one reason)

Reason	No. of Practitioners	%
Need more practice/insufficient understanding of when the procedure is required	12	35%
Procedures are unnecessary/not in demand/not economically viable	8	21%
Nervous that it is a legal grey area and possible opposition from local ophthalmologists†	5	13%
Not in a position to carry out the procedures	6	18%
Peers are not doing it and so would be concerned that he could not access peer support/outside of the optometrist's normal remit	3	9%
Never got around to purchasing the equipment	2	6%
Other	2	6%

† Optometrists in Ireland are not supposed to treat medical conditions

**Table 3**  
**What Practitioners Find Most Useful About CET and CPD Workshops (n = 38)**  
(Practitioners could make more than one comment)

Comment	No. of Practitioners	%
Hands on/practical	20	54%
Useful for learning a new skill	13	35%
Useful for refreshing existing skills	7	19%
Peer contact	6	16%
Small numbers/participation/opportunity to ask questions	3	8%
Challenging	2	5%
Keeping up to date	2	5%
Availability of equipment	2	5%
Other	2	5%

period) was surveyed by 9 months. The intention for future studies is for all practitioners to be surveyed between 6 and 9 months post-workshop.

The CPD workshop taught practitioners new skills, while the CET workshop was designed to reinforce existing skills. For this reason, the change in practice had to be measured using different metrics, which makes direct comparison of the two workshops more problematic. The two groups also differed significantly in that practitioners who wished to start inserting plugs and syringing had to make some financial outlay for equipment, whereas those who wished to change their binocular vision practice did not have to make the same commitment. Future studies should try to examine groups where little or no financial outlay is required in order to keep the groups as similar as possible.

There is limited scope for generalization about the effectiveness of optometric CPD and CET workshops from this study alone, as the sample size was small and the workshops were focused on very specific skills. There was no control group; therefore, it cannot be definitively stated that practitioners would not have changed the way in which they practice without having attended a workshop. As the practitioners in the study either had to pay for the workshop or were entitled to it (if they were taking an undergraduate student), they may have been a particularly highly motivated group. As such, it is unknown how representative they are of optometrists in Ireland in general. However, it can be said for both workshops that less than half of attendees changed the way in which they practice as a direct result of attendance at the workshop. These results are similar to findings from other systematic reviews, which looked at changes in practice after medical staff attended post-graduate workshops.<sup>9</sup> In a Cochrane review of continuing education meetings for a variety of healthcare professionals, Forsetlund<sup>4</sup> et. al. also found only a small change.

Although this study is essentially taking a change in practice as evidence that a workshop has been effective, this may not be entirely accurate. Some practitioners could not have carried out the

insertion of punctal plugs or lacrimal syringing even if they had wanted to because either they were a locum or were working for someone else. In both these instances, they would not be in a position to buy the equipment required. Even if they were, the practice owners may not want these procedures carried out in their practice. Some practitioners in this position said they came to the CPD day specifically to find out about plugs and syringing. Arguably, they still believed the workshop had educational merit, presumably because they now know what the procedures involve and when they are required and they can advise and refer patients accordingly.

Those who attended the CET workshop and made no change to their practice may have felt that the workshop confirmed that they were already carrying out the tests on an appropriate number of patients. It could easily be argued that it is not necessary to perform every binocular vision test on every patient and practitioners working in a busy practice simply would not have time to do a detailed binocular vision assessment on every patient, particularly in the absence of specific symptoms. However, these are only assumptions and future studies should survey practitioners as to exactly why their practice did not change.

In studies examined by Grant<sup>7</sup> et. al. it was found that doctors will frequently make an informed decision not to make any change to their practice following CME and that this is a perfectly acceptable outcome. Therefore, the absence of a change in practice does not necessarily imply that a workshop has been ineffective.

The value of peer contact or support in educational interventions should not be underestimated. A large study<sup>10</sup> in the U.K. on the effectiveness of education to reduce antibiotic dispensing found that in practices where more than two-thirds of practitioners participated in the study the reduction in antibiotic dispensing was greater. Most medical practice involves regular contact with colleagues and training of juniors. This rarely happens in optometric practice, where (apart from in the larger multiples) most practitioners usually work either alone or with one or two fellow

professionals. An example of the value of peer support is the fact that the four practitioners who carried out syringing post-workshop work together (two pairs) and one of the pairs only schedules patients for this procedure when they are both present. This means they are in a position to assist one another should the need arise.

## Conclusions

This is the first study that the authors are aware of that has measured the effectiveness of optometric post-graduate education by looking for a subsequent change in practice. In common with other studies and reviews,<sup>4,9</sup> the study has found that a single intervention is not sufficient to result in a change in practice for the majority of optometrists. Therefore, the authors recommend that, wherever possible, workshops should offer attendees the opportunity to carry out techniques on real patients or each other, as this should increase practitioner confidence. Workshops that are really just presentations with props (i.e., the participants are not offered the possibility of attempting any procedure) are unlikely to give practitioners the confidence to attempt a new skill once back in practice. Some form of follow-up support should be made available after the workshop. This could be a second workshop or a peer-review meeting with practitioners who are now carrying out the procedures. It could also be as simple as providing contact details for the workshop facilitator, which would allow attendees to ask questions subsequent to the workshop.

If a change in practice is really desirable, then practitioners need to be convinced primarily that the change would be beneficial to them and secondly that it would be beneficial to their patients. Therefore, educators need to expound the benefits of change. Further research examining other methods of optometric post-graduate education for effectiveness would also be desirable.

## References

1. Continuing Professional Development. Scheme Regulations. [Internet]. Association of Optometrists, Ireland. c2012 (cited 2012 May 1). Available from [www.optometrists.org](http://www.optometrists.org).

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2. Davis DA, Thomson MA, Oxman AD, Haynes RB. Changing physician performance. A systematic review of the effect of continuing medical education strategies. *JAMA*. 1995;274:700-5.
3. Mazmanian PE, Davis DA. Continuing medical education and the physician as a learner: guide to the evidence. *JAMA*. 2002;288:1057-60.
4. Forsetlund L, Bjorndal A, Rashidian A, et al. Continuing education meetings and workshops: effects on professional practice and healthcare outcomes. *Cochrane Database Syst Rev*. 2009 Apr 15;(2):CD003030. Review.
5. Lester. Continuing Professional Development – the IPD policy. London: Chartered Institute of Personnel and Development. 1997.
6. Adler P, Clegg M, Duignan A, Ilett G, Woodhouse M. Effect of training on attitudes and expertise of optometrists towards people with intellectual disabilities. *Ophthalmol Physiol Opt*. 2005;25:105-116.
7. Grant J, Stanton F. Postgraduate Medical Journal. 2001;77(910):551-552.
8. Likert R. A technique for the measurement of attitudes. *Archives of Psychology*. 1932;22(140):55.
9. Agha S, Fareed A, Keating J. Clinical training alone is not sufficient for reducing barriers to IUD provision among private providers in Pakistan. *Reprod Health*. 2011 Dec 30;8:40.
10. Butler CC, Simpson SA, Dunstan F, et al. Effectiveness of multifaceted educational programme to reduce antibiotic dispensing in primary care: practice based randomised controlled trial. *BMJ*. 2012;344: d8173.